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The "Engineering and Mining Journal" again extends the compliments of the season to its thousands of readers all over the world. It once more congratulates them on the completion of a successful year that has seen the mineral industry of the United States and the allied industrial arts make a further advance toward undisputed supremacy among the nations of the earth. Furthermore, the "Journal" points with pride, not only to the record of the past year, but to that unrivaled record for the past century which has made our country a synonym for industrial boldness, perseverance and ceaseless activity. What the new century may bring is hidden by the hand of Fate, but it is certain that our descendants a hundred years from now will have reason to be grateful for what we have already done. With thankfulness for the past and confidence in the future, "The Engineering and Mining Journal" again wishes its readers a Happy New Year.

We have received a number of letters from parties connected with Stratton's Independence Mine, all of them being interesting and tending to throw light on the recent history and present conditions of the mine. The pressure of statistical matter and annual reviews upon our columns in the present number compels us to postpone their publication until next week, when we hope to present them with such comments as they seem to call for. We think that our readers will then be able to form a very clear opinion with regard to this case, which has excited so much attention throughout the investing world.

A year ago we called attention to the fact that the United States had for the first time passed Great Britain in the quantity of coal produced and had become the leading nation in the world in the output of mineral fuel. The year 1900 has shown another advance and has emphasized the lead thus obtained. From all parts of the country we have reports of increases in production, giving us a total which far surpasses anything ever recorded for our own or any other country. Moreover, for the first time in its history the United States last year began to export coal to nations other than its immediate neighbors, Canada and Mexico. How far this movement will extend is yet uncertain; in 1900 it was favored by a scarcity in the European market which will not continue. We have, however, little doubt that with our abundant supplies and advanced methods of mining our coal producers will become serious competitors of Great Britain, which has heretofore been the chief exporting nation.

The review which we present on another page of the production of gold and silver in 1900 shows that the decrease in the output of gold was very much less than might have been expected, when we consider the absolute withdrawal for the time of a producer which might well have been expected to add from \$90,000,000 to \$100,000,000 to the world's stock in 1900. Omitting South Africa in both years, the world's production of gold showed a substantial gain, the larger part of which was contributed by the United States. Our own country, which has been growing in this direction for several years, again showed a large increase and was last year the leading gold producer of the world. We may expect this gain to continue, since it has been the result less of any new discoveries than of intensified working and the adoption of improvements which have made it possible to reopen old mines and to work low-grade ores at a profit.

The crash in the London market at the close of the year was not unexpected. The failure of the London & Globe Corporation was the natural result of the class of operations which were entered into under the guidance of Mr. Whitaker Wright and his associates. The condition of the market, moreover, was not a good one and made it ready to respond to any unfavorable contingencies. The long-continued stagnation in South Africans and the doubtful condition of affairs in Western Australia had seriously affected the market and only the collapse of the London & Globe card-house was needed to set a small panic in operation. Our London friends have our sympathy in their troubles, but we are compelled to say that they were largely brought about by their own loose methods. We trust that the panic will be checked before more serious consequences have ensued, but we fear that a serious setback to mining speculation is inevitable, and that it will take some months at least to recover.

The year 1900 shows an increased development of foreign trade, and its results support our belief that the United States is going to become the greatest exporting nation in the world. Exports of iron and steel have shown an increase which is very encouraging to manufacturers. The sales of copper to foreign nations have been the largest on record. Exports of spelter and zinc ore increased heavily and coal has entered into our foreign trade to an extent heretofore unknown. In many of the other products of our mineral industry also an excellent trade is being built up. The foreign markets, in fact, are coming to depend

upon those of this country to a very large extent, and in Continental Europe it has even been urged that a great industrial alliance is the only thing which can protect the nations from American competition. Our surplus producing capacity is finding an outlet in this way which promises substantial additions to our prosperity, and must be reckoned with in any attempt to forecast the future.

There is one matter to which we have heretofore called attention, the importance of which will be emphasized by the study of the statistics on the other pages of this number. Our readers know that we have long and actively advocated the adoption of the metric system, both on account of its intrinsic advantages as a logical, reasonable and well-balanced system of weights and measures; and also because it would place us in harmony with a very large part of the commercial world with which we are now cultivating closer relations. Progress is being made toward the completion of this reform, we are happy to say. The further reform to which we refer is the establishment of a uniform international coinage. We do not mean by this that any nation should abandon its present national coins, their names or their various subdivisions; but it is possible by moderate and easily adjustable mutual concessions to establish an international standard which will greatly simplify commercial transactions and do away with many of the difficulties which travellers now encounter. Thus, by changes which would not in any case exceed the limits which all civilized nations allow for wear and abrasion on coins, our own five-dollar piece might be made the exact equivalent of the English pound sterling, twenty-five francs French coin, twenty marks German, ten rubles Russian and five Japanese yen; a uniformity which would practically cover the commercial world. This suggestion, we are pleased to know, is now meeting with consideration in influential quarters.

One feature of the year just closed has been the increased tendency of capital to invest in mining enterprises. The abundance of surplus money and the increasing difficulty of finding remunerative investments, which has been imposed by the gradual fall of the interest rate, have led many to look to the mining and metallurgical industries as sources of profit. The amount of money invested in this way in 1899 and in 1900, has been very large and promises to be still greater in 1901. Improvements in mining management are gradually leading capitalists to realize the possibilities of well-managed mining properties, and are tending to disabuse them of the notion that mining investments are necessarily altogether speculative in their character. That mines can be conducted on a safe business basis has long been our contention and this is every year supported by additional instances. The record of dividends paid by mining companies, which will be found on another page, is an interesting and attractive one and ought to be carefully studied by investors. We may add that in addition to those companies which will be found in our list there are a very great number of mines which pay their owners substantial profits, which are not reported. These include small corporations, or, at least, corporations having only a few owners, which consider it the best policy to limit the publicity given to the results of their work; a feeling which is natural enough under some circumstances, although we have always considered it a mistaken policy. In the case of gold mines also it includes many mines which are owned by individuals or partnerships and whose business, however profitable it may be, is kept to themselves and does not attain even the limited publicity which is required of the ordinary corporation. Could these profits be included, we are satisfied that our dividend list would be swelled to an enormous figure and would show that none of the great industrial interests of this country pays better than the mining industry when properly conducted.

THE PAST.

The year, whose magnificent record we present in the following pages, closed the Nineteenth Century, in which the world has made far greater progress than in any previous hundred years of its history. To say this is simply to repeat what every reader knows, and so is the statement that the advance made in the mining and metallurgical industries has been quite as great—if not greater—than in any other branch of human endeavor. The century has seen the introduction of steam, of electricity and of the gas engine; the general substitution of power pumps and hoists for those driven by hand or animal power; the use of the machine drill and of high explosives and myriad other changes of almost equal importance. The sinking of deep shafts has been made possible and the possible radius of underground exploration extended to a degree of which our forefathers would never have dreamed. At the same time the care of human life and the alleviation of the hard conditions of labor underground have added to the efficiency of the miner and made his tasks far lighter. In metallurgy almost

equal progress has been made. Our forefathers knew many methods of extracting metals from their ores, but the high cost of transportation and of materials restricted the application of these. The manifold uses of electricity, however, were developed within the last 30 years.

The great mineral industry of the United States has been practically created during the century just closed. One hundred years ago our production was limited to a little coal, a little bar and pig iron, made slowly and painfully in charcoal forges and small blast furnaces, and some copper ore mined and shipped to foreign smelters. Gold, silver, lead, zinc and a hundred other metals and minerals which go to make up our present great output were not known to exist; or if the existence of any of them was suspected, no effort had been made to turn them to account. The magnificent industry, whose achievements we now record, has been built up from nothing during the century, and chiefly in its latter half.

Among the greatest improvements of the century must be reckoned the improvements in transportation which have made possible the movement and handling of great quantities of material. Without this the advance in mining and metallurgical methods—and especially operations on the large scale to which we have become accustomed—would not have been possible. Conversely it is the improvements in the material furnished by the mineral industry which permitted the extension and cheapening of transportation.

The century, however, has not exhausted progress—far from it. It leaves much for its successor to accomplish, but it has made a solid foundation on which to build the edifice of the future.

THE FUTURE.

The Nineteenth Century has made a good ending, as far as material progress goes, but it leaves to its successors not only the task of carrying on its work, but of bettering it; and there is more than one unsolved problem with which the new century must deal. We do not doubt that mineral and metallurgical production will continue to grow as fast—if not faster—than demand increases. That has been already settled and would really require nothing more than the gradual extension of our present methods.

The first work which the new century will undertake, we think, is the cheapening of costs by the more thorough utilization of raw materials and the saving of by-product. Something has been accomplished in this direction by our European competitors, but the work has been neglected in the United States. The Twentieth Century will relate with wonder, and perhaps with a little contempt, how its predecessor threw away most of the valuable chemicals which might be saved from the coking or combustion of coal, and wasted the energy contained in the gases from its coke ovens and blast furnaces. In every process this saving will be applied to a degree that we now hardly believe possible.

Akin to this is the better utilization of fuel and its conversion into energy with a lower percentage of loss. Just how this is to come—by the improvement of the gas engine, by rendering practical some form of heat engine, by the direct generation of electricity from combustion—we do not yet know; but we have no doubt that it will come.

Metallurgical problems still to be solved there are in plenty. The treatment of various complex ores of low grade is to be simplified and cheapened. The better adaptation of chemical processes to the extraction of metals from their ores is much to be desired. Production is to be extended largely as much through better and closer working as through the exploitation of new mineral deposits.

Outside of these material problems the Twentieth Century has among its pressing tasks to study out a better adjustment of the relations between capital and labor, between capital and the State and of the questions affecting the ownership of mineral property. There is room for more careful safeguarding of human life in mining operations. And we may hope that before the century closes the policy, and even necessity, of the freest possible intercourse among the nations of the earth may be recognized.

The Twentieth Century has opportunities far greater than were offered to its predecessors. Let us hope it will utilize them with less stumbling and fewer false starts than have been made by any of them.

THE MINERAL AND METAL OUTPUT OF THE UNITED STATES IN 1900.

The "Engineering and Mining Journal" again furnishes in advance of all other publications, whether issued by the Government or by private enterprise, a comprehensive preliminary estimate of the production of the more important minerals and metals in the United States for the preceding year, together with the production of gold in the whole world for the same period. These statements have been compiled with the greatest care, the few small tables embodying many months of work,

the figures being frequently taken from monthly or quarterly returns. At the last, latest figures have been procured by hundreds of special telegrams to important producers all over North America. Yet these statements are necessarily subject to revision in future numbers of the "Engineering and Mining Journal" as later returns come in; and the final complete statement will be published in a few months in "The Mineral Industry," Volume IX.

This prompt publication of carefully compiled statistics of mineral and metal production for a whole continent has never been attempted except by the "Engineering and Mining Journal," and its facilities for carrying on successfully such a stupendous work are unrivalled. While in some cases it has been necessary to estimate the output of particular substances on the basis of reports covering the greater part of the year, yet nearly all the statistics given below are taken from direct returns by producers or railway companies. In this connection it gives us pleasure to state that as the aim and scope of this work are

gold are compiled from the reports of the refiners of crude bullion and the exporters of argentiferous matte and ingot copper. The revised statistics to be published in "The Mineral Industry," with fuller details than are here possible, will be accompanied by technical articles of value relating to every department of the mineral industry. Thus we furnish data for the urgent needs of business on the one hand, and for the requirements of engineers, metallurgists, statisticians and statesmen on the other.

The total value of the metals produced in the United States in 1900 was \$509,800,992, as compared with \$496,057,320 in 1899. The value of the out put of non-metallic substances was \$755,680,991, as against \$645,754,305 in 1899. The total value for the two years, after allowing for duplications, was respectively \$1,157,162,182 and \$1,049,230,594.

As our preliminary statistics become more complete each year, so do the number of minerals and products included under the heading of "other substances" decrease. Included among such "other substances"

UNITED STATES MINERAL AND METAL PRODUCTION.

Products.	Customary Measures.	1899.				1900.			
		Quantity.		Value at Place of Production.		Quantity.		Value at Place of Production.	
		Customary Measures.	Metric Tons or Kgs.	Totals.	Per Metric Ton or Kg.	Customary Measures.	Metric Tons or Kgs.	Totals.	Per Metric Ton or Kg.
NON-METALLIC:									
1 Asbestos.....	Short Tons	912	827	\$13,860	\$16.76	1,100	998	\$15,400	\$15.43
2 Barytes.....	Short Tons	32,636	29,607	137,071	4.63	41,910	38,021	171,831	4.52
3 Bauxite.....	Long Tons.	36,813	37,402	101,285	2.71	23,145	23,515	71,749	3.05
4 Bromine.....	Pounds.....	433,003	196	125,571	640.67	512,743	232	143,568	618.83
5 Carborundum.....	Pounds.....	1,741,345	730	156,712	198.37	2,660,000	1,307	239,400	198.34
6 Cement, nat. hydraul.....	Barrels.....	10,150,947	1,351,332	5,175,350	3.75	8,832,340	1,201,353	4,256,238	3.54
7 Cement, Portland.....	Barrels.....	5,805,620	1,053,965	10,441,431	9.91	8,503,308	1,542,376	11,947,614	7.75
8 Cement, slag.....	Barrels.....	244,757	44,408	360,800	8.10	493,150	89,473	715,007	7.99
9 Coal, anthracite.....	Short Tons	60,622,398	54,996,279	103,753,790	1.89	54,255,540	49,220,303	97,329,032	1.97
10 Coal, bituminous.....	Short Tons	191,456,350	173,688,061	173,301,679	0.99	220,592,239	200,119,966	224,502,483	1.12
11 Coal, cannel.....	Short Tons	36,639	33,239	91,597	2.76	25,000	22,680	60,750	2.68
12 Coke.....	Short Tons	18,025,256	16,352,405	42,081,002	2.57	18,928,372	17,171,706	48,456,384	2.82
13 Cobalt oxide.....	Pounds.....	10,200	4,627	15,810	3.42	11,200	5,080	20,160	3.96
14 Copper sulphate.....	Pounds.....	67,903,370	30,801	3,530,975	114.64	76,959,486	34,909	3,770,278	108.00
15 Copperas.....	Short Tons	13,770	12,492	108,508	8.69	13,785	12,506	110,280	8.82
16 Crushed steel.....	Short Tons	357	306	47,250	154.41	345	313	48,300	303.31
17 Fluorspar.....	Short To is	24,030	21,800	152,655	7.00	23,456	21,379	114,700	5.35
18 Fuller's earth.....	Short Tons	13,020	12,356	81,900	6.63	15,700	14,243	89,750	6.30
19 Garnet.....	Short Tons	2,565	2,327	72,672	31.23	2,913	2,643	83,890	31.74
20 Grahamite.....	Short Tons	3,150	2,858	97,650	34.17	3,300	2,991	105,000	35.11
21 Graphite, amorphous.....	Short Tons	1,030	934	8,340	8.82	940	808	9,000	9.74
22 Graphite, crystalline.....	Pounds.....	3,632,608	1,647,740	145,304	0.09	3,518,731	1,596,086	143,648	0.09
23 Graphite, artificial.....	Pounds.....	405,870	18,410	32,475	0.18	845,000	38,329	67,600	0.18
24 Iron ore.....	Long Tons.	25,341,000	25,746,456	58,284,300	2.26	26,417,315	26,839,992	79,251,945	2.95
25 Lead, white.....	Short Tons	103,466	93,964	10,812,197	115.20	90,853	82,421	9,902,808	120.15
26 Lead, red.....	Short Tons	10,199	9,252	1,070,895	115.67	9,918	8,998	1,096,633	121.68
27 Lead, orange mineral.....	Short Tons	928	842	139,200	165.32	829	752	98,112	130.47
28 Lepidolite.....	Short Tons	124	112	4,600	41.07	100	91	3,700	40.66
29 Limestone, flux.....	Long Tons.	6,707,435	6,814,754	3,475,525	0.51	6,964,255	7,075,683	3,691,055	0.53
30 Litharge.....	Short Tons	10,020	9,030	1,032,060	113.53	10,209	9,261	1,121,663	121.11
31 Magnesite.....	Short Tons	2,000	1,814	7,600	4.19	2,768	2,511	10,518	4.19
32 Monazite.....	Pounds.....	390,000	150	18,450	123.20	350,000	159	19,600	123.27
33 Petroleum, crude.....	Barrels.....	57,234,304	8,007,363	64,143,690	8.01	63,100,596	8,823,090	75,365,685	8.54
34 Phosphate rock.....	Long Tons.	1,823,391	1,852,565	7,331,735	3.90	1,599,990	1,625,590	5,569,131	3.43
35 Pyrites.....	Long Tons.	178,408	181,263	588,323	3.22	208,409	211,743	694,318	3.28
36 Salt.....	Barrels.....	19,861,948	2,522,610	5,437,941	2.16	20,905,099	2,655,097	6,471,098	2.44
37 Slate, roofing.....	Squares....	1,096,374	332,146	3,053,988	2.78	987,412	298,198	2,775,698	2.81
38 Slate, manufactures.....	.....	.....	.....	540,434	.....	.....	.....	516,755	.....
39 Soda, manufactured.....	Metric Tons	.....	387,020	5,925,276	15.31	.....	395,902	6,655,113	16.81
40 Sulphur.....	Long Tons.	1,565	1,590	33,585	21.12	4,630	4,704	101,212	21.51
41 Zinc, white.....	Short Tons	39,663	35,982	3,331,692	92.04	44,568	40,432	3,788,180	33.69
42 Zinc ore, exported.....	Short Tons	28,220	25,601	725,944	25.36	37,920	34,401	1,140,612	33.16
Other products unspecified.....	.....	.....	.....	141,063,263	.....	.....	.....	165,040,973	.....
Total non metallic.....	.....	.....	.....	\$645,754,305	.....	.....	.....	\$755,680,991	.....
METALLIC:									
43 Aluminum.....	Pounds.....	6,500,000	2,948,381	2,112,500	0.72	7,150,000	3,243,219	2,288,000	0.71
44 Antimony.....	Pounds.....	2,500,000	1,137	241,250	212.18	3,100,000	1,406	236,750	203.92
45 Copper.....	Pounds.....	581,319,091	263,685	100,916,994	382.72	615,576,802	279,223	100,154,345	338.69
46 Gold.....	Ounces.....	3,391,196	105,471	70,096,021	664.60	3,805,455	118,362	78,658,755	664.60
47 Iron, pig.....	Long Tons.	13,400,735	13,615,350	234,725,754	17.24	13,914,596	14,137,290	238,076,737	16.84
48 Iridium.....	Ounces.....	5.6	.....	165	.....	8	.....	240	.....
49 Lead.....	Short Tons	217,085	196,988	19,407,399	98.55	251,781	228,414	22,005,659	96.34
50 Nickel.....	Pounds.....	22,500	10,205.9	8,156	0.80	20,000	9,072	7,800	0.86
51 Platinum.....	Ounces.....	Nil.	Nil.	Nil.	Nil.	173	5.4	3,113	576.48
52 Quicksilver.....	Flasks.....	28,879	993	1,155,160	1,163.30	32,315	1,121	1,474,533	1,315.37
53 Silver.....	Ounces.....	57,126,884	1,776,829	34,036,168	19.16	60,478,276	2,881,068	37,085,248	19.71
54 Zinc.....	Short Tons	129,675	117,644	14,912,625	126.76	122,850	111,449	10,786,230	96.78
Other metals unspecified.....	.....	.....	.....	18,446,128	.....	.....	.....	18,971,532	.....
Total metals.....	.....	.....	.....	\$496,057,320	.....	.....	.....	\$509,800,992	.....
Total non-metals and metals.....	.....	.....	.....	\$1,141,811,625	.....	.....	.....	\$1,265,481,983	.....
Deduct duplications.....	.....	.....	.....	92,581,031	.....	.....	.....	108,319,801	.....
Grand total.....	.....	.....	.....	\$1,049,230,594	.....	.....	.....	\$1,157,162,182	.....

better understood producers each year give their output more freely and in greater detail. Never before have the replies to our inquiries been as numerous and prompt as this year, and consequently this annual review surpasses in comprehensiveness and exactness all its predecessors.

The statistics regarding gold, pig iron, lead, nickel, quicksilver, aluminum and zinc vary very little from what the final statements will be, our reports covering in a majority of cases the output for the whole year, except a couple of weeks in December. The statistics for copper production are the same as those collected by John Stanton, Esq., statistician for the associated copper producers, except that we have added our own estimate, based on very full returns from producers, of the amount of copper turned out as copper sulphate. As Mr. Stanton does not give these figures, it is to be expected that our revised statistics of copper production will, as usual, exceed his. Our statistics regarding

in the subjoined table are corundum, diatomaceous earth, emery, grindstones, quartz crystal, tripoli, whetstones, alum and aluminum sulphate, asphaltum and bituminous rock not including grahamite, calcium carbide, borax, clay and clay products, feldspar, gypsum, manganese ore, mica, mineral wool, natural gas, ocher and oxide of iron, sand, silica, soapstone, precious stones, natural soda, sulphuric acid, building stone and also such little-mined minerals as spodumene and the ores of uranium, tungsten, vanadium and molybdenum.

Metallic Products.

Aluminum.—Production in this country is controlled by one company, which reports to us an output of 7,150,000 lbs., valued at \$2,288,000, as compared with 6,500,000 lbs., valued at \$2,112,500, in 1899.

Antimony.—The production of antimony in this country is now controlled by one concern, which does not care to make figures public. The output is estimated at 3,100,000 pounds, as compared with 2,500,000

pounds in 1899. The production came almost wholly from the works at Chelsea, Staten Island. Very little antimony ore is mined in this country. The metal is recovered largely from Mexican and Japanese material.

Cobalt Oxide.—Mine La Motte, in Missouri, continues to be the sole producer of this substance in the United States. The output in 1900 was 11,200 lbs., valued at \$20,160, which compares with 10,200 lbs., valued at \$15,810, in 1899.

Copper.—With a steady demand at high prices the output of copper exceeded the great record of 1899, the total output being 615,576,802 pounds, in comparison with 581,319,091 pounds in the previous year. These figures include the copper contents of by-product copper sulphate.

Gold.—The United States once more takes first place as a gold producer, owing to the suspension of mining in the Transvaal and a decreased output in Australasia. The output was 3,805,455 fine ounces, valued at \$78,658,755, against 3,391,196 ounces, valued at \$70,096,021, in 1899. There was also refined in the United States from foreign matte, bullion and ores 1,984,715 ounces, valued at \$42,057,559.

Lead.—Owing to good demand and the firm control of the market by the smelters, the production of lead shows a great increase and is the largest yet recorded. The output from domestic ores and bullion was 251,781 short tons, as compared with 217,085 short tons in 1899. There were also recovered from foreign ores and base bullion smelted and refined in this country 103,705 short tons, as against 76,423 short tons in 1899.

Nickel.—Mine La Motte, in Missouri, continues the chief producer of nickel ore in this country. The ore in 1900 yielded 20,000 lbs. of nickel, valued at \$7,800, compared with 22,500 lbs., valued at \$8,156, in 1899. The great output of nickel in this country is from imported ore.

Pig Iron.—The production of pig iron was the heaviest on record, and the United States continues to lead the world as a pig iron producer. The output was 13,914,596 long tons, as against 13,400,735 long tons in 1899.

Platinum.—A small amount of platinum, about 173 oz. Troy, was recovered by the United States Mint in 1900, most of it coming from ore from the Pacific Slope. The recovery of 8 oz. of iridium is also reported.

Quicksilver.—The output of the quicksilver mines showed a considerable increase last year, the increase coming chiefly from California. The producing States are California, Texas and Oregon, in the order named. The total output was 32,315 flasks, valued at \$1,474,533, against 28,879 flasks, valued at \$1,155,160, in 1899.

Silver.—Increased production of copper and lead caused a corresponding increase in silver, a large part of the output being in the nature of a by-product. The total output was 60,478,276 troy ounces, valued at \$37,085,248. This compared with 57,126,834 troy ounces, valued at \$34,036,168, in 1899. Refineries in the United States also produced from foreign ores and bullion in 1900 a total of 46,352,281 troy ounces, valued at \$28,423,219.

Zinc.—The weaker markets, particularly abroad, resulted in a decreased output of zinc last year, the production being 122,850 short tons, as compared with 129,675 short tons in 1899.

Non-Metallic Products.

Asbestos.—The production of asbestos in 1900 was 1,100 short tons, valued at \$15,400, as against 912 tons, valued at \$13,860, in 1899. Almost the entire production for both years was from the mines of the Sall Mountain Company, in Georgia, though there was a small amount mined in California.

Barytes.—The output of barytes last year was 41,910 short tons, valued at \$171,831, compared with 32,636 tons, valued at \$137,071, in 1899. Of the States, Tennessee was the largest individual producer, its output being 17,580 short tons. Missouri produced 16,020 tons, and the remainder came from Virginia and North Carolina.

Bauxite.—The production in 1900 was 23,145 long tons, valued at \$71,749, against 36,813 long tons, valued at \$101,235, in 1899. The falling off is due to the exhaustion of some of the mines in the Georgia-Alabama District.

Bromine.—The production of bromine in 1900 was 512,743 lbs., valued at \$143,568, compared with 433,003 lbs., valued at \$125,571, in 1899. The production is from salt wells in Michigan and Ohio.

Carborundum.—The company at Niagara Falls which controls production reports to us an output of 2,660,000 lbs., valued at \$239,400, as against 1,741,245 lbs., valued at \$156,712, in 1899.

Cement, Natural Hydraulic.—The production of hydraulic cement from cement rock shows a decrease in the Eastern States. The 1900 output was 8,832,240 bbls., valued at \$4,256,238, comparing with 10,150,947 bbls., valued at \$5,175,950, in 1899. The output from New York State was 3,222,406 bbls., a falling off of nearly 1,000,000 bbls. from last year; Indiana and Kentucky produced 3,560,638 bbls.; Maryland, 195,242 bbls.; Illinois, 377,579 bbls.; Kansas, 137,339 bbls., and Pennsylvania, 638,333 bbls.

Cement, Portland.—Production of artificial hydraulic cement has shown an enormous increase, and the output is the largest on record, being 8,503,308 barrels, valued at \$11,947,614, in 1900, compared with 5,805,620 barrels, valued at \$10,441,431, in 1899.

Cement, Slag.—The production of slag cement continues to increase in this country. The output in 1900 was 493,150 bbls., valued at \$715,067, against 244,757 bbls., valued at \$360,800, in 1899.

Coal and Coke.—The United States has increased its lead over Great Britain and is now easily the largest producer of coal in the world. The total production in 1900 was 274,872,779 short tons, valued at \$321,792,265, compared with 252,115,387 short tons, valued at \$276,147,056, in 1899. The production of anthracite decreased owing to the miners' strike in Pennsylvania, but the production of bituminous shows a heavy gain. Coke production increased slightly, the total output being 18,923,372 short tons, valued at \$48,456,384, as against 18,025,256 short tons, valued at \$42,081,002, in 1899. Pennsylvania furnished about two-thirds of the coke output each year.

Copper Sulphate.—The total production of copper sulphate in 1900 was 76,959,486 pounds, valued at \$3,770,278, comparing with 67,903,370 pounds, valued at \$3,530,975, in 1899. Of the 1900 output, 42,250,758 pounds was recovered as a by-product.

Copperas.—The production of this substance, a by-product of wire and rod mills, shows a gain, the output being 13,785 short tons, valued at \$110,280, compared with 13,770 short tons, valued at \$108,508, in 1899.

Crushed Steel.—The output of this substance, used as an abrasive, was 345 short tons, valued at \$48,300, against 337 tons, valued at \$47,250, in 1899. The sole producer was a concern in Pittsburg.

Fluorspar.—The production of fluorspar in Kentucky and Illinois shows a slight decrease, the output being 23,456 short tons, valued at \$114,700, compared with 24,030 tons, valued at \$152,655, in 1899.

Fuller's Earth.—The output of fuller's earth in 1900 was 15,700 short tons, valued at \$89,750, as compared with 13,620 tons, valued at \$81,900, in 1899. Florida was the largest producer, though Arkansas and California were also producers.

Garnet.—The production of this mineral, used as an abrasive, was 2,913 short tons, valued at \$83,890, in 1900, as against 2,565 short tons, valued at \$72,672, in 1899. The sources of supply are the Adirondacks in New York, Chester County, Pa., and Roxbury, Conn.

Grahamite.—The production of grahamite in 1900 is estimated at 3,300 short tons, valued at \$105,000, against 3,150 tons, valued at \$97,650, in 1899. The principal source of supply is Utah.

Graphite, Amorphous.—The production of amorphous graphite from the mine near Cranston, R. I., was 340 short tons in 1900, valued at \$3,000, compared with 1,030 tons, valued at \$8,240, in 1899.

Graphite, Artificial.—The company at Niagara Falls, the sole producer of this substance, reports an output of 845,000 lbs., valued at \$67,600, comparing with 405,870 lbs. valued at \$32,475 in 1899.

Graphite, Crystalline.—The output in 1900 was 3,518,731 lbs. valued at \$143,648, compared with 3,632,608 lbs., valued at \$145,304, in 1899.

Iron Ore.—In another column we discuss the enormous output of our iron mines last year. The total production, the largest on record, was 26,417,315 long tons, valued at \$79,251,945. This compares with 25,341,000 long tons, valued at \$58,284,300 in 1899; the great increase in value is very striking.

Lead Pigments.—The production of white lead in 1900 fell off, the output being 90,853 short tons, valued at \$9,902,868, as against 103,446 short tons, valued at \$10,812,197, in 1899. The output of red lead was 9,918 short tons, valued at \$1,096,633, as compared with 10,199 short tons, valued at \$1,070,895, in 1899; of orange mineral 829 short tons, valued at \$98,112, against 928 short tons, valued at \$139,200, in 1899; and of litharge, 10,209 short tons, valued at \$1,121,663, against 10,020 short tons, valued at \$1,032,060, in 1899.

Lepidolite.—The production of this mineral in 1900 amounted to about 100 short tons, or a little less than in 1899. The output is entirely from San Diego County, California.

Limestone for Flux.—The production of limestone as a flux kept pace with the activity of blast furnaces, and the 1900 output was the largest on record, being 6,964,255 long tons, valued at \$3,691,055. This compares with 6,707,435 long tons, valued at \$3,475,525, in 1899.

Magnesite.—A total of 2,768 short tons of magnesite, valued at \$10,518, was produced in California in 1900, against 2,000 short tons, valued at \$7,600, in 1899.

Monazite.—The production of this mineral in 1900, all of which came from North or South Carolina, is estimated at 350,000 pounds, valued at \$19,600, comparing with 330,000, valued at \$18,480, in 1899.

Petroleum.—A good price for oil stimulated new production in the East, and the boom in oil lands in California has greatly increased the output in that State. The output of petroleum is consequently the largest yet recorded, being 63,100,596 barrels, valued at \$75,365,685, against 57,234,304 barrels, valued at \$64,143,890, in 1899. Of the great

total this year the Appalachian District, which includes New York, Pennsylvania, West Virginia and part of Ohio, produced 36,486,222 barrels, and the Lima oil field of Ohio and Indiana 21,647,095 barrels. The California output is estimated at 3,500,000 barrels, and that of Texas at 800,000 barrels. The Colorado production was approximately 500,000 barrels, that of Kansas 125,279 barrels, and that of Wyoming 7,000 barrels.

Phosphate Rock.—A decline in demand abroad kept down the production of high-grade phosphate rock in this country last year, and the output of all grades was but 1,599,990 long tons, valued at \$5,569,131, as compared with 1,823,391 long tons, valued at \$7,031,785, in 1899.

Pyrites.—General industrial activity, with the resulting demand for sulphuric acid, caused an increased output of pyrites, the production being 208,409 long tons, valued at \$694,318, in 1900, as compared with 178,408 long tons, valued at \$583,323, in 1899. The production came almost entirely from Virginia, Massachusetts and New York, Virginia being by far the largest producer.

Salt.—Demand has been good and the production makes a new record, being 20,905,099 barrels, valued at \$6,471,098, as compared with 19,861,948 barrels, valued at \$5,437,941, in 1899. The output of the leading States in order was as follows: New York, 8,188,551 barrels; Michigan, 6,820,685 barrels; Kansas, 2,751,000 barrels; Ohio, 850,000 barrels; California, 428,571 barrels; Texas, 264,285 barrels.

Slate.—The production of roofing and manufactured slate declined from the record of 1899, due largely to the curtailing of exports. The output of roofing slate was 987,412 squares, valued at \$2,775,698, against 1,098,374 squares, valued at \$3,055,988, in 1899. The value of slate manufactures was \$516,755, compared with \$540,434 in 1899.

Soda.—The production of soda, including bicarbonate of soda, caustic soda and soda ash, shows a gain. Reduced to a basis of 58 per cent. ash, the output in 1900 was 395,902 metric tons, valued at \$6,655,113, against 387,020 metric tons, valued at \$5,925,276, in 1899. New York and Michigan continued the largest producers.

Sulphur.—The production of sulphur shows an increase. The total output was 4,630 long tons, valued at \$101,212, as compared with 1,565 tons, valued at \$33,585, in 1899. The output came mostly from Nevada and Utah, these and Louisiana being the producing States.

Zinc Ore.—Exports of zinc ore show a substantial increase, chiefly owing to the erection of several concentrating plants at Leadville, Colo. The total exports for the year, November and December being estimated, were 37,920 short tons, valued at \$1,140,612, against 28,220 tons, valued at \$725,944, in 1899.

Zinc White.—The production of this substance, the greater part of which is made by a company in New Jersey, was 44,568 short tons in 1900, valued at \$3,788,180, as compared with 39,663 short tons, valued at \$3,331,692, in 1899.

COAL IN BELGIUM.

Written for the Engineering and Mining Journal by H. C. Carpenter.

The question of coal now plays so important a part in the industrial development of Europe that a brief examination of the coal wealth of one of the busiest of European nations is at present of timely interest. The output of Belgium coal mines during the year 1899 amounted to 22,033,328 metric tons, with a value of \$54,828,782. The production of the preceding year was about the same. Indeed, it is safe to assume that during the next few years the 22,000,000 mark will not be exceeded to an appreciable extent, owing to the scarcity of labor with which mine owners are obliged to reckon. The idleness in the mines in April and May of last year, when a strike was in progress was counterbalanced by the increased activity following the resumption of work.

In the various provinces of Belgium the production in 1899 was as follows: Hainaut, 15,581,380 tons, worth \$38,053,280; Liege, 5,849,328 tons, worth \$14,479,092; Namur, 602,620 tons, worth \$1,357,410. The mines of Charleroi alone produced 7,680,700 tons, or one-third of the total output. These mines employed altogether 41,754 workmen, 29,286 below and 12,468 above ground. The figures for the entire Province of Hainaut on the other hand show 66,839 miners and laborers below and 24,359 workmen above ground.

The wages paid in the mines of Charleroi are the highest for this kind of work in Belgium. In 1899 Charleroi miners received for a day's work \$1.15, as against 91c. in the mines of Mons, and \$1.13 elsewhere. The cost of living in Charleroi, however, is higher than in other parts of Belgium. The average selling price of coal in 1899 was \$2.66 per ton, while in 1898 the price was only \$2.32; the increase accordingly amounted to 34c. The average profit per ton was 31 cents, an increase over the preceding year of 12½c.

As regards exports, these are placed by the official statistics at 4,563,458 tons, while the miners of the three provinces claim 4,463,115 tons to be the correct figure. Coke exports amounted to 849,041, and briquettes 777,485 tons. Among the imports were 10,717 tons of briquettes, supplied almost exclusively by Germany (as against 1,756 tons in 1898 and 632 tons in 1897) and 396,668 tons of coke, of which Germany furnished 223,222 tons. As a result of the strike of 1899 Belgium was forced to import more coal than in previous years. For 1899 the imports amounted to 2,839,428 tons, 1,451,569 tons of which came from Germany, 767,288 tons from England and 604,291 tons from France.

A NEW COAL AND COKE FIELD.

Written for the Engineering and Mining Journal by Wm. Gilbert Irwin.

For some years the coal-fields of the Ligonier Valley, in Pennsylvania, have received considerable attention from coal and coke operators, but until recently nothing more was done in this field than the leasing of lands, these in all cases heretofore being permitted to lapse before operations were begun. Several years ago representatives of the Soxman Coal Company, whose plants are located in the Latrobe Field, became interested in Ligonier Valley coal lands and leased several thousand acres with the purpose of opening mines and constructing coke ovens of the by-product type.

About two years ago the Pittsburg, Westmoreland & Somerset Railroad was chartered, and this new line, which traverses the Ligonier Valley, is now about completed. In the meanwhile valuable coal mines have been opened at points along the line, and deposits of the Somerset smokeless gas coal will also be opened up. The Ligonier Valley coal-fields are divided from the Connellsville coking coal-fields only by a low range of the Allegheny foothills, and the Ligonier Valley coal is of an excellent quality for coking. The main vein which will be worked is a 9-ft. one, with the coal free from slate, and having many of the distinguishing features of the Connellsville coking coal.

At Bolivar, on the northern border of the Ligonier Valley, the Reese-Hammond Firebrick Company is operating a coke plant, using the Ligonier Valley coal, and a good quality of coke is produced. A by-product oven is also being operated at this plant, and experiments are being made with the various coals for use in this type of oven. The Soxman Company, which operates at Latrobe, Pa., has had its representatives in Europe studying the various by-product types in use in France, Belgium and Germany, and probably this concern will engage in this improved branch of the coke industry.

While the new Pittsburg, Westmoreland & Somerset Railroad will do much toward opening up the Ligonier Valley coal-fields, there are still other roads which will engage in the coal and coke-carrying trade when the new field is once opened. The Ligonier Valley Railroad has long been contemplating extensions and the Beech Creek has surveys through this new coal-field. The Pennsylvania Railroad is also contemplating extensions through Ligonier Valley. This new field embraces more than 100 square miles, and with the new Somerset County fields which are to be brought in by the Pittsburg, Westmoreland & Somerset, will eventually form an important factor in the coal and coke output of Western Pennsylvania.

The Conemaugh Coal Company is a big concern which has lately been formed with the object of developing coal lands in the northern end of the Ligonier Valley, and this new concern has already secured a large acreage. The plans of this company include the building of a road from the main line of the Pennsylvania at New Florence. In the southern end of the Ligonier Valley many other companies now have representatives at work securing coal lands. One rumor has it that the Carnegie Company will build a branch road from the Connellsville Region to tap this new field.

RAILROAD CONTRACT IN NICARAGUA.—United States Consul Donaldson reports from Managua, November 1st, 1900, that the Government of Nicaragua has conceded to Mr. Julio West the contract for about 38 miles of railroad which is to connect the capital directly by rail with Leon and Corinto, by a road around the lake connecting at La Paz with the western division now in operation. This will avoid the delay and cost of changing freights from the cars to steamboat at Managua and from steamboat to cars again at Momotombo. The railroad is to be finished within two years and is to cost \$23,000 in Nicaragua currency per mile, which at the present rate of exchange is about \$8,000 in United States gold.

FORGE BLAST.—In his paper at the last meeting of the American Society of Mechanical Engineers Mr. William Sangster presented some interesting facts regarding fan-blower practice in connection with cupola furnaces and forges. He points out that "in hardly any other class of machinery is the method of application of so great importance as it is in the case of centrifugal fans. The conditions of one installation are usually so different from those of any other that hard and fast rules are out of the question." Briefly summarized, he shows that the horsepower required to produce blast for a cupola is equal to three-tenths of the number of tons melted per hour multiplied by the pressure of blast in ounces per square inch. For forge blast an allowance of ¼-H.-P. may be made per forge, and for exhausting smoke therefrom the power required will be 0.44 H. P. per forge.

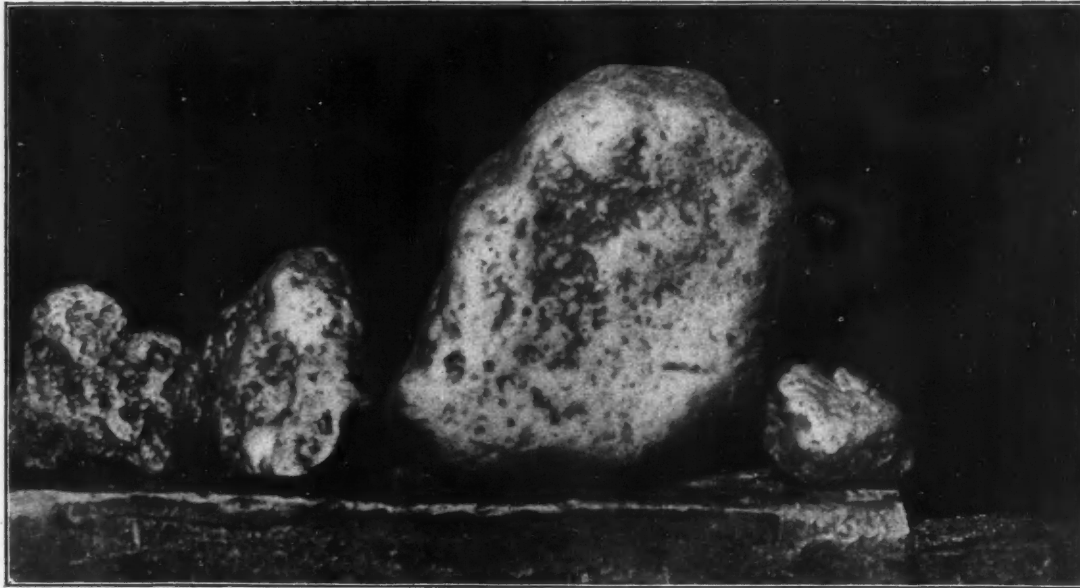
STEEL RAIL HISTORY.—Steel-rail production has had a marvelous history during the 32 years since it began. In 1868 rails sold at \$174 a ton, but even at this price a few railway companies had decided that it was economy to begin to use them instead of iron. Ten years later, in 1878, the price had dropped to \$41.50, and about one-quarter of the railway mileage of the country was of steel rails. During the next ten years the price first doubled, reaching \$85 in 1880, and then declined to \$31.50 in 1888, by which time there were 130,388 miles of steel tracks, against 52,979 miles of iron. At the end of another decade, in 1898, the price had fallen to \$18, and there were 220,800 miles of steel tracks, only about 24,000 miles of iron remaining. The following year, 1899, saw nearly 9,000 miles of steel added, although in the course of the year the price had almost doubled. To-day the mileage of steel is about 230,000, as compared with 20,000 miles of iron—that is, 92 per cent. steel and 8 per cent. iron—and the battered relics of the iron age that still linger in the scattered sidings and spur tracks will soon disappear. Although the price, \$26, fixed by the mills for the coming year, is an advance of \$8 over the price at the commencement of 1899, it is less than the average quotation for that year. But it is a higher figure than the large purchasers expected to pay, and if maintained may somewhat diminish the amount of new construction and renewals.

HYDRAULIC WORK IN THE ATLIN COUNTRY.

The accompanying illustration shows hydraulic work in progress on the Janne de Lamare hydraulic concession on Boulder Creek, in the Atlin District in British Columbia. The photograph from which the engraving is made was taken September 15th last. The concession on which the De Lamare Syndicate is working is about 17 miles east of

hands. Men with long shovels are posted near the head of the sluice boxes to intercept any boulders that may be carried down with the gravel.

From the sluice-boxes the tailings pass down Boulder Creek to the lake. The grade on Boulder is from 6 to 7 per cent. The flumes are 30 in. wide and 30 in. deep, the sluice-boxes having the same section. In their construction about 166,000 ft. of lumber were used. The whole



3 oz.

4 oz. 12 dwts.

48 oz. 12 dwts.

2 oz.

NUGGETS FROM DISCOVERY CLAIM, BOULDER CREEK, ATLIN, B. C.

Atlin Lake, and is on Boulder Creek, which falls into Surprise Lake at a point 3,000 ft. above sea level. The concession is $2\frac{1}{2}$ miles in length and 1 mile in width. Water for the hydraulic is brought through a flume which is 1 mile in length from the intake to the pressure box. The fall is 208 ft. From the pressure box the water is carried to the monitor by 500 ft. of steel pipe, the section nearest the box being 22 in. in diameter, the size diminishing to 18 in., and finally to 14 in. near the monitor. The nozzle of the monitor is 8 in. in diameter. The head of

installation is considered one of the best in the Atlin or the Yukon country. It was completed and finally put in operation on July 23d last. Some dynamite is used to blast down the bluffs.

The climate in the Atlin country in the summer is pleasant and healthy. At present wages are high, the usual rates being \$3 to \$3.50 a day with board. This costs about \$1.50 a day additional, bringing up the cost of labor to \$4.50 or \$5 a day.

The second photograph shows several nuggets taken last season from



HYDRAULICKING BY DE LAMARE SYNDICATE, BOULDER CREEK, ATLIN, B. C.

water is sufficient to work very satisfactorily on the banks along the creek.

The work of piping goes on day and night through the season. The average work done is from 1,200 to 1,500 cu. yds. washed down and into the sluice boxes in a day of 24 hours. Much of the success of the work is due to the experienced pipemen in charge, who are old California

claims on Boulder Creek. The largest—"Jumbo"—was found on Discovery Claim in September. It weighs 48 oz. 12 dwt. 3 gr., and is solid, containing no fragments of quartz, as large nuggets often do. The other nuggets, also from claims on Boulder Creek, weigh 4 oz. 12 dwt., 3 oz. and 2 oz. respectively. The large nugget has been taken to France by M. de Lamare.

THE RAMSAY CASTING AND CONVEYING MACHINE.

A number of iron casting machines have been brought to the attention of blast furnace managers, and several types are in use. The latest machine, of which we give a number of illustrations, has been designed by Erskine Ramsay, of Birmingham, Ala., chief engineer and assistant

and replaced immediately, as they are not bolted but simply placed in bearings. An object of this machine, as of most others, is to insure the delivery of the metal from the mold to the car or other conveying means, without bleeding. A further object is to provide a machine of the character indicated which will operate continuously and will be durable and effective and therefore economical in the performance of its work. In-

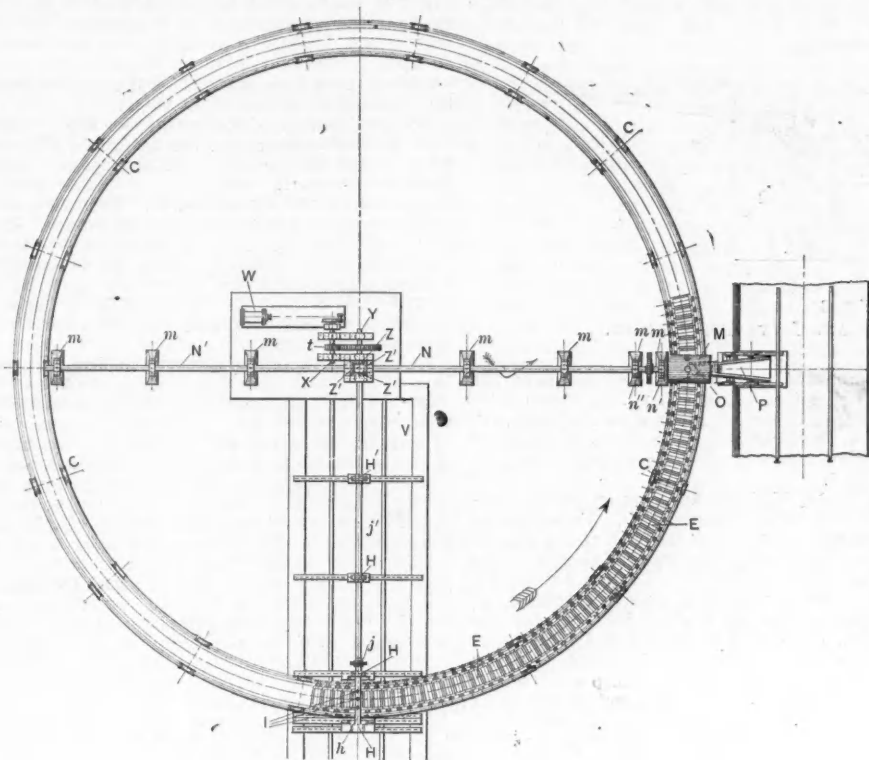


FIG. 1. THE RAMSAY CASTING AND CONVEYING MACHINE.

general manager of the Tennessee Coal, Iron and Railroad Company. For the description and the illustrations we are indebted to the courtesy of the Cleveland "Iron Trade Review."

In metal casting machines which employ endless belt or chain conveyors for carrying the molds under the ladle or pouring device to receive the molten metal, it is customary to make the molds with overlapping flanges to prevent the metal from falling between the molds, the latter being fastened at either end to the double strand chain. These endless chains are made up of heavy links, pins and bushings with cast-iron rollers to carry the chain, the chain passing around heavy sprocket wheels at either end. From the fact that all these parts are subject to constant wear it necessarily follows that the cost of keeping up such a chain machine is considerably above that for the machine illustrated in this article.

terposed between the ladle and the moving molds is a cut-off device or drum so arranged as to deliver to each mold as it arrives under the cut-off, the proper quantity of metal for the mold and to cut off the supply during the time that the succeeding mold is passing into position. This prevents the falling of any of the metal between the molds, and does away with the necessity for a projection to overhang from one mold to another.

Of the illustrations, Fig. 1 is a top plan view of the casting machine, with the cooling pipe removed. Fig. 2 is a sectional side elevation. Fig. 3 is an enlarged detail sectional elevation of the charging and cut-off mechanism. Fig. 4 is a transverse vertical central section of the pouring drum or cut-off device. Fig. 5 is a sectional front elevation of the discharging mechanism. Fig. 6 is a view of the luting or coating device.

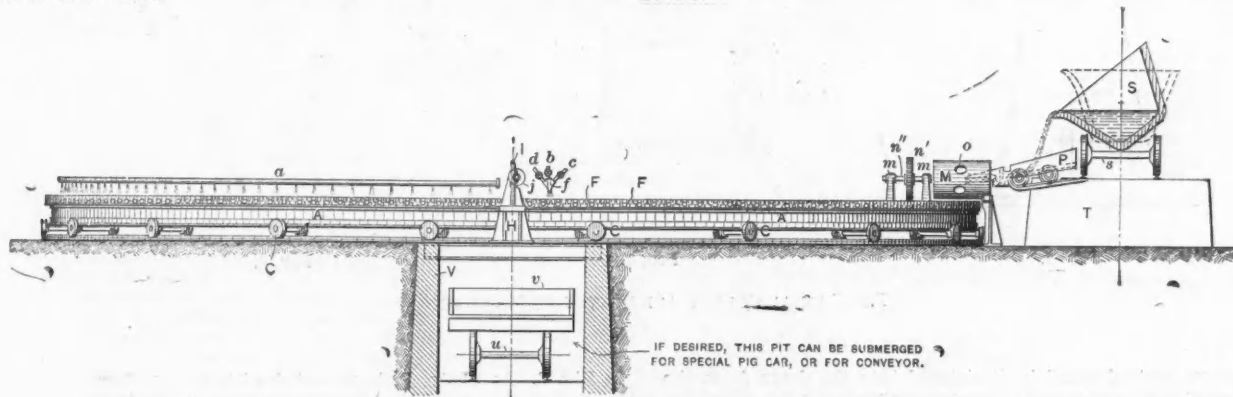


FIG. 2. THE RAMSAY CASTING AND CONVEYING MACHINE.

It may be said that in the chain machine some of the molds are to all intents and purposes dead during a portion of each revolution. This comes from the fact that it does not require as much time to coat and dry the mold, after it has dumped out the pig at the discharge end of the machine, as necessarily elapses before it reaches the pouring point again. To put it differently, in the chain machine only one-half of the molds are full during its regular operation, while in the turntable machine here described three-fourths of the molds are always full. It is claimed that the machine here described is cheaper to build and cheaper to maintain and operate, while doing its work as well as the chain machine. The Ramsay machine takes very little power to operate, because of the construction and the principle of the machine. It does not use any roller chain, links, sprocket wheels, bushings or rollers, and after the machine proper is built there is nothing that can wear out except the molds, which, as on other machines, will crack in time and have to be replaced. But should a mold be cracked it is not necessary to stop the operation of the machine. The broken one can be lifted out

The metal molds, E, are mounted upon the circular framework, A, which is composed of metal sides and angle web braces. The frame is mounted upon wheels, C, carried by axles forming trucks traveling upon ordinary rails. The wheels are flanged at both sides, and are distributed at suitable intervals around the frame, A, so that the conveyor may rotate about a central axis. In suitable bearings, F, secured to the top of the frame, are the metal molds, E, provided with trunnions, e, rotatably mounted in the bearings, and attached to the inner side of the frame is a circular rack, L, with which pinions, secured to the ends of the shafts, N N', are engaged for the purpose of giving rotation to the mold carrying frame.

The shafts, N N', are mounted in suitable bearings, m, and derive their motion from an engine, W, Fig. 1, which is connected to the shaft, X. Upon the latter is a pinion, x, meshing with a spur wheel, y, mounted upon a countershaft, Y, which also carried a pinion, t, meshing with the spur wheel, z, which latter gives motion to one of four bevel gears, z', the latter gear meshing with two similar bevel gears, one on

each of the shafts, N N', the fourth bevel, z', being mounted upon the shaft, J', journaled in bearings, H H'.

This driving mechanism gives continuous rotation to the mold carrying frame, and in order to deliver the metal to the molds successively, a pouring drum, M, is provided which is secured at one end to an angle web, r, attached to the outer casting, q, forming the drum and to the

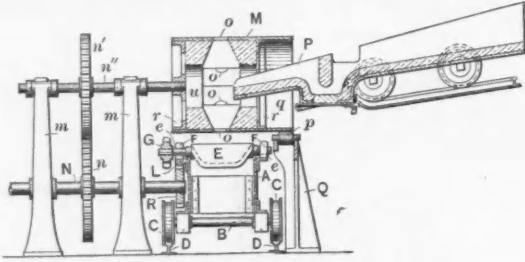


FIG. 3.
THE RAMSAY CASTING AND CONVEYING MACHINE.

horizontal shaft, n", rotatably mounted in the bearings, m, above the main driving shaft, N, from which latter the shaft, n", is driven by a spur wheel, n, meshing with a similar gear, n', secured to the shaft, n". The gears, n n', are of the same diameter and have the same number of teeth so that the same speed of rotation of the pouring drum and the mold carrying frame is secured.

The outer end of the pouring drum, M, is mounted upon roller bearings, p, which are rotatably mounted in the standard, Q. This pouring drum is provided with six perforations, o, separated by sharp ridges, which pass through the outer casting, q, and the inner lining, u. The latter is held in place between the angle webs, r, the lining being of a fireproof material and recessed on each side of the perforations, o, as shown. When the stream of metal strikes the sharp ridges between the openings, o, in the pouring drum, M, it will be discharged simultaneously through the holes on either side thereof into the mold, the flow of metal being absolutely cut off just as soon as the sharp edge of the lining passes the stream of metal. Entering the outer end of the drum is an inclined chute, P, into which the molten metal is discharged from the ladle car, by which the molten metal is brought direct from the blast furnace.

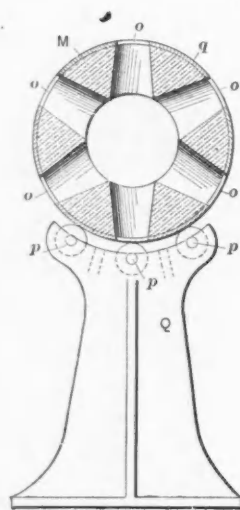


FIG. 4.

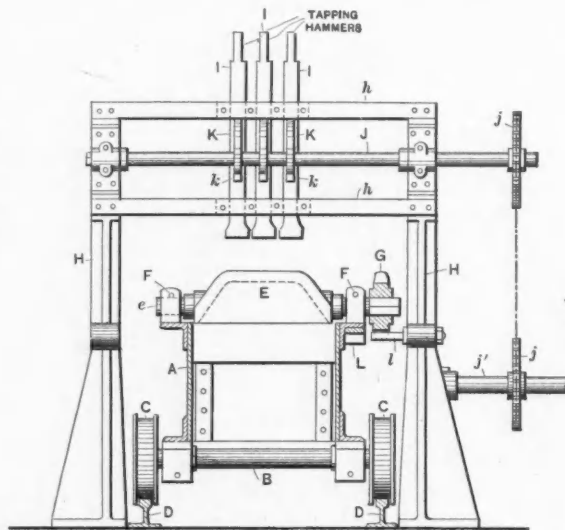


FIG. 5.

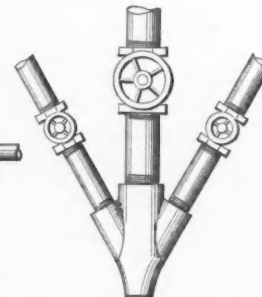


FIG. 6.

THE RAMSAY CASTING AND CONVEYING MACHINE.

Only such an amount of metal is discharged into the drum from the ladle as will properly fill the molds. The molten metal in the drum immediately flows out through the lower discharge openings into the mold immediately below said lower discharge openings, and as the mold which has been filled moves away from the drum, the latter will be rotated so as to cut off the flow of metal during the time in which the next mold is being brought into position under the drum, the imperforate walls between the adjacent perforations acting to cut off the flow of metal. When the next succeeding mold assumes the proper position the next discharging hole has taken position at the bottom, thereby permitting the metal to flow directly into the mold until it is filled. This operation will be repeated, six molds being filled at each revolution of the drum. With the sharp ridges used, the metal divides and flows through the two lowermost perforations into the two molds immediately under the drum, the imperforate wall of the ridge at that time covering the space between the two molds and preventing the metal from flowing between them.

If it is necessary, in order to cool the pig sufficiently, as the molds move away from the pouring drum, they pass under a perforated water pipe, a, a portion of which is shown in Fig. 2. This pipe is located be-

tween the charging and discharging points, and is arranged to spray water upon the pig in the molds, cooling it sufficiently, by the time it reaches the point of discharge, to cause it to retain its shape and prevent bleeding when dumped out.

About three-fourths of a circle from the charging point is the discharging mechanism under which is the loading pit, V, containing the car, U. Above the dumping pit and on each side of the mold carrying frame, two standards, H, are located, the inner one of which is provided with a rack, l, adapted to engage the gear wheels or sprockets, G, mounted upon the inner trunnions of the molds, E. This rack is of sufficient length to turn the molds, E, a full revolution, so as to bring them bottom upward and then right them.

To facilitate the dumping of the metal from the molds a hammer is used, so constructed that the bottom of the mold will be struck a smart blow at the proper time. This tapping mechanism consists of two or more hammers, I, vertically movable in guide ways in cross beams, h, supported by the standards, H. Each hammer is provided with a vertical slot, k, in which the cams, K, rotate. These cams are mounted on a horizontal shaft, J, having at its outer end a sprocket, j, on shaft, J'. The cams are so timed that they will gradually lift the hammers to the highest point and suddenly release them at the moment each mold is turned bottom upward. When the mold has delivered its metal it passes on and is quickly turned by the rack, l, right side up in position to receive another casting.

At a suitable distance from the dumping point the luting pipe, b, is located for the purpose of coating the molds with a luting composed of clay, ore dust, coal dust, or lime to prevent the metal from burning or adhering to the molds. This luting is sprayed into the molds by means of a steam jet introduced from a pipe, c, into the nozzle or chamber, f, at the point of discharge of the luting material from the pipe, and in case the luting should not be plastic enough to adhere to the molds, the device is provided with a water pipe, d, leading into the chamber, so that any degree of moisture may be obtained. The steam jet atomizes the material, which is in a powdered condition, and sprays it on the inside of the molds. As the molds arrive at the luting point they still retain sufficient heat to dry the coat thoroughly before they can reach the pouring drum, M, for the reception of another charge of molten metal. With this arrangement it is not necessary to add to the luting or coating material any more moisture than is required to cause the coating to adhere to the molds. This plan of coating the molds has advantages over the one usually adopted of spraying or immersing, which causes the molds to crack owing to expansion and contraction. After the metal has been dumped it may be sprayed with water to further cool it, and is then ready to be distributed to any point in the works or to be shipped.

In Fig. 3, the chute, P, is provided with an overflow opening on the side, adjacent to which is a skimming wall of fire brick, by which the slag and other impurities on the top of the flowing stream of molten metal are skimmed and caused to flow out through the opening. The bottom of the trough is depressed below the skimmer, and is provided with a valve conveniently hinged, and secured by latch mechanism. When it is desired to drain the trough this valve is opened, and the remaining metal passes through the opening in the bottom of the depressed portion of the trough. This trough is mounted on wheels to facilitate its withdrawal from the drum.

CALCIUM CARBIDE IN ARGENTINA.—The use of acetylene gas is growing in Argentina, where several shops have been furnished with the necessary apparatus. A large calcium carbide factory has been established about 2 km. from Cordoba. In the main building there are five carbide melting ovens, as well as the machinery for crushing the raw material. There are also works for making metal vessels to receive the manufactured carbide, packing rooms, etc. There is a plentiful supply of limestone of high quality in the neighborhood.

ANTIMONY IN 1900.

The production of antimony in the United States, as shown in our table, was very little less in 1900 than in 1899. The production of the metal is carried on in this country only by the Mathison Smelting Works in New York and by the Chapman Smelting Company, of San Francisco, and the Mathison concern is in entire control of the trade so far as American production is concerned.

There is little new to report in relation to antimony mining. No ore was received at San Francisco from Nevada or Utah during 1900. In California the Wild Rose Antimony Company is developing some claims near Ballarat in southern California, from which some shipments of antimony have been made to the Chapman Smelter, which ran from 49 to 50 per cent. metal. The property consists of four claims which were bought in July last by E. M. Dineen, George Montgomery and C. B. Flemming, who organized the present company. It is stated that surface workings and a prospecting shaft show a vein 8 ft. wide and that outcroppings have been traced for a distance of 4,500 ft. The mine is favorably situated, having good supply of wood and water. It is at present some distance from a railroad, but the branch line which now runs to Johannesburg is to be extended this year up the Panamint Valley shortly, which will furnish excellent transportation.

For the ten months ending with October the imports of antimony, metal or regulus, into the United States were 2,980,092 lbs., an increase of 227,812 lbs. over 1899. Imports of antimony ore for the same period were 4,776,535 lbs., an increase of 794,402 lbs. over last year.

New York Antimony Market During 1900.

During the past year the market for antimony has been very steady. Supplies, both domestic and foreign, were somewhat larger than in 1899, and consumption also increased. To some extent the greater demand for this metal was due to the high prices ruling for antimonial lead, which, in certain cases, made it more profitable for manufacturers to buy the antimony and lead and prepare their own mixtures.

The favorite brands continue to be Cookson's, Hallett's, United States Star, Japanese, Hungarian and Italian. The last named is a new brand, which we are informed has already found much favor.

The market has fluctuated but little. The year opened with Cookson's selling at 10½ to 11c.; Hallett's at 9¾ to 9½c.; other brands at 9¼c., which figures ruled until the spring, when, owing to heavy imports, supplies accumulated somewhat. The market then sold down about one-quarter of a cent, but at the lower price a good demand developed and the values were firm until the fall. Then prices went off another quarter of a cent, Cookson's selling at 10c., Hallett's at 9¼c., other brands at 9 to 9¼c.

COPPER IN 1900.

The production of copper during the year just closed was in one sense a disappointment. The output of the United States was very large, but showed only a moderate increase over the total of 1899, notwithstanding the opening of new mines and the inducements for a larger production offered by the continued great demand for the metal and the consequent high prices.

Our estimate of copper production in the United States in 1900 is based upon the statistics collected by Mr. John Stanton, who receives the reports of all the large producing companies. The total for the year, compared with the completed figures of "The Mineral Industry" for 1899, was as follows, the month of December being estimated. The figures are in pounds:

	1899.	1900.	Changes.	Per ct.
Fine copper	571,811,194	604,887,360	I. 33,076,166	5.8
Copper in by-product sulphate	9,507,897	11,000,000	I. 1,492,103	15.7
Total	581,319,091	615,887,360	I. 34,568,269	5.9

The output of the mines which report directly—and which include all the larger companies—changed very slightly from 1899, the increase being derived entirely from the smaller mines, from new mines and from ores smelted in which the copper is subordinate to the other values.

The three chief producing regions in this country are the Lake Superior District, Montana and Arizona. Of these, Arizona was the only district showing an increase. The large mines of that region have continued to extend their production and their facilities. Few new producers have been added to the list. This district now turns out about one-fifth of the copper produced in the United States, and will probably gain steadily in proportion.

On the other hand, Montana, which produces about two-fifths of our copper, reduced its output slightly in 1900. The complicated litigation which has vexed the mines of the Butte District for two years past is still unsettled, in fact has grown more complicated than ever. Under the present management of most of the mines it is difficult to obtain reliable figures; but it is reported and generally believed that in several of the mines the tenor of the ore is not increasing with depth.

The Lake Superior District last year about held its own. The large mines as a rule have not increased their output, and the new mines which have been started in the last two years are not yet producers.

Outside of these three districts, California and Utah are the more important copper producers, and both of them gained last year.

The business done by our refiners in handling foreign ores and mattes has steadily increased. Besides handling Mexican and Canadian copper, some from Australasia now comes to this country, a contract having been closed early in the year by which all the blister copper from the Mount Lyell Mines, in Tasmania, now comes to the United States to be refined electrolytically. The imports last year also included some copper from Japan.

Exports of copper during the year have been very large. Our mines have continued to furnish a large part of the European supply. The total exports, estimating the month of December, were 158,100 long tons of fine copper, or 58.5 per cent. of our total production.

Foreign production, like our own, has shown very little change, the larger mines about holding their own. No important new mines were opened abroad in 1900, though the year just beginning may see some im-

portant developments in Mexico. In Australia also some promising mines are being developed.

The New York Copper Market During 1900.

After the extraordinary activity of 1899 it was not unreasonable to expect that during 1900 consumption would decrease and much lower values for copper be established. The political situation the world over was not favorable; in the United States a presidential campaign was pending, in Europe the English reverses in South Africa tended to disturb the financial situation. In the face of these adverse conditions the market during the past year has been remarkably steady. While at no time prices soared as high as in August, 1899, when for a while Lake copper sold at 18¼c., the average price of electrolytic copper in New York was 16.19 as compared with 17.61c. for 1899, the fluctuations being much less violent.

During 1899 the demand for copper was almost constantly in excess of the supplies, and thus for many months spot copper demanded a considerable premium. During 1900 the product was always adequate to supply the demand; and there was, furthermore, a tendency on the part of the manufacturers generally to work up their stocks and carry less copper. Thus, at different times during the year there were but few buyers of the metal, and the market became dull, but as the metal is held in very strong hands, values did not suffer, and buyers soon had to replenish their stocks and relieve the producers of their holdings.

It appears that the total consumption in the United States has not changed. The output of brass has been somewhat less, but that of conductivity wire has correspondingly increased. The consumption abroad has shown a large increase, both on the Continent and in England. In the latter country demand was especially brisk, and the installment of electric traction and power has called for tremendous quantities of copper.

Exports from the United States show a remarkable increase, being this year 137,800 tons, as against 114,360 tons last year. The United States has still further strengthened its position as the dominant factor in the copper market.

The London market for standard copper has lost its former significance, as at times it moved quite out of harmony with the course of the market for refined copper. Early in the year it was possible for some large operators to obtain control of the stocks of Standard copper; in consequence early deliveries rose sharply and a backwardation of £5 resulted. Meanwhile electrolytic copper had been selling much below standard.

The year opened with Lake copper selling at 16¼c., electrolytic at 15½c. The market was quite steady. When, early in January, the price of manufactured copper was reduced, the demand was greatly stimulated, and a domestic business resulted. Large export orders also came to hand, and early in February an active market resulted. At this time one of the largest producers consummated a sale of some 15,000,000 lbs. for delivery up to June at 16c. The market became very steady, for previously buyers in general were nervous as to just what course the market would take. Electrolytic copper sold at 15½c., and it is to be observed that while this description had advanced, Lake copper had declined slightly. The chief reason for this is to be found in the fact that at that time the European demand was very strong, and there requirements are mainly for electrolytic copper.

The market during March continued firm and active. Europe continued to call for constantly increasing quantities, and exports for this month reached the tremendous figure of over 20,000 tons. Meanwhile manufacturers here had quite depleted their stocks, and came forward as heavy buyers, so that it was hardly possible for the refiners to meet the demand. The price advanced to 17c. for Lake copper and 16½c. for electrolytic copper.

During April the market was very quiet, and there was not much business, either foreign or domestic, but in the absence of any pressure to sell, Lake copper continued to find buyers at 17c., electrolytic copper at 16¼c. In May, however, the continued dullness made itself felt, and Lake copper sold down to 16¼c., electrolytic at 16c. These conditions prevailed until July, when once again a buying movement set in, and Lake copper changed hands at 16½c. and electrolytic copper at 16¼c. During August the foreign demand became very pressing. The great heat which prevailed interfered seriously with production, and refiners were much in arrears in their deliveries. Europeans whose stocks, in spite of the large shipments from this country, had been worked up, were calling for prompt copper, and the result was that this became quite scarce. Lake copper sold at 16½c. and electrolytic at 16¼c.

Throughout the fall the market was very quiet. Manufacturers, both in this country and in Europe, were inclined to work with smaller stocks. Here the presidential election, and in Europe the Chinese trouble, caused a cloud to hang over the market. That values did not suffer more is to be ascribed to the fact that the producers had sold well ahead and were confident of a favorable outcome of the situation. Meanwhile Lake copper sold down to 16¼c. and electrolytic at 16¼c.

Average Monthly Prices of Copper in New York.

Month.	1899.		1900.		Month.	1899.		1900.	
	Elec.	Lake.	Elec.	Lake.		Elec.	Lake.	Elec.	Lake.
Jan.	14.26	14.75	15.58	16.33	Aug.	17.42	18.50	16.35	16.58
Feb.	17.02	18.00	15.78	16.08	Sept.	17.34	18.46	16.44	16.69
Mar.	16.35	17.54	16.29	16.55	Oct.	16.94	17.76	16.37	16.64
April	17.13	18.43	16.76	16.94	Nov.	16.49	16.93	16.40	16.80
May	17.20	18.25	16.34	16.55	Dec.	15.85	16.40	16.31	16.88
June	16.89	17.93	15.75	16.00					
July	17.10	18.33	15.97	16.16	Year	16.67	17.61	16.19	16.52

The re-election of Mr. McKinley early in November completely changed the aspect of the market, and brought forward American and European buyers for delivery as far ahead as next spring. Throughout the world stocks in the hands of manufacturers had become very small. Prices gradually advanced, and Lake copper sold at 17c. and electrolytic at 16¼c.

During early December the market became quite dull again, but toward the end of the month a better demand from Europe made itself

felt. The year ends with Lake copper selling at 17c. and electrolytic copper at 16¼ to 16¾c.

The London Copper Market in 1900.

(By Our Special Correspondent.)

The London metal markets during the past year have fluctuated considerably, owing to the many side issues which have affected them. The continued hostilities in South Africa caused a spirit of unrest to pervade all branches of trade. The never-failing belief in the eventual British success prevented any great break in prices, but "hope deferred maketh the heart sick," and the outside public became disappointed and the markets during the middle and latter months of the year were left to a great extent in the hands of professional operators. It also became evident that the zenith of the metal boom had been passed, and although the demand for raw materials was still on a very large scale, the buying was quite spasmodic, and of a hand-to-mouth policy. The massacres in China also caused a very unsettled feeling at one time, when it was feared that it might lead to some serious rupture between some of the European Powers; but happily this uneasiness was soon dispelled, and a mutual understanding was arrived at between the different governments. Requirements for war materials and ammunition for Great Britain and other nations has given an increased fillip to these branches of trade, and large quantities of metal have been used in this direction.

The elections in Great Britain and in America did not disturb trade to any appreciable extent, because the general feeling on both sides was that the parties in power would without doubt be again returned to office. This was the case, and when it was an accomplished fact it was discovered that the whole thing had been discounted, and after a few days' spurt prices eased off again. Dearthness of fuel in every producing center has been a disturbing factor, and has caused most manufacturers to work at a much smaller profit than was satisfactory, and although the volume of business throughout the year has been exceptionally great, it has not brought with it that feeling of security and contentment which should accompany good trade. Taking all points into consideration, however, and remembering the troubles which have so narrowly been avoided in all parts of the globe, the year 1900 will stand out in the annals of the trade of this country as a satisfactory one, but we must now prepare ourselves for a return of more normal conditions, not forgetting that we have come through two years of wonderful activity and prosperity.

January commenced with a visible supply of 22,817 tons copper, and the cash and three months value was £70. Consumers were buying freely, but only for their immediate requirements, although the demand on this side was good, as it was on the Continent and in America. From this point values improved to £71 18s. 9d. for cash, while forward metal only rose to £71 7s. 6d. At this level very unfavorable news arrived from the seat of war, and caused a break in prices to £70 7s. 6d., cash, and £69 8s. 9d., three months. This backwardation on forward metal was due to the fact that American operators were holding all the available stock of warrants and were in the act of giving the bears a pinch.

February came in with an upward move, owing to the statistics, which were made to look more favorable by shipments from English stocks in America, and the stock of the world was given at 21,327 tons. Bears got funk and paid up to £72 2s. 6d. for spot and £70 17s. 6d. for forward prompts. Consumers then followed, and on the report of further consolidation of American interests there was a fresh burst of activity and values were run up to £74 17s. 6d. for near prompts and £73 10s. for forward; but the Americans at this time were making cheap offers on the Continent, and on this becoming known, the speculative market again eased off, and this was also helped by the publication of statistics at the commencement of March, which showed a visible supply of 22,982 tons, or an increase for the month of nearly 1,700 tons. Standard copper declined to £74 7s. 6d. for cash and £73, three months, but the scarcity of warrants resulted in a bear scare and values were quickly rushed up to £79 15s. for cash, which price had not been touched for a considerable time, although stuff for delivery in three months was only worth about £5 per ton below cash warrants. All descriptions of copper were being hurriedly put into warehouse to help the sellers of shorts, who were in an exceedingly unpleasant corner. The price of refined suffered, and this class of copper was being delivered against standard contracts. During this period advices from America were very good, and this helped to frighten operators on this side. When the most urgent needs had been satisfied, values dwindled to £77, cash, and £74 5s., three months, but the trade of the country was good, and before the month was out a rally had taken place, and cash closed at £78 2s. 6d. and three months at £77 8s. 9d. April statistics showed another increase of 1,650 tons in the visible supply, which, when the month opened, stood at 24,632 tons. This feature rather deterred speculators from further commitments, but at this period a large business was doing in the copper share market, where the outside public were being attracted by the excellent returns and dividends which were published by the different producing companies. Consequently, bears of shares rushed in to cover. Standard copper was firm at the commencement in the region of £79 for spot and £77 10s., three months, but a setback occurred owing to large deliveries of English copper into warehouse, which material, was deliverable against speculative copper, and values suffered considerably, falling to £77 2s. 6d. spot and £75 12s. 6d. forward. The English Government at this time gave out good orders, but the outside trade was slack. May began with the visible supply standing at 27,475 tons, a further increase on the previous month of over 1,800 tons, and this naturally gave the bears further courage, despite the severe squeezes that they had received of late, and they were able, owing to the market not receiving much support from the ruling powers, to depress prices from £76 17s. 6d. cash and £76 2s. 6d. three months to £71 for cash and £70 10s. three months. Refined sorts were being offered at cheap rates, but when, at the end of the month, it was known that Lord Roberts had played a trump card in South Africa, and that the British troops were on the eve of entering Johannesburg, a further upward move commenced, and June saw values at £72 10s. for all positions. At this time we were again treated to that never-failing bull shout of "fire in the Calu-

met & Hecla Mine"; and these features were good enough to counteract the bad effect which would have been felt from an increase in stocks of over 1,700 tons. Events in China then gave commercial men food for reflection and prices were put down to £71 5s. cash, £71 12s. 6d. three months. When it became known that all the Powers had practically agreed to a concerted action in the Far East confidence was somewhat restored, and this was helped by a recovery in the iron market here and in America, and the reduction in the Bank of England discount rate which was lowered to 3 per cent. Home and Continental consumers took courage and bought somewhat freely, and this had a good effect on the speculative market, so that standard copper recovered to £72 10s. spot, and £72 2s. 6d. three months, but this level was not maintained, and before the month was out there was a decline to £71 15s. cash, £71 17s. 6d. three months, being a recovery of about 20s. per ton from the lowest.

July started with statistics showing practically no change for the past month, and this had rather a good effect. Consumers also were buying with more freedom, and good orders were being placed for cable work and warlike stores. Prices of copper, therefore, were moved upwards and touched £73 12s. 6d. cash, and £73 17s. 6d. three months, the month closing slightly easier at £73 cash and £73 5s. three months.

August statistics showed a decrease of 2,130 tons, and the Amalgamated interests again took a prominent share in the market, and as they absorbed a fair quantity of cash warrants the market in general, and outside operators rushed in and helped to run values, and cash touched £74 10s., while three months rose to £74 17s. 6d. When this level was reached the mid-monthly figures were published, and showing a large and unexpected increase caused a drop in prices, and operators for the rise got disheartened and began to sell freely, putting values down to £72 2s. 6d. cash, which drop for the time being helped to choke off the regular consumers.

Statistics published at the beginning of September showed an increase in the visible supply of about 1,250 tons, which fact, together with the good trade which was being done on all sides, caused a firmer tone, and values responded by improving to £73 17s. 6d. cash and £74 10s. three months. This advance, however, was brought to an end by the general election in the country and the tightness in the money market on the Continent, and to a somewhat lesser extent in this country. India sent a few good orders at the time, and the Government also placed fair lines. Before the month was out cash and three months' metal had declined to the region of £72 cash, but just at the close of the month American operators supported and improved values to £72 12s. 6d. cash and £73 2s. 6d. three months.

October started with a decrease in visible supplies, which then stood at 29,133 tons, but the whole month was characterized with dulness and the trading was below the average. The elections in England and in America caused people to look on for a time so as to see what the possible outcome would be. Consumption remained good, but America was a free seller and took manufacturers' orders at rather cut prices. The public also shirked continuing their commitments, owing to the increase in the contango and closed out their holdings when these prompts fell due. This caused a shrinkage in values to £71 11s. 3d. cash, £72 5s. three months. Toward the end of the month America sent over very strong reports and advices said that the Calumet & Hecla Company, and many of the leading producers had sold out for the year; this caused a slight revival, and the close of the month saw an improvement to about £72 7s. 6d. cash, £73 three months.

Statistics published at the commencement of November showed the visible supply at 28,812 tons, and cash was worth £72, with three months at £72 10s. On the re-election of McKinley to the Presidency of the United States the tip went round that things were going to improve and a little burst of speculation was noticed, driving the price of standard copper to £73 5s. cash and £73 15s. three months, but when the buying was completed values again settled down in the neighborhood of £72 10s. cash.

December opened with the visible supply standing at 29,222 tons, being an increase of about 500 tons; and prices rattled down, being influenced by liquidation of holdings of copper shares and the depression in stock exchange circles. The year closed with the quotations for standard copper standing at £73 for spot, and £73 10s. for three months.

GOLD AND SILVER IN 1900.

We are able this year, as a year ago, to present at this early date a very close estimate of the gold production of the world in 1900. By the use of official reports, with estimates for the closing months of the year, and by special cable dispatches where needed, we have prepared a table the totals, in which will vary, we believe, but very slightly from the final figures.

In one respect the gold situation in 1900 was unprecedented. It has never before happened that the output of a great gold producing country has been suddenly cut off entirely, or almost entirely. The Transvaal, which produced \$78,070,761 in gold in 1898, was expected to yield close to \$90,000,000 in 1899 and \$100,000,000 in 1900. The war broke out in October, 1899, and the total for that year was \$72,961,501; while in 1900 the only production was from the few mines which were operated by the Government in the opening months of the year, and this work was stopped when the British armies reached Johannesburg. Instead of \$100,000,000 the Transvaal appears in our table for only \$6,845,046.

The total production of gold in 1900, as shown in our table, was \$256,462,438. It was \$313,641,534 in 1899, so that last year there was an apparent decrease in the total of \$57,179,096. If we deduct the Transvaal output in both years, however, we find that there was an increase of \$8,877,360. Had the Transvaal mines continued to work undisturbed, there is little doubt that the year would have shown an increase of some \$40,000,000, and a total of more than \$350,000,000.

The United States, which, in 1899, ranked third among the great gold producers, in 1900 showed a substantial increase, which, with the elimination of the Transvaal, put it in the first place in 1900. Australasia dropped from first to second place, while Canada took the third rank, though at a long interval, and Russia the fourth place. These four countries produced together 78.5 per cent. of the total.

The United States produced in 1900 a total of \$78,658,755, an increase

of \$8,500,000, over 1900. A very considerable part of this gain came from Colorado, which stands first among the States, with a total of about \$29,500,000. The large outputs of Cripple Creek and Leadville were assisted by the old districts of Gilpin County and many smaller mines. California, the second State, showed a moderate gain, the result mainly of working the older mines, though the application of the dredge to the river beds and flats formed a feature of the year's progress. Alaska now holds the third place. The much-exploited fields of Cape Nome have proved a disappointment to many, and their yield has been less than was anticipated. The coast mines have done well, and about \$1,000,000 has been taken from the American Yukon. Among the other States, the northern group, including Montana, Idaho, Washington and Oregon, has maintained its production, as have Arizona and New Mexico.

GOLD PRODUCTION OF THE WORLD.

Countries.	1899.			1900.		
	Fine Ounces.	Kilo-grams.	Value.	Fine Ounces.	Kilo-grams.	Value.
North America:						
United States.....	3,391,196	105,471.0	\$70,096,021	3,805,455	118,961.9	\$78,658,755
Canada.....	1,018,371	31,674.6	21,049,730	1,257,862	39,121.3	26,000,000
Newfoundland.....	3,950	122.9	81,646	3,950	122.9	81,646
Mexico.....	448,832	13,960.1	9,277,351	404,749	12,589.0	8,366,162
Central America.....	23,470	730.0	485,158	31,446	978.1	650,000
South America:						
Argentina.....	6,773	210.6	140,000	6,773	210.6	140,000
Bolivia.....	15,723	489.0	325,000	15,723	489.0	325,000
Brazil.....	76,613	2,383.0	1,583,700	77,407	2,407.6	1,600,000
Chile.....	54,657	1,700.0	1,129,820	60,474	1,880.9	1,250,000
Colombia.....	164,490	5,115.9	3,400,000	135,462	4,213.3	2,800,000
Ecuador.....	3,628	112.9	75,000	5,805	180.6	120,000
Guiana (British).....	108,239	3,367.5	2,238,040	102,801	3,200.6	2,126,964
Guiana (Dutch).....	26,972	838.9	557,532	25,239	785.0	521,690
Guiana (French).....	80,072	2,490.5	1,655,088	68,353	2,126.0	1,412,857
Peru.....	35,045	1,090.0	724,414	38,581	1,200.0	797,530
Uruguay.....	2,572	80.0	53,168	2,572	80.0	53,168
Venezuela.....	46,619	1,450.0	963,670	46,619	1,450.0	963,670
Europe:						
Austria.....	2,411	75.0	49,845	2,411	75.0	49,845
Hungary.....	98,798	3,072.8	2,042,159	98,798	3,072.8	2,042,159
France.....	6,047	188.1	125,000	6,047	188.1	125,000
Germany.....	3,601	112.0	74,435	3,601	112.0	74,435
Italy.....	3,643	113.3	75,299	3,643	113.3	75,299
Norway.....	74	2.3	1,539	74	2.3	1,539
Portugal.....	96	3.0	1,994	96	3.0	1,994
Russia.....	1,159,214	36,053.3	23,963,017	1,117,120	34,744.0	23,090,862
Spain.....	1,329	40.0	30,873	1,329	40.0	30,873
Sweden.....	3,415	106.2	70,581	2,415	75.0	50,581
Turkey.....	375	11.6	7,751	375	11.6	7,751
United Kingdom.....	2,845	88.5	58,810	2,845	88.5	58,810
Asia:						
China.....	321,510	10,000.0	76,645,612	266,086	8,276.1	5,500,000
India (British).....	405,688	12,618.2	18,385,467	453,275	14,098.3	9,369,185
Japan.....	58,055	1,805.6	1,200,000	60,474	1,880.9	1,250,000
Korea.....	55,432	1,724.0	1,145,769	62,988	1,959.0	1,300,000
Malay Peninsula.....	25,399	790.0	524,997	25,399	790.0	524,997
Dutch East India.....	12,309	384.7	255,667	20,369	639.5	421,027
Africa:						
Transvaal.....	3,529,826	109,782.6	72,961,501	381,158	10,900.1	6,845,046
Rhodesia.....	54,241	1,687.0	1,121,170	78,055	2,427.8	1,613,388
West Coast.....	33,365	1,033.3	700,000	36,284	1,123.5	750,000
Madagascar.....	7,257	225.7	150,000	24,190	752.4	500,000
Australasia (7 cols.).....	3,807,727	118,452.6	78,705,710	3,642,149	113,282.3	75,283,215
Other countries.....	72,569	2,237.1	1,500,000	77,407	2,407.6	1,600,000
Totals.....	15,173,633	471,936.8	\$313,641,534	12,406,554	385,910.1	\$256,462,438

in the South a beginning has been made at systematic mining and milling in Georgia, which promises well for the future. In the Black Hills there has been an increase.

The prominent feature of the gold mining industry has been the increased attention paid to low-grade deposits and to the careful adaptation of milling processes to the ores to be treated. The example set by Capt. De La Mar in the Mercur District in Utah has been followed in the Republic District in Washington, and is also to be copied in several of the Nevada districts. Under competent management there is no doubt that many low-grade mines, heretofore neglected, will be profitably worked and will add largely to our gold production.

Canada.—The large production of Canada, which we estimate this year at \$26,000,000, places it third in the list of gold producers. Four-fifths of this came from the Yukon Territory, where the estimated output was \$20,000,000. British Columbia shows a fair increase, the exploitation of the Atlin Country having turned the decline of placer mining into an increase.

Wm. T. Robertson, Provincial Mineralogist of British Columbia, has kindly furnished us with the following estimate for the Province:

	1899.	1900.	Increase.
Placer gold.....	\$1,344,900	\$1,500,000	\$155,100
Lode gold.....	2,857,573	3,500,000	642,427
Total.....	\$4,202,473	\$5,000,000	\$797,527

This is a very conservative estimate. Mr. Robertson estimates the production of silver and of other metals, iron in connection with gold and silver, as follows:

	1899.	1900.	Increase.
Silver.....	oz. 2,939,413	3,800,000	860,587
Lead.....	lbs. 21,862,438	45,000,000	23,137,562
Copper.....	lbs. 7,722,591	10,000,000	2,277,409

The gain in lead is the most striking feature of this statement. The Ontario mines, according to the best information, yielded last year \$300,000 in gold, or somewhat less than in 1899. In Nova Scotia the production is estimated by Mr. E. Gilpin, Jr., head of the Bureau of Mines, at \$563,875, or somewhat more than in 1899.

Mexico.—The mint and custom house returns indicate a small decrease in gold production, as shown in the table.

South American Countries.—But little change is to be noted, except in Colombia, where the long-continued revolutionary struggles interfered with mining.

European Countries.—The only European producer of importance is Russia, and the returns from that country include the Siberian mines. The Russian official returns, as forwarded to us by cable, after making the usual allowance for gold not reported to the mint officials, show a total production of \$23,090,862, a decrease of \$872,155 from 1899. This was

almost entirely due to the disturbances in Eastern Siberia and Manchuria, which interfered seriously with the working of the rich placers on the tributaries of the upper Amoor. The restoration of order on the frontier will doubtless be followed by a large increase especially as operations will be extended into the rich river valleys on the Manchurian side of the Amoor. There is no doubt that Manchuria will remain permanently under Russian control.

Asia.—An increase is shown in the Colar Field, in India. China shows a decrease, naturally, while Japan and Korea increased. In the Dutch East Indies a considerable gain has been noted, from operations at various points. Thus the Redjang-Lebong Mining Company, from its mines at Lebong-Donok, in Sumatra, is now turning out 1,300 oz. gold and 8,500 oz. silver monthly.

Africa.—The condition of affairs in the Transvaal is referred to above. The production given in the table is that made by some of the Witwatersrand mines, which were operated by the Government during the early months of the year. This production was reported to us by our special correspondent at Johannesburg. Rhodesia showed an increased output. A great boom has been engineered on the Gold Coast, but the new mines there have not reached the productive stage as yet.

Australasia.—The seven colonies together show a total decrease of \$3,422,495. The greater part of this was in Western Australia, the output of that Colony in 1900 having been \$27,992,693. The loss was due to closing of some of the mines, and to difficulties in the treatment of the sulphide ores at the great mines of the Kalgoolie District. The other colonies show totals—estimating the December production—as follows: Victoria, \$15,526,550, a decrease of over \$1,000,000; Queensland, \$14,178,936, an increase of \$1,300,000; New South Wales, \$8,190,468, a small decrease; New Zealand, \$7,169,568, also a small decrease; Tasmania, \$1,600,000, a gain; and South Australia, \$625,000, also a gain.

California Mines in 1900.

(By Our Special Correspondent.)

Mining as a whole was prosperous in California during 1900. This condition is not due to any support from the wealthier classes who are indebted to the mines for their fortune, but to the confidence shown by prospectors and local merchants scattered throughout the interior of the State. So far as any aid to legitimate mining from the mercantile or moneyed people of San Francisco is concerned, it would be waste of time to seek it. Neither the merchants nor brokers are inclined to invest in any mines, except, perhaps, in some with speculative possibilities, such as existed in years gone by in Pioche or on the Comstock. They will extend no financial aid to the development of the mineral resources of the State.

No better illustration of this policy could be adduced than the history of the Copper Mountain property, which went begging here for many years. When presented to local capitalists the only response was a query regarding copper, which implied an absolute lack of confidence in the future for the metal. However, a foreign company eventually supplied the necessary funds to exploit the property and determine its value, which proved to be far beyond the original calculations. It is now a thoroughly established fact that some large deposits of copper ore are to be found in California, covering an area extending from San Bernardino County on the south to Del Norte County on the north, yet none of these mines have been developed by home capital, excepting what has been done by individual miners working in their own behalf. The Copper King of Fresno County, offering inducements to a British company, was taken in hand and the developments were of such a character as to justify the erection of large and expensive smelting works on San Francisco Bay.

In the north Captain J. R. De La Mar, another wealthy and enterprising outsider, is opening up extensive mines in Shasta County which promise to equal, if not surpass in point of production, the Copper Mountain property. In Calaveras County the Williams Brothers are developing with their own money the old Napoleon, near Copperopolis, backed by experience gained in their former successful venture, the Copper Queen, which made a fortune for them after it had been dropped by some San Francisco men who thought it had petered out. Boston capital is now backing some extensive work in the southern portion of the State opening up copper deposits, and smelting works are now in course of erection at Raymond, in Madera County. The prediction can be made with safety that in the future copper mining will be an important industry in California, but the indications are that the mines will pass into the hands of Eastern and foreign capitalists, as their value and the importance of the industry are evidently not appreciated at home.

During the period under review there has been no important gold development in California. Some small mines have opened out well in Siskiyou, Shasta and Trinity counties, a very large proportion of the ores from them finding a ready market at Keswick, where quartz has been in urgent demand for flux at the smelters. Elsewhere in the mining districts north and south, the old-time mines still in operation have simply held their own.

With the prospects for cheaper fuel as a result of the increased production of oil throughout the State, and the transmission of electrical power from the mountains, the cost of mining and milling will, for the future, be largely reduced and a marked increase in production of gold from quartz veins may be expected.

The success of dredging machines, not only on rivers but on the alluvial deposits found in flats and benches in proximity to dry river beds, has helped this year to keep the gold production up to the average, and from this time forward this branch of the mining industry will grow in importance. The annual yield of gold in California will increase year by year from this source, and if Federal legislation can be invoked which will permit the resumption of hydraulic mining while protecting the interests of both the farmer and miner, there is nothing to prevent California again taking the lead among the gold-producing States of the Union.

The promotor of mining schemes for outside markets has scored no successes in California of late, and outside of one or two reconstruction schemes in London, the State has not been represented during the year by any foreign flotations.

There has been a demand of late for quicksilver mines from the East,

and should the present advance in the price of the metal be maintained, this class of mining can again be carried on here to advantage. The character of the California deposits of this mineral does not permit a very wide margin of profit on operations with a low range of prices for the product.

Cripple Creek in 1900.

(By Our Special Correspondent.)

This year completes the first decade of the Cripple Creek Mining District. In these 10 years the output of the camp has increased from \$2,300 in 1891 to \$19,862,594 in 1900. The total yield of the district during this time has been \$82,442,773. From a cattle range it has grown to be a mining district of about 40,000 population, with millions of dollars invested in buildings, railroads, samplers, mills, hoisting plants and other permanent improvements. The year shows a considerable increase over 1899, and has been, as usual, a prosperous one. A few mines that were shipping a year ago, are not now, but a number of new ones have come to the front and some of the old ones have increased their output.

The production for the year amounts to 466,975 tons of the total value of \$19,862,594. Of this 119,456 tons of the value of \$79 per ton, making \$9,437,024, were treated by the smelters, and 347,519 tons of the value of \$30 per ton, making \$10,425,570 were treated by the chemical mills. The following table gives the tonnage for each month:

Months.	Smelting. Tons.	Milling. Tons.	Total. Tons.
January	13,314	24,718	38,032
February	11,871	19,161	31,032
March	12,793	28,085	40,878
April	11,733	28,618	40,351
May	10,172	29,062	40,034
June	9,165	28,844	38,009
July	10,219	24,701	34,920
August	9,150	27,735	36,885
September	7,414	28,022	37,436
October	8,633	34,528	43,161
November	7,492	36,985	44,477
December	7,500	37,050	44,550
	119,456	347,519	466,975

Of this 102,180 tons of ore of the total value of \$4,015,674 were treated by the Colorado Philadelphia Reduction Works at Colorado City, 86,895 tons of the value of \$1,958,523 were handled by the Metallic Extraction Works at Florence, and the National Extraction Works handled 33,000 tons of the value of \$1,000,000.

It will be noticed that the milling ore runs considerably higher, \$30 per ton as against \$25 per ton last year, probably because considerable rich ore was handled by the mills from Stratton's Independence.

The following table shows the production by years:

1891.....	\$2,300	1897.....	\$11,500,000
1892.....	555,010	1898.....	14,200,000
1893.....	2,010,867	1899.....	15,662,400
1894.....	3,250,737	1900.....	19,862,594
1895.....	6,970,015		
1896.....	8,499,300	Total.....	\$82,442,773

Dividends.—The dividends paid during the year by the principal public stock companies are as follows: Portland, \$720,000; Stratton's Independence, \$1,789,327; Vindicator Consolidated, \$177,625; Consolidated Mines, \$110,000; Gold Coin, \$240,000; Last Dollar, \$60,000; Acacia, \$45,000; Mary McKinney, \$120,000; Modoc, \$60,000; Golden Cycle, \$120,000; Bull Hill Consolidated, \$15,000; Elkton Consolidated, \$183,750; Gold King, \$112,421; Lillie, \$45,000; Isabella, \$180,000; Kittie M. Leasing Company, \$1,500; Independence Town and Mining Company, \$50,000; Santa Rita, \$4,000; total, \$4,033,623.

The Cripple Creek Consolidated, the Greater Gold Belt, the Monarch, the Touraine, the Union, the Specimen and the Amazon companies paid large dividends that were derived from the sale of property. Beside there are properties owned by private individuals and close corporations paying large dividends that are not made public.

Mines.—On Battle Mountain the Portland, Strong, Gold Coin and Stratton's Independence have shipped steadily, except when putting in new machinery. The Dillon has done considerable work, and the Ajax has made a good record.

On Bull Hill the Vindicator has kept up a steady record, except when installing new machinery. The Lillie has done a large amount of development, but no work has been done in the Victor, except some leasing on the upper levels. The Isabella has not made the stir of last year, having had poorer ore, but has shipped steadily. The Acacia has shipped a large amount of ore and considerable development has been done on the Pharmacist now closed down. A large amount of development is in progress on the American Eagles and John A. Logan claims, belonging to the Stratton's Cripple Creek Mining and Development Company. But little is done and no ore is coming from the old Orphan Belle property. Work on the Pinto continues as usual. Development is in progress on the Easter Bell Group, lying east of the Victor Mine.

The north slope of Bull and Ironclad Hills is not as prominent as a year ago. On Raven Hill the Elkton and Doctor have shipped steadily. The lease on the Jack Pot expired early in the year, and since then shipments have been small. The Elizabeth Cooper claim of the Nugget Company, has shipped considerable ore. A large amount of work has been done on the Work Company's property by the Morning Glory Leasing Company. The Doctor-Jack Pot consolidation is to be worked through the deep shaft on this property. A little work is being done on the Moose. On Guyot Hill the Mary McKinney has kept up its splendid record. Beacon Hill has made a fair record. Considerable development work has been done on the Anaconda, with gratifying results, and a number of leases are also worked on the property. With the exception of the Midget, Kittie M., Lexington and the Conundrum claim of the Anchoria Leland Company, but little ore is shipped from Gold Hill. In Poverty Gulch, the Gold King is working steadily, also the Abe Lincoln and the Chicago and the Cripple Creek Tunnel.

Mining Transfers.—The year was noteworthy for the number of consolidations and changes of ownership. Stratton's Independence has passed entirely out of the hands of Mr. Stratton. The Elkton, Raven,

and Tornado have consolidated into one company, as have also the Doctor, the Ingham, the Jack Pot Claim of the Jack Pot Company, the Elizabeth Cooper Claim of the Nugget Company, and the Lucky Corner Claim of the Magnet Rock Company. Mr. Stratton has acquired a large tract of ground on Bull, Globe and Gold Hills, including on Bull Hill the Union Company's property, the Specimen, Lucky Cuss and others; on Globe and Gold Hills the Abe Lincoln, the Chicago and Cripple Creek Tunnel, May Queen, Ivanhoe, Geneva, control of Temomj property, the Marigold and others. Most of the properties are owned by the Stratton's Cripple Creek Mining and Development Company. The Anaconda Company has reorganized, paid its debts and now has a fair surplus in the treasury. The Hull City Placer and the Wilson Creek Consolidated Company have settled their differences by consolidation, and the company is now the Independence Consolidated, though the consolidation does not necessarily mean that all litigation is at an end.

Railroads.—The year was noted for its activity in railroad building. The new railroad from Colorado Springs will probably be completed in a few months. The road is controlled by a number of the principal mine owners of the district and will cut quite a figure in transportation. A new electric road around the district in connection with the new road from the Springs is in operation, though only for passenger service at present.

New Machinery.—The installation of new and heavy hoisting machinery was a feature of the year. Among the mines putting in large hoists are the Elkton, Vindicator, John A. Logan, American Eagles, Ajax, Isabella, Strong, Gold Coin, El Paso and others. Most of these hoists are first motion ones, manufactured by Webster, Camp & Lane, of Akron, Ohio, and are good for a considerable depth. From all appearances the coming year will see much deep development. A number of large compressor plants have also been put in.

Mills.—No new mills were built in the district, but in Florence the Union Gold Extraction Company has completed its new mill, and the Dorcas Mill is also ready for ore. The Rocky Mountain Smelter has begun work there and will compete for Cripple Creek ore. In Colorado City the Portland Company is putting up a mill for its own ore. In the district the Tutt and Penrose people have about completed a new sampler, on the Midland Road, east of the Victor Mine, in connection with their work at Colorado City and Florence. This sampler will handle a very heavy tonnage. The Gillette Mill and the Brodie both worked a few months, though they are closed down now. The Arequa Mill is just winding up its affairs, and the Economic Mill is the only one now running in the district. The Oneida and the Detroit mills, both small ones, have made feeble efforts to exist without success. As usual the bulk of the milling ore was treated in Florence and Colorado City, though considerable was also treated at the Atlas Mills in Boulder. The days of the local custom mills seem to be numbered as mills in the valley have cheaper labor and fuel.

Litigation.—There have been many suits brought, but a considerable number have been settled out of court. Among the principal of these are the Portland-Strong suit, which was settled by division of the disputed vein; the Doctor-Jack Pot, the Nugget-Doctor and the Hull City Placer and Wilson Creek Consolidated, all settled by consolidation.

New Finds.—There has been but little increase in the producing area. A number of good reports have come from outside districts, but so far nothing permanent has been developed. Considerable work was done on Copper Mountain, but no ore was shipped.

Electricity.—There is a large increase in the amount of current used. The La Bella plant has nearly doubled its capacity and made additions to its compressor plant. The Colorado Electric Power Company has also largely increased its capacity. There has been a new steam plant built at Cameron to supply electricity for the two electric railroads. The plant is owned by the railroad company.

Gilpin County, Colorado, Mines in 1900.

(By Our Special Correspondent.)

Gilpin County is the smallest in Colorado, but for regular returns and high per capita earnings few districts, either in Colorado or anywhere else, can compare with it. During 40 years of mining its production has year after year ranged from \$2,000,000 to \$4,000,000, and the "Little Kingdom of Gilpin" has added to the world's output of precious metals a total of not far from \$100,000,000, mostly in gold, the by-products of silver, lead and copper being estimated at about one-tenth of the entire amount.

The past year has been one of ups and downs. Matters promised at the start an unprecedented year, but the promises failed from several reasons. Spring work was hindered by exceedingly heavy snow, which also kept many properties busy handling water for several weeks. Litigation spoiled the chances of the Topeka, while at Nevada, the Gold Coin Mines Company, after spending a large sum in surface improvements and dead work, stopped work in early summer. A large amount of machinery has been installed on properties and the county now is very lively. Several good strikes insure more shippers for 1901. A number of properties are to be reopened and a number of others will start up within 30 or 60 days. In the larger properties deeper and more economical mining and closer ore saving are the basis of future success. Consolidations of a number of small properties will also insure better results. The outlook for 1901 is bright. A prosperous time is apparently in store for the older sections about Central City, Black Hawk, Nevadaville and Russell Gulch and the outlying sections of Perigo Lump Gulch, Pine Creek and Yankee. A late fall has allowed work to be kept up longer than ever before. Gilpin County now offers a good field for legitimate investments. Several good sales were made during the latter half of the year and indications point to more, though there is no boom.

A large amount of ore has been hauled either by the Colorado Southern Railroad or by wagon to Idaho Springs for concentration and the results have been generally satisfactory. The shipments of smelting and crude ores, concentrates and tailings from Black Hawk Station to the Denver and other smelters or mills were 3,174 cars, or 58,689 tons. The shipments for the last four months showed a gain. Below is given

a table of the mills, mostly located at Black Hawk, which are busy day and night all of the year:

	Slow-drop stamps.	Fast-drop stamps.
Black Hawk.....	25	..
Avon.....	33	..
Fullerton.....	75	10
Hidden Treasure.....	40	..
Mead.....	40	..
Polar Star.....	..	25
Eagle.....	50	..
Gilpin.....	..	80
Boston & Denver.....	25	..
Rocky Mountain.....	50	20
New York.....	50	..
Randolph.....	..	25
Iron City.....	35	10
Penn.....	..	35
Gamble Gulch.....	..	..
Perigo.....	15	..
Daisy.....	..	..
Lump Gulch.....	..	..
Petersen.....	15	..
	453	215

These 668 stamps and the Rocky Mountain Concentrator of 40 tons capacity handle from 1,800 to 900 tons of ore every 24 hours. Adding the shipments of smelting and crude ores, and the daily tonnage is not far from 1,100 tons.

The Cook, Fisk, Gregory and Bobtail properties and the new 80-stamp mill erected this year at Black Hawk have passed into the hands of the Boston & Denver Consolidated Mines and Milling Company. About 175 men are employed and the daily ore production is about 300 tons, nearly all being delivered at the 350-ft. or Bobtail level of the Cook property and hauled by an electric motor over one mile to the new mill. This mill was built on the site of the old Black Hawk mill, and the 80 rapid drop stamps treat about 300 tons, making between 60 and 70 tons of concentrates in 24 hours. The mill was built by Hendrie & Bolthoff, of Denver, and cost from \$100,000 to \$125,000. C. K. Colvin is manager.

At the Topeka big buildings were erected and a large plant of machinery installed and a new skipway made to the bottom at 1,000 ft. Litigation came after all this work was done, but indications point to a settlement before long. The Grinnell Gold Mining and Milling Company has installed new hoisting plants at the Grand Army and Grinnell mines, and although making a heavy production, has been troubled by water. About 125 men are employed under Manager F. C. Young.

The Kansas-Burroughs Consolidated Mining Company employs about 200 men and has added considerably to its holdings, now having 28 claims on Quartz Hill. It has been shipping from 100 to 150 tons per day, 10 per cent. of which is smelting ore. Larger machinery has been installed at the main working shaft, now 1,255 ft. deep, and big ore reserves have been opened. Pat McCann, of Central City, is manager. The same gentleman now has charge of the California Mine and the Indiana, Hidden Treasure and other properties formerly worked by the Gold Coin Mines Company, which are to be worked by the Patch Mining Company. The California shaft, 2,230 ft. deep, is being unwatered and the property will be opened as quickly as possible. A new shaft building 110 by 101 ft. was erected and one of the largest plants in Northern Colorado installed last spring. Heavy operations are looked for during 1901.

The Saratoga properties have been developed extensively with no attempt at production. The company is putting up a reduction works with a capacity of 300 tons at Golden, and will build a Bleibert tramway about 2 miles long to Black Hawk to connect with the railroad. E. Le Neve Foster is manager.

The Newhouse Tunnel being run from South Clear Creek to cut the veins of Gilpin County is creating interest in the Russell section and has caused a number of sales, chief of which are the Aduddell to the John Owen Mining and Milling Company and the Two-forty for \$40,000 to Illinois men. New machinery has been put on the former.

The Perigo is worked by the Tonawanda Leasing and Mining Company and its daily production is from 80 to 90 tons, the grade of ore being better of late. E. M. Messiter, of Perigo, is manager. The Calumet Gold Mining and Milling Company maintains a daily production of 40 tons, hauled by wagon to Idaho Springs for treatment, besides a high grade smelting ore. The National Tunnel Mining and Milling Company is talking of installing electric drills and running a big tunnel through Gregory and Lake districts.

The New Haven & Denver Mines Company recently bought the Justice, a good producer. The Carr Mine and Colorado Company, Limited, an English syndicate, purchased for \$45,500 the Carr and adjoining property and has put up new machinery. A Scotch and English syndicate bought the Galena, a good producer, and the Boston & Gilpin Gold Mining Company recently bought the Nemaha for \$15,000. The Crown Point & Virginia Mine at the head of Virginia Canyon has installed a big plant and done much development, besides producing well. The O'Neill is being developed and is showing good ore. Canadian capital is interested and H. C. Eastman, of Central City, is manager. A large concentrator is to be built at Black Hawk this spring, and a reduction works will be put up near Apex by Nebraska parties.

The Gilpin Tramway Company, which has about 20 miles of narrow-gauge track, has put switches to several producers this year and is hauling a big tonnage of ores and coal. Fred Krusel, of Central City, is manager of the company.

The Gold Coin and the Gold Bullion Placer and Mining Companies have done much preparatory work on ditches and pipe lines for hydraulic mining on North Clear Creek next year. In other parts of the county placer mining on the usual scale has gone on.

Leadville Mines in 1900.

(By Our Special Correspondent.)

The value of the output of the Leadville district for 1900 will almost reach \$13,000,000, an increase over 1899 of \$4,000,000. This remarkable

advance bears out the predictions made a year ago. The tonnage has been enormous and has been largely increased the past year by zinciferous ores. The total tonnage of all kinds of ore will be about 750,000 tons. Leadville had no boom during the year, but work has gone on steadily. Much of the new work started a year ago is just nearing completion and should give results within a few months. The great iron deposits have been proven further to the north and west; the Leadville Basin mines have continued to improve, and the lower contacts recently tapped have revealed great ore deposits and an area of mineralization which it will take years to exhaust. Numerous new shafts have started during the year, and probably one of the greatest advances is the work carried on by the Cloud City, Home Extension and other companies in the heart of the east side residence portion of the city. When a single concern pays over \$200,000 for titles to mineral rights of residence lots before even sticking a pick into the ground, it certainly shows faith in its territory, and such action was recently taken by the Cloud City Company. The silver-lead and the gold belt sections have received equal attention and much virgin territory is being prospected. The lessee has been more active than ever and he remains one of the great mainstays of the district. The sun of prosperity which arose so brilliantly with 1900 shines more brightly for the beginning of 1901.

The total value of the production of the Leadville district to date is \$275,000,000.

The zinc product is now a valuable adjunct to the camp, as its valuation this year will be about \$1,000,000, a difference from only 14 months ago, when zinciferous ores were cast aside. Much of the zinc ore has been sent abroad, where a better price was obtainable than in this country. The A. M. W., Moyer and Golob mills are making a fine concentrate, and while the Maid, Moyer and A. Y. & Minnie mines have furnished much of the ore, a greater production can be had, and during 1901 Leadville bids fair to rival Joplin as a zinc producer.

The Downtown Section.—As a result of the successful work of the Leadville Home Mining Company, this territory, geologically known as the Leadville Basin, is receiving the lion's share of attention. During the year the Home Company has paid dollar for dollar on its original stock issue and in addition has opened up a wonderful territory, having recently found the big iron shoot and a carbonate shoot in sinking the Penrose shaft. These lower workings have just begun shipping, and the company is now making average shipments of 500 tons of ore per day. Development work continues and the management is sinking a new shaft to the west on the Alice Claim. The company owns all its machinery, has no debts and promises to be a good dividend payer for 1901.

The Sheedy-Kountz combine in the Nubian, Weldon and A. V. projects has done well. The Nubian has opened fine ore bodies in the Midland and P. O. S. shafts, while the Weldon is again a shipper through its Nos. 1 and 2 shafts. The A. V. shaft, the latest project, is being sunk at the foot of Harrison Avenue to tap the extension of the shoot opened in the combine's other properties. This will probably require 8 months' work.

The California Gulch Company has sunk its new shaft to contact and is now drifting for an ore body. Exploration work with a diamond drill continues. The Valentine No. 1 shaft at 500 ft. is drifting for an ore body, while at No. 2 shaft diamond drill exploration is under way. The Cloud City Company has just started its new shaft west of the Penrose. It controls over 32 acres of ground. The Home Extension Company, in sinking its new shaft at Third and Oak Streets, passed through good contact and struck iron and water at the same time. As soon as pumps are in the new strike is to be explored. The Bohn Mine has opened up considerable new territory and is to sink deeper to follow the rich ore streak caught in the upper levels. The Poverty Flat Company has opened a good iron ore body through its Seeley Shaft, thus proving up the iron shoot further northwest than ever mined in the district.

The above work in connection with the new shaft of the Maple Street Company, the starting of a new shaft on the Chapman and Georgia Gulch placers and on the Neusitz placer by the Capitol Hill Mining Company, the opening of big iron bodies in the Coronado and Sixth Street Mines, the work of lessees on the Bison, Hope and other properties makes a different picture from 18 months ago, when scarcely a miner was seen in the entire downtown section.

Carbonate Hill.—The A. M. W. combination, one of the greatest enterprises, is sinking its Wolf toe shaft to the lower levels, where, at over 1,400 ft., the ore bodies tapped by the diamond drill will be explored. It is also shipping from the Mab and the Midas, where immense iron deposits have been opened. At the Midas, while 200 to 250 tons of good grade ore are shipped daily, the ore bodies show no signs of failing.

The Morning and Evening Stars and the Maid & Henriett groups are worked successfully by different sets of lessees. The Tarshish has sunk a new shaft on the Seneca and is now exploring its upper level. The Greenback has opened up the R. A. M. ore shoot and is a heavy producer. The Rialto Company, through its Pyrenees shaft, has tapped the same ore shoot with a diamond drill and is going to open it. The Rose Emmet is going after its extension of the shoot and has 3 claims to work on. The deep workings of the R. A. M. shaft of the Small Hopes have done a large amount of work which is now showing in increased shipments. A new shaft has just been started by the Evelyn Mining Company to open the same shoot. A new shaft is also going down on the Gallagher for this deposit. On the other side of the hill the Toledo Avenue Company and several others are carrying on new work and anticipate being in ore within 60 days. The new work on Carbonate Hill and slope, however, has not prevented a heavy production throughout the year from the R. A. M., Wolfstone, Maid Group, Stars, Greenback, Mab and others.

Fryer Hill.—This section may not have produced as many dollars' worth of ore as other parts of the camp, but it has produced an enormous tonnage. It is the home of the lessee. The Little Chief, Seneca, R. E. Lee, Matchless, Chip, All Right, Chrysolite, Pittsburg and numerous others are dotted with shafts many of which have been worked all year and have furnished their share of the production.

Iron and Rock Hills and California Gulch.—This territory embraces

a multitude of good claims that have made great progress during 1900 and also mines that have produced heavily. The Iron Silver combination, with its new concentrating mill, the A. Y. & Minnie with its mill, the different Iron Hill leases, the different Rock Hill leases, the Louisville and others have made a heavy tonnage. The Iron Silver Company has been producing over 200 tons daily and is sinking its Stevens shaft. The A. Y. & Minnie has produced heavily and development work has resulted in opening up still better territory. The Rubie Mine sank its shaft to the lower zones and is now working a large ore body. The Louisville Mine has resumed work on a large scale, on the sub-leasing plan. The Silver Cord and other properties located along the line of the Yak Tunnel are producing a good tonnage through this big bore which runs from the old Silver Cord Tunnel in California Gulch to the Forest Queen claim of the Golden Eagle on the summit of Breece Hill. This tunnel is now in about 9,000 ft. and will be completed early in 1901, enabling numerous properties along its route to ship that are now prevented by heavy transportation changes.

The lessee has done much work on Rock Hill and the year closes with an important strike in the Coon Valley claim that has stimulated work in surrounding properties. The Nisi Prius sub-leases have been doing nicely on the Weir, Hall and Pinnacle shafts, while the new shaft on the Crown Point is 800 ft. deep and is ready to explore the lower horizon. The Moyer Mill of the Iron Silver Company has proved a very important feature in mining operations of that locality.

The Gold Belt.—Much new work and good results on the properties opened up in the past in the history of Breece Hill and the tributary gulch sections of the gold belt. The Ibex has gone on steadily and done much development, while shipping about 8,000 tons of ore per month. The Penn Mining Company has opened up immense ore bodies, shipped heavily and is preparing to sink its No. 1 shaft deeper. The Resurrection Company has completed its new No. 2 shaft and is preparing to open up the ore extensions from No. 1 shaft. While the company has been shipping about 5,000 tons of ore per month, after both shafts start shipping it can almost double this tonnage. The Ballard Company has settled its litigation and is shipping from the big ore bodies opened. The Chippewa and Comstock companies have both caught ore, but the Comstock is still sinking and intends to explore the lower contacts. The Elk and Donovan claims are shipping and the same can be said of the President, which is worked by new lessees. The Highland Chief Mine near the Ibex has started up and a new shaft is going down to tap the Ibex deposits. The Dolly B. is shipping and both it and the Board of Trade shafts are to be developed the coming year. The new Diamond shaft is fast approaching the lower ore zones. The Fortune is now a steady shipper. The Vega is putting up boarding houses and a fine surface plant preparatory to sink a new shaft after the gold belt ore shoot. The Lida, Winnie and Monarch shafts of the New Monarch combination have all opened up the same sulphide shoots after a number of months' steady development, and shipments of 75 to 100 tons are to be doubled. The Lillian has been worked successfully all the year by lessees. In addition to the above, new work is being done by the Ohio Gold Mining Company, Big Six Company, the Little Bob, Vedalia, Gaesburg, Josie, Black Prince, Spot Cash, Triumph, Banker Ollie Reed, Golden Eagle, Great Hopes and a number of other smaller propositions. In fact, Big Evans and Little Evans, and Breece Hill and its surrounding gulches are humming with industry.

The Outer Rim.—Outlying localities took new life during the past year, and more work has been done on them than for a long time past. Everything inside the limits that looked anywhere favorable being gobbled up, the investor had to seek virgin territory, with the result that Iowa Gulch, Sugar Loaf, St. Kevin, Alicante, Ball Mountain, Dewey and Birdseye sections, as well as Lake Park and other points in the Arkansas Valley, have seen much activity. In Iowa Gulch the Doris, the Frank and several small propositions think they will open ore very soon. The First National Mine is being drained and the shaft deepened. On Ball Mountain Mr. P. L. Kimberly is sinking a deep shaft on the Butcher Boy group, which is entirely virgin ground. In Lake Park the Hap Hazard, Nanticoke and a number of other claims are successfully working, but the need of a mill for the low-grade ore bodies is more evident every year. In Sugar Loaf section the Silver Moon, Black Iron, Dinero, Fanchon, Gunnison, Venture and Golden Curry are all running and several of them are developing pay ore and shipping regularly. Good reports also come from the Twin Lakes section, where the Gordon litigation is settled and that old-time producer is to be operated again. The Twin Lake Placer Company is showing results that promise well for the new year. In Dewey, Alicante, Taylor Hill, St. Kevin and Red Mountain localities considerable new work has been planned for the early spring.

Railroads and Smelters.—The Arkansas Valley Smelter owned and operated by the American Smelting & Refining Company, and working under the management of J. H. Weddle, has been greatly improved, over \$200,000 having been spent on it, making it one of the largest and most complete plants in the west. The Bimetallic and Union, owned by the same concern, are closed down, but the Union may be improved and reopened. The Boston Gold Copper Smelting Company, under the direction of Superintendent Loder, has added a number of new furnaces and made other improvements and is ready for a big year's work. Ore teams in Leadville are not as numerous as they were. There are still quite a number in use, but the year has seen every important producer in the camp connected with the principal railway lines now entering the camp, thus giving promise of little or no trouble with shipments during the winter.

The Utah Output of Metals for 1900. (By Our Special Correspondent.)

At the outstart it may be said that the mines of Utah record a handsome increase over 1899, both in ore tonnage and in the metals. Accurate figures cannot be given till after complete returns are at hand, which will be several weeks later than this writing. The closest estimate is that supplied by Wells, Fargo & Company, completed on December 23rd, an advance copy of which is received through the courtesy

of Mr. Harry T. Duke, who has exercised every possible care in the preparation of this statement. These totals are as follows: 206,262 oz. gold, 10,196,818 oz. silver, 18,354,726 lbs. copper, 96,088,100 lbs. lead. The most surprising change compared to prior year is that of copper, which shows an increase of 100 per cent. Of this total the Utah Consolidated supplied 6,120,000 lbs., while the mines of Tintic furnished over 3,000,000 lbs., and Park City mines about 800,000 lbs., most of which is to be credited to the Daly-West. Among the several new copper producers the most notable is the Dixie Mine, operated by the St. George Copper Mining Company, the property being in Washington County, in the southwest corner of the State in speaking distance of Nevada and Arizona, 80 miles from railroad, which marketed 670,000 lbs. of clean copper.

It is needless to state that the total above shown is the largest copper yield ever made in Utah. The silver production is also the largest, while the output of lead crowds the record very closely. The 1900 gold yield also establishes a new record, and it may be affirmed that the showing for 1901 will be far more flattering.

The Utah management of the American Smelting and Refining Company, while adverse to giving out any information in detail relative to the operation of the smelters, furnishes these totals for the past 12 months: Gold, 41,332 oz.; silver, 4,613,319 oz.; lead, 47,958,928 lbs.; copper, 5,647,363 lbs. Had the stacks in blast in this field a greater capacity a much larger production of the several metals would have been made, as the ore tonnage shipped out of the State for treatment never was as great as during the past season. This fact is pleasantly emphasized by the following statement of total bullion and ore shipments forwarded from Utah, which is official record compiled by D. G. Spencer, of the Oregon Short Line Railroad. He states that to haul this tonnage required 6,748 railway cars. In this presentment an interesting comparison is made with the shipments during the prior year. The figures are in pounds:

	1899.	1900.	Changes.
Silver-lead ores	89,925,227	206,195,902	I. 116,270,675
Silver-lead bullion	50,017,257	46,159,052	D. 3,858,205
Copper bullion	7,812,875	12,302,407	I. 4,489,532
Copper ore	30,000	4,963,940	I. 4,933,940
Iron ore .....	.....	140,000	I. 140,000
Silver sulphides, Marsac Mill.....	.....	60,000	I. 60,000
Total	147,785,359	269,821,301	I. 122,035,942

The foregoing gives in brief a good bird's-eye view of the achievements of Utah's mines for the closing year of the nineteenth century. Our crowded columns will not permit reviews of the individual camps in this issue, though interesting summaries will be published in the near future.

No new producing camps made their appearance in 1900, though Gold Mountain, in Piute County, which for 5 years has figured among the promising mineral-yielding sections of Utah, will hereafter contribute handsomely to the State's gold production. The Annie Laurie Mine, on conservative estimates by independent, able engineers, is shown to have \$3,000,000 net in reserves, carrying \$10 to \$20 gold per ton. Of all Utah low-grade gold mining propositions, the average gold content is the highest in this mine. The 200-ton mill will go into commission in 2 weeks, and it is said that no plant was ever constructed on better economic lines. The treatment scheme is cyaniding, followed by amalgamation; numerous test runs, of several tons each, indicate high metallic extraction on a large working scale. This undertaking has given renewed life to Gold Mountain, and the Blue Bird, Sevier, Holland, Breckenridge-Mammoth and other mines will soon be found among the profit-paying producers.

A Few Notes on the Alaskan Coast.

Written for the Engineering and Mining Journal by Herbert Murray.

The stories of pestilence, starvation and anarchy which the newspapers print for the information of the public are rather amusing to those who, having spent some time in Nome, know the actual conditions existing there. Nome has been a remarkably healthy place this year, owing, doubtless, to the purity of the water furnished by its new water system. There have been very few cases of sickness, considering the size of the city, which at one time must have contained at least twenty thousand people.

There have been quite a number of people drowned along the coast from Norton Sound to Cape York, owing to traveling in unsafe craft. Storms rise very quickly at certain times in the year, and with an off-shore wind too strong to row against for the land, combined with the powerful current which sweeps up the Alaska coast and through Behring Strait into the Arctic Ocean, many a small boat has been wrecked and its crew drowned.

The treacherous weather is well understood, yet the fate which every now and then overtakes men does not deter others from putting to sea in flat-bottomed boats which cannot make the shore in the face of a blow.

There have of course been a number of fatal shooting affrays and hold-ups, but remarkably few, taking other mining camps of the same size as a standard.

This has been a bad year in Nome's history. What remained of the beach from the previous year was practically all worked out during the winter months, as were also the Topkuk beach diggings. When the great rush came in, thousands who were depending on the beach to make money found themselves stranded.

Owing to the unusually dry season, and in as great a measure to the peculiar attitude of the Nome Court, but little work was done toward opening up new claims. The summer rains, which are due in June and which continue regularly and almost continuously all the working season, held off until the latter part of August, and then came so violently as to swell the streams to the size of floods, tear out the dams and render sluicing impossible.

Hundreds of claims in the Nome District alone known to be rich were not opened this year, owing to the enterprising manner in which a certain well-known and now well-advertised man was persistently appointed as receiver for claim after claim, despite the protests of the owners. The trial now being held is bringing out some very unsavory

facts, and when the matter has been well sifted it is to be hoped that the system of legal piracy now practiced will be rendered impossible for the future.

Business, as well as everything else, was overdone, and Nome developed into a city large enough to transact the entire business of Alaska and several times too large to be supported by the Nome District at its present development.

In addition, every available piece of ground in the Nome District was staked—had been staked for months—and from Norton Sound to Cape Prince of Wales, a distance of 300 miles along the coast, the country had been so much and so carelessly staked that to the newcomer it certainly was a hard matter to decide where to go to find ground open for location. The great majority threw up their hands in disgust. The beach where they expected to pick up nuggets was exhausted, and upon the many known rich creeks there were no claims left open for them. As is always the case in a mining excitement, thousands had gone to Nome expecting to make fortunes without an effort. Many never even went on shore to ascertain for themselves the conditions, but returned on the same steamer that had brought them. Of those who did go ashore, the majority stayed in Nome, and a comparatively small number of those who arrived hit the trail to do bona fide prospecting.

These were men who had either prospected before or those who, new to the business, formed their own opinions, had the grit to face the hardships of the trail and the horse sense to get away from the already overrun districts and make some discoveries of their own. Many of these succeeded in getting claims on several of the most promising creeks in the Koogrock, Bluestone and other new districts.

Several new districts were discovered and came prominently to the front this year. In the Bluestone, now a part of the Port Clarence District, several very rich creeks were struck, among which are Alder and Gold Run creeks, quite a little money having been already taken out of the latter.

In the Koogrock District, which lies inland 90 miles northeast of Nome, are Garfield, Quartz, Coffee, Dahl, Iron and Harris creeks, all of which will pay. It has been estimated that this district produced \$40,000 this year. In both these districts gold was not found until so late in the season that but little work could be done.

Daniels Creek, at Topkuk, was also discovered this year, and it is thought that it will prove richer than Anvil Creek.

At present almost nothing is known of the possibilities of the various districts. Here and there pay has been found on many creeks. In some districts paying creeks have been discovered, but the immense area comprised by these districts and the few bona fide prospectors who are depended upon to make the discoveries combine to render it a matter of time to develop the true worth of a district.

Even of the Nome District, which is already three years old, but little is yet known, and of the others, outside of the district at Council City, which is the oldest, no work has been done until this year. I personally know of many long creeks staked from one end to the other which have never had a pick stuck into them.

There is already known to exist an enormous amount of low-grade ground in several of the districts; too low to work by the ordinary means of shoveling into sluice boxes, but which can be worked to a profit on a large scale either by hydraulicicking or dredging. There are thousands of acres of such ground in the Nome and Koogrock districts, especially the latter.

Naturally the low-grade propositions will not receive much attention until those involving less expense and quicker and larger returns for the money invested have been exhausted. However, they insure a longer period of active existence to the camps than is usually the case with placer diggings.

Although a large amount of territory has already been explored to a certain extent, yet even in the Seward Peninsula little is known of but a small fraction, the greater part being almost absolutely unknown. That new strikes have been made here, as well as in other parts of Alaska this summer and will be made known when parties now in remote parts of Alaska return and confirm certain reports, is believed by the majority of Nome people.

The greatest fault to be found with the United States mining laws is that they permit the staking of claims by proxy. The result in Alaska has been the wholesale staking of everything in sight. Men have made it a business to stake claims for others at so much per claim, and when once their signatures are found on a location notice, it is useless to go further up the creek to look for an open claim, for they do their work thoroughly. I have known three men to stake forty-five claims on one creek in a day and then only desist on account of darkness. One man staked 500 claims; those who staked over 250 you cannot count on your fingers, and those modest to the extent of 100 or better are too numerous to count.

Were these claims staked for men who would go upon the ground themselves and prospect or hire others to do this it would not be so injurious to the country; but they make no such effort, simply holding their claims for speculation, hoping that some one will find gold on the creek and enhance the value of their claims so that they can sell.

This simply ties up claims for the year and the fraction in which they were staked, when, the assessment work not having been done, the claim reverts to the Government again.

It is very discouraging to a bona fide prospector to travel over promising looking ground, and though there is not a soul at work on the creek, yet everything is staked and held by Jones or Smith or Brown, of New York, with not one chance in a hundred that they will expend a cent to prospect.

What the output will be next year from Nome and the other districts is hard to say. About \$5,000,000 is supposed to represent this year's clean-up, but unless there is a repetition of the present dry year the output for 1901 should much exceed this.

The Commercial Movement of Gold and Silver.

The commercial movement of gold during 1900 was seriously affected by the absence of supplies of gold from South Africa, and by the heavy

war expenditures made in that section of the world. Instead of drawing gold from the Transvaal mines, Great Britain was compelled to make exports to the Cape of Good Hope to a considerable amount, and this fact had more or less effect upon the European markets. The United States has been the great accumulator of gold during the year and the stocks of the metal held by the Treasury and the banks of this country are the largest ever known. The greater part of these stocks, however, were accumulated during 1899 and the imports of gold in 1900 were rather light, the increase during that year coming mainly from our own production. The chief reason for this was that throughout the whole year much higher rates of interest prevailed in the European markets than at home, and while the United States increased its trade balances and strengthened its position as a creditor nation, our bankers found it more to their account to loan large balances abroad than to bring them home. Indications of this were found in the placing of a large part of the British war loans in New York, and of the sale of considerable amounts of German bonds on this side of the water. Some movement of securities also helped to lessen the gold exports and the amount of foreign money invested in American enterprises and materially lessened during the year by sales of stocks and bonds to our own people. The only European nation whose gold balances show any increase during 1900 was France; the gold holdings of the Bank of France having increased during the year by \$90,500,000. On the other hand, the gold balance of the Russian Government and the Bank of Russia, which at the close of 1899 was the largest accumulation of gold in the world, was reduced in 1900 by over \$70,000,000.

The official statement of imports and exports of gold and silver in the United States for eleven months ending November 30th is as follows:

	Gold.		Silver.	
	1899.	1900.	1899.	1900.
Exports	\$33,521,900	\$53,705,524	\$47,760,823	\$58,863,325
Imports	45,714,718	56,499,635	27,817,710	36,745,936
Excess.....	I. \$12,192,818	E. \$2,794,111	E. \$19,943,113	E. \$22,117,389

The coinage executed at the mints of the United States in the year ended December 31st, 1900, is reported by the Bureau of the Mint as below:

Denominations.	Pieces.	Value.
Double eagles	4,334,084	\$86,681,680.00
Eagles	374,960	3,749,600.00
Half eagles	1,734,730	8,673,650.00
Quarter eagles	67,205	168,012.50
Total gold	6,510,979	\$99,272,942.50
Dollars	24,960,912	24,960,912.00
Half dollars	10,067,234	5,033,617.00
Quarter dollars	15,291,497	3,822,874.25
Dimes	24,779,182	2,477,918.20
Total silver	75,098,825	\$36,295,321.45
Five-cent nickels	27,255,965	1,362,799.75
One-cent bronze	66,833,764	668,337.64
Total minor	94,089,759	\$2,031,137.39
Total coinage	175,699,563	\$137,589,401.34

The gold and silver includes recoinages of old and worn coins and of foreign coins imported.

In the silver market the most pronounced feature of the year was the heavy movement of silver to the East. The following table shows the exports from London up to the latest date for which advices have been received—December 20th—as shown by Messrs. Pixley & Abell's circular:

	1899.	1900.	Changes.
India	£5,100,525	£7,399,739	I. £2,299,214
China	1,423,840	2,255,636	I. 831,796
The Straits	277,705	806,016	I. 528,311
Totals	£6,802,070	£10,460,791	I. £3,658,721

Shipments of silver from San Francisco to the East showed an increase in 1900 of over \$8,000,000, reaching a total of \$14,000,000 this year.

Various causes contributed to this large gain. In India the Government was at last forced to realize that the efforts to restrict the silver circulation was to a large extent a failure. While the gold standard was maintained so far as the exchange value of the rupee is concerned, India is a country where gold cannot be forced into general circulation. The country is poor and the daily transactions for which currency is required to a far greater extent than in the commercial nations of the East are of too small an amount to permit the use of gold coin to any extent. The silver rupee remains the chief coin and its limited supply was fast becoming a serious menace to the business of the country. The Government realized this with especial force last year when it had to face the necessity of heavy expenditures for famine relief and for works undertaken in connection with this relief. Throughout the year it has been a heavy purchaser of silver on the London market, while the sale of silver to India on private account was also very large. Another factor of some importance was the continued high prices of tin throughout the year. By far the greater part of this metal, which is produced in the East, is paid for in silver, and larger quantities were required for that purpose. In China in the early part of the year the Russian expenditures for railroad and other work were large. The greater part of this silver, however, was shipped to the East from Germany and did not pass through the London market. When the troubles in China became imminent there was a large increase in the demand for silver for that country. Chinese merchants realized what was coming earlier than our own people and ceased to import goods, requiring pay for exports in silver as being more portable and easily concealed than stocks of European goods, while later considerable amounts were required for the payment of expenditures made for the foreign armies in that country. There is every prospect that the demand for silver from the East will continue in 1901.

We see no reason to change the opinion which we have heretofore expressed and which has been founded on very careful investigation that not over 25 per cent. of the gold mined in the course of the year is added to the general coinage stock of the commercial world, the balance being either consumed in the arts or required to make up

losses from various directions. In silver the proportion is even less, and it is also altogether probable that not over 15 per cent. of the silver production of 1900 passed into circulation in the form of coin. The Eastern demand, indeed, accounted for the greater part of the production, leaving but a small balance for use in the United States and Europe. In Europe, in fact, the silver coinage of the year must have been small, Russia having practically concluded the coinage of silver rubles and subsidiary coin on her new standard, while hardly any silver coinage was made by the Latin Monetary Union during the year.

The average prices of silver in New York and London for the year are shown in the following table:

Month.	1900.		1899.		1898.	
	London. Pence.	N. Y. Cents.	London. Pence.	N. Y. Cents.	London. Pence.	N. Y. Cents.
January	27.30	59.30	27.42	59.36	26.29	56.77
February	27.49	59.76	27.44	59.42	25.89	56.07
March	27.59	59.81	27.48	59.64	25.47	54.99
April	27.41	59.59	27.65	60.10	25.95	56.02
May	27.56	59.96	28.15	61.23	26.31	56.98
June	27.81	60.42	27.77	60.43	27.09	58.61
July	28.23	61.25	27.71	60.26	27.32	59.06
August	28.13	61.14	27.62	60.00	27.48	59.54
September	28.85	62.63	27.15	58.89	28.05	60.68
October	29.58	63.83	26.70	57.98	27.90	60.42
November	29.66	64.04	27.02	58.67	27.93	60.60
December	29.68	64.14	27.21	58.99	27.45	59.42
Year	28.17	61.41	27.44	59.58	26.76	58.20

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

The demand from the East contributed to the higher average shown in 1900 and there was also an increased demand for silver for use in the arts which was incident to a time of general prosperity.

IRON AND STEEL IN 1900.

The year 1899 closed with the iron trade extremely active and prosperous all over the world. This boom period reached its culmination in the first half of 1900, and was followed by a reaction, which commenced in the United States and gradually extended to the European iron manufacturers. Toward the close of the year there was in this country a considerable recovery, the year closing with a feeling generally favorable for the future. Such a feeling, however, was totally absent from the European trade.

The iron production of the United States, which reached in 1899 a figure heretofore entirely unprecedented, and which promised a still greater increase in 1900, did not fulfill anticipations, but it nevertheless shows an advance over the previous year. We are enabled to give estimates of production which will approximate very closely to the actual results which will be ascertained later.

Iron Ore.—As in previous years the production of the Lake Superior Region continued to be by far the most important in the United States, and fully 80 per cent. of all our pig iron was made with Lake Superior ores. From all appearances this will continue to be the case for some time to come, especially as, in addition to the mines which are already worked, important operations have been begun in the adjacent iron regions of Canada.

We estimate the production and consumption of iron ore in the United States in the year 1900 as follows, in long tons:

Lake Superior Region, shipments from mines.....	18,632,315
Southern mines	5,100,000
Eastern, Ohio and other local mines.....	1,758,000
Total	25,490,315
Add iron ores imported	927,000
Total	26,417,315
Deduct increase in stocks	690,000
Approximate consumption	25,727,315

For the Lake Superior ores we are able to present a very full statement, owing to the care with which the records are kept, both at the shipping points on the upper lakes and at the receiving docks on Lake Erie and elsewhere. The total shipments by ranges, as furnished us by our special correspondent, were as follows for the shipping year, which closes with the close of navigation on the Lakes:

	1899.	1900.	Changes.	Per ct.
Marquette Range	3,757,010	3,205,437	D. 551,573	14.7
Menominee Range	3,301,062	3,193,024	D. 108,038	3.3
Gogebic Range	2,795,856	2,752,675	D. 43,181	1.5
Vermilion Range	1,771,502	1,655,799	D. 115,703	6.5
Mesabi Range	6,626,384	7,763,390	I. 1,136,996	17.1
Michipicoten (Canada) .....	.....	62,000	I. 62,000	.....
Total	18,251,804	18,632,315	I. 380,511	2.1

To these figures for 1900 there will be added the shipments by rail made during the winter from the various mines to furnaces in the Upper Peninsula and to those in the neighborhood of Chicago, which are estimated at 600,000 tons. These rail shipments come almost entirely from the Marquette, the Menominee and the Gogebic ranges, hardly any ore being sent from Minnesota after the close of navigation. It will be seen that the increase last year came entirely from the mines of the Mesabi Range, and that all the older ranges showed decreases, the largest and most important being from the Marquette Range.

The following table shows the receipts at Lake Erie ports and the stocks on dock at those ports on December 31st:

Ports.	—Receipts.—		—Stocks, Dec. 1—	
	1899.	1900.	1899.	1900.
Toledo	792,248	645,147	186,422	242,375
Sandusky	87,499	154,542	23,184	35,111
Huron	263,600	321,914	164,480	211,377
Lorain	1,112,946	1,090,235	337,822	251,838
Cleveland	3,222,582	3,376,644	1,200,806	1,337,445
Fairport	1,241,013	1,085,554	692,147	611,717
Ashtabula	3,341,526	3,709,486	1,902,598	1,811,459
Conneaut	2,320,696	2,556,631	468,808	630,514
Erie	1,309,961	1,240,715	361,335	480,734
Buffalo and Tonawanda.....	1,580,016	1,616,919	192,681	232,100
Total	15,222,187	15,797,787	5,530,283	5,904,670

The difference between the receipts reported in this table and the shipments from the mines shows the amount sent to points on Lake Michigan, principally to Milwaukee and Chicago. Allowance must also be made for the 1 per cent. deduction from shipping weights which is allowed on all deliveries on the Lower Lakes. Combining these tables we find the following, deliveries to furnaces of Lake ore during the year ending December 31st, the increase in these being nearly parallel to those in shipments:

	1899.	1900.	Changes.	Per ct.
Shipments from upper lake ports..	18,301,358	18,632,315	I. 330,957	1.8
Less increase in stocks, Lake Erie ports .....	.....	.....	D. 19,489	4.9
Shipments to furnaces.....	17,907,482	18,257,928	I. 350,446	2.5

Of the Southern iron ores, the Alabama mines furnished the larger proportion, although much work was done during the year in the mines of North Georgia, and those of Southwestern Virginia. In the Eastern mines there had been comparatively little change. The large imports shown are a mark of the activity which prevailed in the blast furnaces located near the Atlantic seaboard, which are in position to use imported ores with the minimum of classification charges. The greater part of the imported ores came from Cuba, although a few cargoes were received from Spain and some from Newfoundland.

Pig Iron.—The production of pig iron for the year is given in the table below, that for the first half of the year being the official statement of the American Iron and Steel Association, while the output for the second half is estimated on the reported capacity of the furnaces in blast:

	1899.		1900.		Changes.
	Tons.	Per ct.	Tons.	Per ct.	Tons.
First half.....	6,289,167	46.2	7,642,569	54.9	I. 1,353,412
Second half.....	7,331,546	53.8	6,272,027	45.1	D. 1,059,519
Total	13,620,703	100.0	13,914,596	100.0	I. 293,893

It will be seen that the course of production in 1900 almost exactly reversed that of the preceding year. In 1899 we see that 53.8 per cent. of the pig iron made was in the second half of the year, and the production for that half exceeded the first by over 1,100,000 tons. In 1900, on the other hand, 54.9 per cent. of the total was made in the first half of the year. Had production continued unchanged we would have turned out a total of about 15,300,000 tons of pig iron, and the increase would have been 2,700,000 tons instead of 293,893 tons, or 2.2 per cent., which was the actual gain. The difference was due to the market conditions, which are more fully commented on below, the blast furnaces responding promptly to the drop in demand and prices when it occurred.

The following table shows the division of the output according to classes of iron, the first half of the year being covered by the figures of the American Iron and Steel Association, while the division for the second half is necessarily estimated:

	1899.		1900.		Changes.
	Tons.	Per ct.	Tons.	Per ct.	Tons.
Foundry and forge iron	4,213,124	30.9	4,464,529	32.1	I. 251,405
Bessemer pig.....	8,202,778	60.2	8,124,255	58.4	D. 78,523
Basic pig.....	985,033	7.3	1,058,542	7.6	I. 73,509
Spiegel and ferro.....	219,768	1.6	267,270	1.9	I. 47,502
Totals	13,620,703	100.0	13,914,596	100.0	I. 293,893

The points specially calling for attention are the slightly increased proportion of foundry and forge iron and of basic pig with a corresponding decrease in the proportion of Bessemer iron. It will be seen that in 1900 a total of 67.9 per cent., or over two-thirds of the entire output of iron, was intended for conversion into steel.

Under the older classification, according to fuel used, we find that 13,534,874 tons were made with coal or coke as fuel, and 379,722 tons with charcoal. We have heretofore explained the reasons why the old classification of iron into anthracite and coke has been abandoned. Nearly all of the so-called anthracite furnaces now use some proportion of coke, and the quantity of iron made with anthracite alone is insignificant.

The activity of the past year brought into operation nearly all the furnaces which were in condition to run at all, including some of the older furnaces in Eastern Pennsylvania, New Jersey and elsewhere, which, owing to location and other causes, can operate at a profit only when iron is abnormally high. The quick drop in production which followed the drop in prices in the middle of the year is largely explained by the blowing out of these furnaces when quotations began to recede below their paying point.

Steel.—No official figures are available for the production of steel through any period of the year, and the estimate given is based largely upon the production of pig iron. We estimate that the total output of steel in the United States in 1900 was 10,980,000 long tons, or 318,000 tons more than in 1899. Of this production, approximately 7,500,000 tons was Bessemer steel, 3,225,000 tons open-hearth, and 155,000 tons crucible and other special steels. The production of Bessemer showed, if anything, a slight decrease from 1899, the gain in output being entirely in open-hearth steel, and more especially in basic steel. This change will continue to be emphasized in 1901 and succeeding years. The great plant at Ensley, in Alabama, which has been in successful operation for a considerable part of 1900, is to be followed by other basic open-hearth plants in the Alabama iron region, and several of the large Northern companies are increasing their output of open-hearth metal.

Exports of Iron and Steel.—Exports of iron and steel from the United States, including machinery, during the ten months ending October 31st, were valued at \$109,492,297, which compares with \$86,167,205 in 1899, and \$67,290,560 in 1898. These exports formed 29.1 per cent. of the exports of manufactures, or 9.3 per cent. of the total exports for the current year.

There was not much change in the relative position of different classes of iron and steel exports. In pig iron the October shipments were large, and the ten months shows a total of 227,680 tons, or 19,973 tons more than last year, instead of a decrease shown in the earlier part of the year. Shipments of rails showed an increase of 102,477 tons over 1899, and reached a total in 1900 of 325,525 tons—of which about

40 per cent. went to Canada and 10 per cent. to Mexico. The remaining half was pretty well distributed over Asia, Africa and Europe.

In general the evident tendency is to export iron and steel in finished forms rather than as raw material.

The November and December exports of pig iron, especially, were large, and the total for the year will reach 300,000 tons. Other principal items, besides rails, were steel billets, bars, plates, structural steel and rails.

New Blast Furnaces in the United States.—The American Iron and Steel Association recently reported the completion of four large blast furnaces—two at South Chicago, by the Illinois Steel Company; one at Thomas, Alabama, by the Pioneer Mining and Manufacturing Company; and one at La Follette, Tennessee, by the La Follette Coal, Iron and Railway Company. In addition to the above the Carnegie Steel Company is building two large furnaces at Rankin Station; the Buffalo Charcoal Iron Company has about completed a charcoal furnace at Buffalo, New York; Joseph Wharton is building a new furnace at Port Oram, New Jersey; the Warwick Iron and Steel Company is building a new furnace at Pottstown, Pa.; the American Steel and Wire Company is building a new furnace at Neville Island, near Pittsburg, Pa., and is erecting an additional stack at its Central Furnaces at Cleveland, Ohio; Jones & Laughlins, Limited, are adding a new furnace to their Eliza plant, at Pittsburg; the National Steel Company is erecting three new furnaces, one at New Castle, Pa., one in Mingo Junction, Ohio, and one at Youngstown, Ohio, and is also building another stack at Mingo Junction to replace one of its old furnaces now in use; the Sharon Steel Company is erecting a new furnace at Sharon, Pa.; the Roane Iron Company is erecting a new furnace at Rockwood Tennessee; the Columbus Iron and Steel Company has about completed the erection of two furnaces at Columbus, Ohio; the Globe Iron Company is erecting a new furnace at Jackson, Ohio; the Iroquois Iron Company is erecting a new furnace at Chicago, Illinois; and the Colorado Fuel and Iron Company is erecting a new furnace at Pueblo, Colorado. This is a total of 23 new blast furnaces to be added to our productive capacity in 1901. Some of these will replace old stacks put out of commission. The net addition to capacity will, however, be over 3,000,000 tons of pig iron a year.

In the other leading iron-producing countries we are enabled to estimate the production of 1900 with a close approximation to accuracy.

Canada.—For the first half of the year the output of the Canadian blast furnaces was 45,234 long tons of pig iron. Allowing for the starting up of at least one new furnace, the total for the year is estimated at 95,000 tons. The year just opening will see a great increase in Canadian production. The great works of the Dominion Steel Company in Cape Breton and the furnace of the Canada Iron Furnace Company at Midland will be in operation. The new works of the Nova Scotia Steel Company also will be at least partially finished in 1901.

Great Britain.—The production of pig iron for the first half of the year was 4,782,868 tons, and of steel 2,663,162 tons. The second half of the year showed a decrease, and the total output of pig iron was 9,150,000 tons, against 9,305,319 tons in 1899. The steel output for the year was approximately 5,100,000 tons, an increase of 255,000 tons over 1899. The proportion of the British iron output converted into steel yearly is increasing, though British manufacturers have held more persistently to the use of puddled iron than those of Germany and the United States. Great Britain continues to be an exporter of iron and steel on a very large scale, and an importer of raw materials, as shown in the tables below:

The value of exports of iron and steel and their manufactures from Great Britain for the 11 months ending November 30th is given by the Board of Trade returns as below:

	1899.	1900.	Changes.	Per ct.
Iron and steel.....	£25,473,955	£29,826,697	I. £4,352,742	17.1
Machinery	18,057,868	18,027,703	D. 30,165	0.2
New strips	8,562,922	7,750,831	D. 812,091	9.5
Totals	£42,094,745	£55,605,231	I. £13,510,486	6.7

The new ships exported include only those built in Great Britain for foreign countries.

Imports of pig iron into Great Britain for the 11 months ending November 30th showed a slight decrease, the statement being as follows, in long tons:

From	1899.	1900.	Changes.	Per ct.
United States.....	79,735	80,129	I. 394	0.5
Sweden	62,144	58,196	D. 3,948	6.4
Other countries.....	22,207	19,269	D. 2,938	13.3
Totals	164,086	157,594	D. 6,492	4.0

The other countries are chiefly Germany and Belgium. Imports of billets and other unwrought steel, on the other hand, which were 73,850 tons in 1899, rose to 146,307 tons in 1900; showing an increase of 72,457 tons, or 98.1 per cent.

Imports of iron ore into Great Britain for the 11 months ending November 30th were, in long tons:

From	1899.	1900.	Changes.	Per ct.
Spain	5,718,003	5,053,363	D. 664,640	11.6
Other countries.....	807,444	701,916	D. 105,528	13.1
Totals	6,525,447	5,755,279	D. 770,168	11.8

Spain furnished 87.6 per cent. of the imports in 1899, and 87.8 per cent. in 1900, showing only a very slight proportional change.

Germany.—Estimated on the basis of the actual production for 10 months, the output of pig iron in Germany was 8,406,370 metric tons, against 8,029,305 tons in 1899; an increase of 377,065 tons, or 4.4 per cent. A greater gain was expected, but the expansion was limited by the scarcity of fuel. The production of steel in Germany was 6,780,000 tons, an increase of 490,000 tons over 1899.

France.—The official half-yearly reports show a small increase in French production. We estimate the pig iron output for 1900 at 2,683,000 metric tons, against 2,567,388 tons in 1899; the steel at 1,625,000 tons, against 1,529,182; wrought or puddled iron, 821,000 tons, against 852,755 tons.

Belgium.—In pig iron there was a slight decrease from 1,036,185 tons reported in 1899 to 975,000 tons in 1900.

Other European Countries.—In Austria-Hungary there was a decrease, the result of trouble with the fuel supply. There was no material change in Italian or Spanish production of iron and steel, though there was a falling off in the Spanish output of iron ores. For Russia it is difficult to obtain late figures, but it is believed that there was a large increase over 1899, and the total for 1900 was not far from 3,000,000 metric tons.

Other Countries.—No important changes have taken place anywhere outside of North America and Europe. Efforts are being made to utilize the iron ores of British India, but the all-important question of fuel supply is in the way. The preliminary work, which had been begun on the great deposits of coal and iron ore in China, was stopped entirely by the troubles in that country. Further work may be postponed for years.

The World's Production.—So far as the figures are available, the indications are that our own production indicated very nearly the course of the iron trade throughout the world. European ironmasters, it is true, do not respond so quickly as our own to changes in demand, and the fluctuations in production are slower there than here, though quite as sure in the end. The first half of the year was a period of increasing output everywhere, and the second one of hesitation and gradual curtailment and limitation.

We estimate the total output of pig iron in the world in the year 1900 at 41,750,000 tons, an increase of 750,000 tons over 1899; while the production of steel was approximately 27,500,000 tons, an increase of 500,000 tons. The advance in pig iron would probably have been 500,000 tons greater had more abundant supplies of coal and coke been available in Europe.

Changes in Iron and Steel Metallurgy.—There have been no changes of marked importance during 1900. As for two or three years past the tendency has been chiefly in the direction of improvements in economy of production and in the better handling of large quantities of material. Thus new machinery for transferring ore from vessels to cars has been installed at several of the Lake Erie docks, notably at Conneaut, which exceeds in ease and speed of working anything which can be found anywhere else in the world. The Carnegie Railroad from Conneaut to Pittsburg, built expressly for the transportation of coal and ore, has made a record in the transportation of heavy freights, showing higher average train loads and lower rates per ton-mile than had ever before been attained. Several improvements have been made in charging machines for blast furnaces and steel furnaces. The casting machine, which is now a necessary attachment to all large furnaces, has been further improved.

In steel making the Talbot continuous process has been introduced in Great Britain and seems to meet with more approval there than in this country. The Monell open-hearth steel process has been tried at the Carnegie Steel Works, and it is understood that the results have been very satisfactory.

The use of blast furnace gases for the production of power has extended rapidly in Germany and Belgium. At the close of the year the engines operated with the waste gases of blast furnaces reached a total of 35,000 horse-power. A plant of this class is, we understand, soon to be installed in this country.

In Great Britain Mr. Stead has continued his experiments on the desulphurization of iron, and near the close of the year made public an important paper on this subject.

The study of the possible utilization of slag for various purposes has been continued by A. D. Elbers and others. The use of basic slag in the manufacture of cement and in making commercial fertilizers is extending. Mr. Elbers has suggested uses for slag in making artificial stone or building blocks, and this will probably be put in practice before long.

Among minor improvements may be mentioned the establishment in Chicago of a plant for making steel castings by the Tropenas process; the increase use of molybdeum, tungsten and vanadium in making special steels; and tests now in progress of nickel-steel for rails. The advantages of drying the blast for blast furnaces and converters are being seriously discussed, and appliances for that purpose will soon be tested on a large scale.

Lake Superior Iron Mines in 1900.

By Dwight E. Woodbridge.

Lake Superior iron ore shipments for 1900 show an increase of about 1,000,000 tons over 1899; not what was expected early in the year when mining activity was phenomenal. The shipments have been about 19,250,000 gross tons, and would have been several thousand tons larger had cold weather not come suddenly. A considerable tonnage now in docks and cars and at stockpiles would have gone forward, but for the freeze in late November. The leading port was Two Harbors, the shipping point of the Duluth & Iron Range Railroad. The shipments from the various ports have been as follows:

	Long tons.	
	1899.	1900.
Two Harbors, Minn.....	3,973,733	4,007,294
Duluth, Minn.	3,509,965	3,888,586
Escanaba, Mich.	3,720,218	3,436,734
Marquette, Mich.	2,733,596	2,661,861
Ashland, Wis.	2,703,447	2,633,637
Superior, Wis.	878,942	1,519,000
Gladstone, Mich.	381,457	418,854
Michipicoten .....	.....	62,000
Total	17,901,358	18,632,315
All-rail shipments (estimated).....	350,446	600,000
Grand total	18,251,804	19,232,315

Considering lake shipments only, Minnesota has for the first time surpassed Michigan and Wisconsin, and including both lake and rail shipments there is almost no difference between the two leading States. Either is as large a miner as many an important mineral producing nation. It is probable that next year Minnesota's lead will be unquestioned.

Seven Lake Superior mines have shipped this year over 750,000 tons each, two have shipped over 1,000,000 tons, and the greater portion of the output has come from comparatively a few properties, though there

is a large increase in the number of producing mines, the total exceeding any season since 1893, except 1899. A number of mines opened this year will be producing in 1901. The seven largest individual shippers of the year have been:

	Long tons.	
	1899.	1900.
Fayal, Mesabi Range.....	1,072,257	1,253,000
Mountain Iron, Mesabi Range.....	1,137,970	1,001,000
Chapin, Menominee Range.....	940,513	925,000
Hiwabik, Mesabi Range.....	553,836	925,000
Mahoning, Mesabi Range.....	750,347	911,000
Norrie, Gogebic Range.....	714,669	907,667
Adams, Mesabi Range.....	720,474	777,000

This table is a striking indication of present methods. Up to 1890 not a single iron mine in the Lake District had reached a production of 750,000 tons in one season, and there was but one such producer up to 1896. Now seven mines produce as much as did the entire district up to 1889, and more than came from 82 properties in 1893.

The Chapin's showing is most remarkable. It mined underground, shipped to dock and disposed of more than 925,000 tons. The mine really produced in the 12 months 1,012,000 tons. During the same period it kept its development well ahead in spite of great trouble from heavy flows of water. In the short period of 8 months the Fayal mined and shipped 1,253,000 tons. This mine had 3 shafts in commission the entire year, but the bulk of its product was from an open pit, where mining did not begin till the middle of April, was interrupted two months by floods and ceased with November. Some underground mines have shipped more than 60,000 tons of guaranteed ore this year, although eight months ago not a shovelful of earth had been removed for development. One concern this year spent more than \$60,000 in an unsuccessful attempt to find ore on a piece of land a few acres in extent, besides exploring with many men and diamond drills a score of other locations. One railroad, in a short season of from 7 to less than 8 months, has handled three to four million gross tons of freight, all one way over one railway.

The Mesabi has increased its lead over the other ranges. Its reserves are called on more and more and will be the chief reliance of consumers of Lake Superior ores as reserves on the older ranges diminish. The Mesabi's shipments during 1900 were 7,795,000 tons, an increase of 1,349,000 tons over the preceding year, and more than twice as much as was shipped by its nearest rival, the Marquette. It is evident that the Mesabi range must furnish a still greater proportion of the Lake ores, for explorations along the older ranges have been generally disappointing. On the Vermilion Range four great corporations have spent about \$300,000 in diamond drilling and found very little new ore. On the Menominee Range some excellent indications have been met, but actual results are meager. Several of the larger companies, including the Carnegie, Federal Steel, Oglebay, Norton & Company, Pickands, Mather & Company and some others, have opened ore bodies, but in most cases these are not new finds. The Marquette has given results of slight importance, and the finds on the Gogebic are mostly extensions to partially developed properties. On the Mesabi even, there have been few finds, though among these were two or three of considerable importance and others that will make mines of moderate size. If all ore shown this year on the Mesabi is to be counted there has been a great addition to the range reserves; if entirely new bodies are considered the total will not exceed 50,000,000 tons, of all merchantable grades, while the proportion of desirable Bessemer is disappointingly small.

On the north shore of Lake Superior, however, development has gone on rapidly. The ore-bearing formations are so vast and so difficult of access, that exploration has been slow and but two fields of desirable ores have been explored enough to show much value. These are the Michipicoten, at the east end of the lake, and the Atikokan, 100 miles west of Port Arthur. The Michipicoten must be judged now by the Helen Mine of the Algoma Commercial Company. The average analysis of the first season's shipments of Helen ore is not high, though the ore is of an excellent physical character. The ore shipped to United States ports ran hardly 60 per cent. iron and is non-Bessemer. What has gone to Midland and Hamilton is said to be somewhat better grade. Most of the ore exposed is a desirable non-Bessemer. There is no definite knowledge yet of the amount in the great hill above Lake Helen. The owners of the property have found several other deposits farther from Lake Superior, which they expect to open later and from them have some ores of a better grade.

The Helen Mine is about 12 miles from Lake Superior, at an altitude of 650 ft., on the side of a high hill that forms the crest of the continental watershed. Below the ore outcropping lies a lake, with ore beneath it, that can easily be drained. The Algoma Company has built a heavy standard-gauge railroad with excellent equipment, 50-ton cars, 110-ton locomotives, and the like. It has ordered 200 of these cars, and built a large dock that it is extending. It has also a fleet of four steamers that it is increasing to twelve. The company, carrying its own ore, and mining at low cost, should be able to sell at a profit though the ore may not be as high grade as that from many Lake Ranges.

The Atikokan ore is a magnetite, and lies along Atikokan Lake and River. The range has been known many years, and was examined ten years ago, but its distance from the lake and the discovery of the Mesabi discouraged exploration. A railroad is now under construction along the Atikokan River from Port Arthur, and an option on one deposit has been taken by an American concern, which is to explore thoroughly.

Aside from the Michipicoten and Atikokan there are ore finds along the Mattawin River, nearer Port Arthur, where the Ontario Government has been working with a diamond drill. Explorations some years ago showed both magnetite and hematite, but in thin beds. Ore outcrops here on a number of locations on both sides of the Mattawin River, and the ore-bearing formation covers many miles. In other parts of West Ontario ore has been found, but not enough is yet known about these to determine their importance.

One recent discovery may indicate the existence of more ore on the Mesabi than has been expected. The apparent footwall of taconite is not always such, and excellent ore in quantity may be found deep under taconite. In some explorations ore has been found under 50 to 80 ft. of taconite.

Not only have the consuming companies been most actively at work, but they have been the chief customers for outside exploring interests. Independent mining concerns are few, and with a very small number of exceptions are comparatively unimportant. All the old range Bessemer ore now mined outside the consuming companies is from the Gogebic Range, and a few mines on the Marquette and Menominee. On the Mesabi there are several large independent companies, including the Rockefeller concern, Corrigan, McKinney & Company, besides a few small producers. The Rockefeller company is really an independent concern, its connections aside from mining being solely with transportation. This company has continued its policy of fortifying itself with large ore reserves, and has purchased a number of high-grade ore properties that may not be opened for many years.

The railways of the Mesabi that are more intimately connected with mining than those of any other range, except the Lake Superior & Ishpeming, of the Marquette, now have large reserves of ore. The Duluth & Iron Range Road is preparing to build a new harbor and expend therein several million dollars for docks, etc., to double its present ample capacity of 5,000,000 tons annually. Little but timber and ore traffic is to be expected, and the timber traffic is of comparatively short duration. So the roads are forced to control sufficient ore to make the investment remunerative. With other of the ore roads of Michigan, except the Lake Superior & Ishpeming, ore traffic is incidental to general business.

For the lake ore and grain trade there are now about 30 large steel ships under contract or erection of an average capacity for 6,000 to 7,000 tons. As ships capable of carrying 2,000,000 tons were idle all the past season the outlook for new vessels next season is not flattering. It is noticeable that neither the Rockefeller, Carnegie or Minnesota iron companies are interested in a single ship now on the stocks. The season rate for ore delivered at Lake Erie ports last year was \$1.25 a ton, while the wild rate averaged 84½ cents. The season rate for 1901 will probably be under 75 cents, and the wild rate may touch 50 cents next summer. With dock charges higher than in many years this will bring vessel rates pretty close to hardpan. Such probable reductions in freights will permit a drop in ore prices, and still leave the mines a profit. This year a net profit of \$2 a ton has been not unusual for desirable well-known ores of the old ranges. Wages have been higher than in years, labor quiet and contented and the unions have lost what little hold they ever had among the miners. The same conditions bid fair to rule this year. Indications favor a material increase in output. One company, for instance, that in 1900 mined 2,000,000 tons in Minnesota, intends to increase this by 25 per cent.; another, that mined 435,000 on all ranges, will add 50 per cent. A number of properties developed last year, but adding a mere trifle to the output, will be worked heavily another year, and if the demand for silicious ores and limonites amounts to anything still others will be active again.

The range railways were prepared a year ago for a larger business than came and can easily take care of what seems probable. The Duluth & Iron Range will raise two of its docks to 60 ft., but that will not add to their storage capacity. Rolling stock and motive power will be altered but little. Experiment with pressed steel cars of 50 tons capacity have brought varying opinions. On some of the lake ore roads wood cars average a paying load of 70 per cent., and cost no more than steel cars per ton of revenue load, while they are easier on track and handier about a mine.

The Chicago, Milwaukee & St. Paul road has extended its lines on the Menominee and Marquette ranges and erected a dock at Escanaba, and is preparing for a considerable amount of ore traffic.

The Course of the Iron Markets in 1900.

The general course of the American iron market is substantially told in the letter of our Pittsburg correspondent, given below. A period of high prices, somewhat prolonged on the surface by sellers, who began to give concessions quietly some time before the actual break came; a sharp break in quotations, accompanied by a falling off in business; a period of somewhat more active trade at low prices; finally a recovery in prices, but to a point much below the level at which the year opened. The year closes, however, with an encouraging volume of business.

A feature of the year 1899 which was specially marked, was the large number of consolidations and of new companies formed to buy out and bring together existing concerns. This movement was very much less in 1900, financial conditions being less favorable. Nevertheless several new companies or trusts were formed, several of them being the outcome of negotiations begun in the previous year. These new companies include the American Bridge Company, with \$70,000,000 capital stock; the American Sheet Steel Company, \$52,000,000; the Crucible Steel Company of America, \$50,000,000; the National Roofing and Corrugating Company, \$5,000,000; the Standard Chain Company, \$3,000,000; the Shelby Steel Tube Company, \$15,000,000. In reorganization, articles of incorporation were filed by the new Carnegie Steel Company with authorized issues of \$160,000,000 stock and \$160,000,000 bonds; and Jones & Laughlins, with \$20,000,000.

Conversely another movement, which has heretofore followed the organization of the so-called trusts, has set in. This is the organization of new companies to enter into competition with the combinations. This movement so far affects chiefly nails, wire, tin plates, tubes and sheet steel. Some of the new companies are doubtless trusts; but others are legitimate industrial undertakings. There are, in fact, few departments in our iron trade which are so limited that they can be covered by a single organization.

A feature of the close of the year was the contest between the rail-makers and the railroads. During the greater part of the year the price of steel rails of standard section was maintained at \$35 per ton at mill, though some large contracts closed late in 1899 were executed at \$33. Late in the year the price was reduced to \$26, at which the companies offered to take 1901 contracts. This did not meet the views of railroad officers, who claimed that \$22 or \$23 would be nearer a fair price. Many companies held back their orders, and it was not until December, when

the upward turn in the market was in full progress, that contracts were generally placed.

Export business was a feature of the market, though not to a sufficient extent to affect prices at home materially.

The Alabama Iron Market in 1900. (By Our Special Correspondent.)

The year 1900 has not been bad for the pig iron and steel interests of Alabama. The shipments, though not as large as those in 1899, represent the production, there being practically no pig iron on hand at the beginning of the year. It is believed that when official figures are given out a few weeks hence it will be seen that all previous records have been broken. The shipments during the first 11 months of the year from Alabama and Tennessee were 1,185,854 tons. From the Birmingham District alone there were shipped 720,528 tons of pig iron during the same time. During November the Birmingham District shipped 62,000 tons, and it is estimated that as large an amount went out during December. There were exported from Alabama and Tennessee 205,375 tons of pig iron during the eleven months, nine-tenths of which was from the Birmingham District. This is greater by more than 35,000 tons than was exported during 1899. Cast-iron pipe shipments from Alabama and Tennessee during the 11 months amounted to 79,115 tons, and from the Birmingham District alone, 25,130. There were exported 7,910 tons of cast-iron pipe from this district.

Eight months out of last year saw fairly good prices. For four months during the Presidential campaign business was dull and shipments fell off, but for the first six months of the year the product of the furnaces brought excellent prices and in the last two months there was a recovery from low prices.

Generally speaking, furnacemen of Alabama and Tennessee have no complaints of conditions. They have been steadily busy and no financial embarrassment occurred, except in a very few cases. The amount of pig iron in the warrant yards and in furnace yards does not amount to much compared with the amount three years ago. Prospects are very bright, and there is not an ironmaker in this State who does not believe that as soon as the holidays are over and stock-taking is concluded a demand will start that will be hard to fill. The furnaces are making iron to their fullest capacities and the railroads are preparing to supply facilities for a prompt handling. Quotations are firm and are expected to rise again.

The export movement since August 31st has been wonderful. While the domestic market was on a boom no efforts were made to get any foreign orders, but when demand dropped off, orders were sought abroad and export shipments started in September. For the first four months of the year the export shipments were less than 10,000 tons per month. From April to August 31st the shipments ranged from 11,000 to 20,000. In September the export movement amounted to 55,029 tons, in October 37,807 tons, and in November 19,160 tons. The shipments will be over 15,000 tons at least. The greatest export shipments recorded were in 1897, when 220,000 tons went out. With already 205,000 and more tons known to have gone abroad, the shipment of December will put the aggregate foreign shipments for 1900 ahead of the 1897 record.

Furnacemen in Alabama believe that the coming year will be more prosperous than the past. There will be no national campaign, stocks on hands are low, there is much structural work to be done, there is more territory to supply, people are able to pay better prices and the general outlook of the country is brighter.

The Cleveland Iron Ore Market in 1900. (By Our Special Correspondent.)

The season of lake navigation, which came to a close December 18th with the arrival in the port of Cleveland of the boats carrying the last cargoes of ore, stands without a precedent in many respects. It really lasted over a period of 16 months, having been started upon before the season preceding had commenced to wane. A number of years ago, when John D. Rockefeller was just beginning to be a power on the chain of lakes as an owner of vessel property, having then organized the Bessemer Steamship Company, his present representative on the lakes, he entered into a contract with Andrew Carnegie, the head of the Carnegie Steel Company, to carry down the lakes for him 1,500,000 tons of ore each year, to be paid at the average going or wild rate of the year. In 1898 Mr. Carnegie had gone into the market and fixed the carrying rates for the season upon contracts at 65c. a gross ton, and thereby greatly lowered the average carrying rate for the season. In retaliation Mr. Rockefeller's men were on the market as early as August in 1899, asking for figures on tonnage for the entire season of 1900. The wild rate at that time was \$1.25 and, thinking to stave off further negotiations, Captain John Mitchell offered to place his tonnage for the entire season of 1900 at what was then the going rate, \$1.25. This was immediately accepted by the Bessemer Steamship Company, and before the end of September thousands of tons of carrying capacity had been contracted for the coming season. By December every boat, that was to engage in the ore trade on contract, was provided for. Thus started the first recorded effort to obtain a corner on the tonnage of the lakes.

The iron market at that time was in full boom, and estimates of the shipment for the coming season were placed high. Sales amounted to 18,000,000 tons, the equivalent of the entire shipment of the season just closed, and it was figured that in the coming season of 1900 the shipment would be at least 2,000,000 tons in excess. No sooner had these extraordinary tendencies developed, than a boom in shipbuilding began to appear. Carnegie, to offset the advantage which Rockefeller had gained by chartering the tonnage, began to order vessels of the American Shipbuilding Company. Other vessel owners did likewise, and as a result the berths in the shipyards were filled for months ahead and vacancies were spoken for as far ahead as six months. The result of this building has been that the record on the chain of lakes has been surpassed in the erection of new craft, the aggregate of large vessels being 28, with a gross tonnage of 100,997. This is equal to a

carrying capacity of about 200,000 tons per trip, or about 4,000,000 tons during a season.

The season opened early and caught many owners and shippers unawares. There was a rush in all parts and a crowding of vessels at the docks, but it was not too rapid to show the owners soon that they had not based their calculations well.

The season opened the latter part of April, and a week or two later the ore men began to grow apprehensive. Iron sales and the demand for ore at the furnace docks dropped away. Freight rates that had started out on a par with the contract rate of \$1.25 per gross ton, soon began to slowly dwindle. Ore dropped first to \$1.10, then to \$1, and then down to 90c. from the head of the lakes, with Marquette and Escanaba shaded in accordance with the basing rate. Grain dropped to less than 1c. per 100 lbs., and coal also dropped. The market grew excited over the report that Mr. Rockefeller was 2,000,000 long on tonnage and that this was to be withdrawn from the ore trade and turned into other lines of business. The market was in a fever of excitement for three weeks until June 1st, when it became apparent that something must be done. A larger part of the whaleback fleet of the Bessemer Steamship Company was tied to the docks, at Duluth, at Cleveland and at Erie, and from that date forward was never moved. Before the summer was half gone 42 of these lake steamers and barges had sought their quarters, removing from the lakes a carrying capacity equal to 2,000,000 tons.

The immediate effect of the withdrawal of this immense fleet was to brace rates for a time, but they soon began to sag, when the slump in the iron market began to develop. The fight between the Carnegie and the Rockefeller interests ran wearily on through the summer months, being a more or less demoralizing influence, until September, when it was reported that a truce had been patched up. This proved to be worse for the carrying interests at large than the war. The report, which was shortly afterward confirmed, made it apparent that Rockefeller was to retire as an ore producer, leaving the mines he had acquired earlier in the year, to some other interests and henceforth devote himself to the carrying trade altogether. Mr. Carnegie in the meantime was to pay him 50c. a ton for carrying his ores, exclusive of the loading and unloading charges which were to be assessed upon the chipper. The agreement is to run for 50 years. This was a stroke that almost disheartened the individual shipowner, for future rates based upon this general contract will assure him nothing better than 68 or 70c. a ton for carrying ore.

This was a virtual admission on the part of the Rockefeller interests of their defeat, the magnitude of which was only attested to by the results of the remainder of the season, where the shippers kept prices down to the very bottom notch, at one time as low as 55 and 60c. from all of the upper lake ports. The end of the year finds 18,500,000 tons of ore carried down and the average rate for the season has been 84c. This is the average when the contracts are counted in, while the average of wild rates seems to have been closer to 60c.

For the past two years the tendencies have been toward enormous craft, the larger the more attractive to the owner and builder. The shipbuilders reached a point in the construction of the "John W. Gates," which came out April 19th, where they were compelled to say that they could go no further. The "Gates" is one of four vessels that have been built on the chain of lakes that measures 496 ft. over all. She is owned by the American Steamship Company, an organization inside of the American Steel and Wire Company. This vessel proved to have a gross tonnage of nearly 6,000 tons and a carrying capacity, when loaded to her limit, of about 10,000 tons of iron ore. She was built broad, having a 52-ft. beam, but when loaded to her limit draws 20 ft. of water, which is too deep for the ordinary channels and harbors along the chain of lakes, hence there is waste space in her which cannot be utilized. This becoming known, there has been a reversion to former types, boats with a carrying capacity of 5,000 tons being now the most popular.

Pig Iron.—Early in 1899 the furnaces had on their books enough orders to keep them busy up until July. Stock piles had been eaten away by the enormous demand for material, and it was a hand-to-mouth rush for the first four or five months and then orders fell off and no inquiry was made for material after July. That they could not keep running with no business in sight was soon recognized, and the Valley furnaces one after the other began to go out of blast, as the prices lowered. Foundry irons had been selling as high as \$22.50, but dropped until the smaller furnaces, which had started up during the boom times, were compelled to blow out and retire from the market. Other and larger furnaces did likewise, selling only from their stock piles. Following this the Bessemer iron producers, who were even in worse straits than the foundry iron men, called a meeting of their association—this was early in September—and decided to withdraw all of their furnaces from blast for a period of 60 days, or until the demand in the open market for their product should make it imperative that they resume operations. As this time has not come, although it is apparent that it is near, these furnaces are still idle, no Bessemer iron having been produced or sold in the last four months. Where this grade was selling for \$24 it is now at \$13.50, with no great demand for it at that price.

Finished Material.—The dealers in finished material and the makers of it have seen greater vicissitudes than any other branch of the trade. Their market has been fluctuating and uncertain since the opening of the year, but closes with more steadiness. In steel plates there has been a great divergence of prices and of conditions. The year opened with plates selling at 3.25c. Before the middle of the year prices flattened, plates being forced from 3.25c. down to 1c., at which enormous sales were made, some of the buyers covering their needs far in advance of what they would have done under ordinary circumstances. These big orders have been placed and the market having taken a turn, it was discovered that the mills were pretty well filled up with these low-priced orders and the market at once noted an advance, until recently in a pool the mill men agreed to establish the prices at 1.50c., Cleveland, which is now considered a very good rate. The pool arrangements for the apportionment of territory among the various steel plate mills, with absolute possession of this guaranteed, while all are bound

by an iron-clad agreement to maintain prices for a period of five years. All business is to be done through a clearing house, which assures to each mill a certain percentage of the total business, these percentages being based on the operations for the year just closed.

The history of the other grades of steel has been about upon a par with that of plates. Steel rails have been the subject for a fierce fight between the steel mills and the railroad men. The prices started out at \$35 and ended at \$26, the latter being the fought-over pool basis. Owing to a disagreement among the mills interested in what was to have been a pool, the price of structural material dropped from 2.25c. to 2.10c., and then down to 1.90c., and at last, through varying stages, down to the basis at which the year closed, 1.50c. being demanded on beams and channels and 1.40c. on angles, at Cleveland. Before the last-named price had been agreed to, the warring elements had been brought to peace. In all grades of the finished material the year has been an exceptional one. When the other iron products were going steadily down the scale in price and the sales gradually shrinking, steel seemed to be selling well. The finished material market is now in a more rugged state than any of the other branches of the steel or iron

The Pittsburg Iron Market in 1900.

(By Our Special Correspondent.)

The year 1900 was as remarkable in fluctuations and uncertainties in prices in the iron and steel trade in the Pittsburg District as 1899 was in unprecedented and continued advances throughout the year in all lines of raw and finished material.

The actual conditions of the iron and steel trade have been seriously misrepresented since the opening of the year and it is, therefore, a difficult matter to give strictly correct figures as to prices in many lines based on the weekly reports. It is now known that the market quotations given out by producers, particularly during the first half, were not according to the actual sales made. Steel manufacturers earnestly endeavored to maintain a high range of prices, for the reason that it is difficult to sell material on a falling market.

At the close of the first half-year matters were further complicated by extravagant demands of the Amalgamated Association of Iron, Steel and Tin Workers for increases in wages in every branch of the iron, steel and tin-plate industries. The union mills of the country were all closed on June 30th, the old wage scale having expired. The delay in arranging the iron scale was responsible for advances in bars and plates in August. Most of the mills were idle for nearly three months before all the wage scales had been arranged and operations resumed.

In April there were some signs of weakness in the market. In the latter part of that month the crash came when the American Steel and Wire Company announced the unusually heavy cut of \$18 and \$20 a ton in the prices of its products. In May a general slump was on in earnest and prices in all lines began to decline. The lowest point was soon reached, and buying stopped, purchasers waiting for still lower rates. In the fourth quarter a reaction came and a stiffening of prices began, the year closing with a firm market in all lines of finished material and with indications of still further advances soon after the opening of the new year.

The year opened quietly and with decided indications of strength in almost every line of finished iron and steel products. Several thousand tons of Bessemer pig iron were sold during January at \$25, Pittsburg. There was but little buying of Bessemer steel billets in the first month of the year, but all that were sold brought \$35 a ton. The minimum price of steel bars was 2.25c., and this was also the price for tank plates for a desirable order, but the regular run of business was about 2.40c. Sheet is the only line in which the same price was practically maintained throughout the year. No. 28 gauge was quoted in January at 2.95c. to 3c., and this was the price in December. There was a decline to 2.90c. during part of the year and advances to 3.40c. Galvanized sheets show an improvement in prices in December compared with the quotations at the opening of the year. There was no decline in prices during February, but sales were not as large as in the preceding month. In the following month Bessemer steel billets dropped to \$34 and there was a decided weakness in steel bars and plates. The former declined to 2.05c. and tank plates sold at 2c., a drop from the highest quotation of the year of 0.40c. This low price was even shaded in some instances. Bessemer steel billets fell to \$33 in April and steel bars advanced a trifle, but tank plates took a further drop to 1.90c. Despite these lower prices for steel, there was no change in the price of Bessemer pig iron, the rate of \$24, Valley furnaces, and \$24.90 to \$25, Pittsburg, being well maintained.

The heavy cut in prices made by the American Steel and Wire Company in April met with considerable adverse criticism as it had the effect of weakening other lines. It was pointed out that the advance in wire had been heavier than in other finished products and they could readily stand the cut. At the opening of May some business in Bessemer steel billets was done at \$32, and bars were sold at 2c. Tank plates were quoted at from 1.70 to 1.85c. Sheets, however, were not affected by the slump, and No. 28 sold at 3.30 to 3.40c., while galvanized sheets were also higher than at the opening of the year. A meeting of steel interests was held this month, at which the nominal price of \$35 for Bessemer steel billets was reaffirmed, but despite this fact in the latter part of May sales were made as low as \$28. Tank plates went down to 1.60c. and steel bars sold as low as 1.75c., Pittsburg.

The second half of the year opened with the markets in a very unsatisfactory condition. At a meeting of the Bessemer Furnace Association the price was fixed at \$20, Pittsburg. The steel makers also held a meeting and fixed a price of \$28 for Bessemer steel billets to supersede the former figure of \$35 which had become entirely nominal, but before the end of the month billets could be bought as low as \$24. Steel bars went down to 1.45c. this month, and tank plates to 1.40c. Sheets also declined, No. 28 being quoted at 3 to 3.05c. There was a further drop in all lines in July except in sheets, which were somewhat stronger. Sales of Bessemer pig iron were made at \$17, delivered in Pittsburg. Tank plates dropped to 1.10 to 1.15c., and the price of steel bars ranged from 1.05 to 1.25c.

The price of Bessemer pig iron in August ranged from \$15.75 to \$16.50. The lowest price for Bessemer steel billets was \$18. Early in the month steel bars sold considerably below cost, as low as 87½c. a hundred being done in exceptional cases. There was a reaction before the close of the month owing to the suspension at a number of mills on account of wage troubles, when the minimum price was 1.10c. and many sales were made at a higher figure. Tank plates declined to 1.05c.

A further drop in Bessemer pig iron occurred in the following month, the price ranging from \$14 to \$15, delivered in Pittsburg. Several thousand tons of Bessemer steel billets were sold at \$17.50. There was no change of any consequence in the plate and bar prices. Sheets declined, and No. 28 was quoted at 2.95c.

There was little change in affairs in the iron and steel markets at the opening of the fourth quarter. Prices did not advance to the point manufacturers had expected. The mills in this district, however, were all well filled with orders and prices of finished material were generally firm. Bessemer pig iron had declined to \$13.25, Pittsburg. But little business was done in Bessemer steel billets, and the price was as low as \$16.75, the lowest point reached during the year. There was a reaction before the close of October, and sales were made at \$17.50 delivered, Pittsburg. Steel bars were firm at 1.15c., and tank plate was quoted at 1.10c. The sheet market was irregular, the price for No. 28 hanging around the 3c. mark.

Soon after the result of the Presidential election was known there was a noticeable improvement in nearly all lines, but Bessemer pig iron was not benefited, the price at the opening of November being \$13.50 to \$13.75. The principal Bessemer steel billet producers got together and established a price of \$19.75 for billets, delivered at Pitts-

PITTSBURG MONTHLY PRICES OF IRON AND STEEL.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer pig iron.....	\$25.00	\$24.90	\$24.00	\$24.90	\$24.90	\$20.00	\$17.00	\$15.75	\$14.00	\$13.25	\$13.50	\$13.90
Basic.....	23.75	23.00	23.00	23.00	23.00	19.00	15.25	14.50	13.25	13.00	12.50	12.50
Foundry No. 2.....	23.00	23.00	22.50	21.75	19.50	18.00	15.50	14.50	13.50	13.75	14.00	14.00
Gray Forge.....	21.00	21.00	21.00	20.00	19.00	17.00	15.00	14.25	13.00	12.75	13.00	13.25
Bessemer steel billets.....	35.00	35.00	34.00	32.00	23.00	21.00	19.00	18.00	17.50	16.75	19.75	19.75
Sheets No. 27.....	2.90	2.90	3.00	3.20	3.05	2.90	3.10	2.90	2.80	2.70	2.85	2.90
Sheets No. 28.....	3.00	3.00	3.10	3.30	3.15	3.00	3.20	3.00	2.90	2.80	2.95	3.00
Tank plates.....	2.25	2.15	2.00	1.80	1.60	1.40	1.10	1.05	1.05	1.10	1.35	1.35
Steel bars.....	2.25	2.25	2.05	2.60	1.75	1.45	1.05	1.15	1.15	1.20	1.25	1.25
Steel rails.....	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	26.00
Wire nails.....	3.20	3.20	3.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
Cut nails.....	2.50	2.50	2.50	2.50	2.05	2.05	1.95	1.95	1.95	1.95	1.95	1.95
Ferromanganese.....	100.00	100.00	100.00	125.00	100.00	100.00	85.00	85.00	75.00	75.00	62.50	62.50

burg. Plates were advanced \$2 a ton, making the price for tank plates 1.35c. Steel bars were increased to 1.25c., and there was an active demand at that price. These prices continued to the close of the year. Before the close of November the price of Bessemer pig iron had advanced to \$14, delivered at Pittsburg, and this price practically remained unchanged during December.

LEAD IN 1900.

The production of lead in the United States in 1900 showed a substantial increase over the previous year. The great silver-lead mines of the Coeur d'Alene were actively worked throughout the year, while the mines of the same class in Montana and Colorado were also generally active. The soft lead mines of Southeastern Missouri also showed a considerable gain. The following table shows the output of lead as estimated for 1900 compared with the actual figures for 1899:

	1899.	1900.	Changes.	Per ct.
Desilverized lead.....	171,495	196,632	I. 25,137	14.8
Soft lead.....	40,508	47,364	I. 6,856	17.0
Antimonial.....	7,377	7,785	I. 408	5.7
Totals.....	219,380	251,781	I. 32,401	15.0

Our refiners during the year also turned out a very large quantity of lead from foreign ores and base bullion. By far the greater part of this material comes from Mexico, though the mines of British Columbia furnish a considerable quantity. The production of this foreign lead is estimated at 103,705 short tons in 1900, which compares with 76,423 tons in 1899.

The lead imported into the United States in all forms and the foreign lead re-exported after being refined here in bond, are reported as below by the Treasury Department for the 10 months ending October 31st, in short tons:

	1899.	1900.	Changes.	Per ct.
Lead in ore and base bullion.....	79,174	91,381	I. 12,207	15.4
Metallic lead.....	233	203	D. 30	12.0
Totals.....	79,407	91,584	I. 12,177	15.4
Re-exports of foreign lead.....	63,306	81,160	I. 17,854	28.3
Balance.....	16,101	10,424	D. 5,677	35.5

Of the imports this year, 73,138 tons (79.8 per cent.) were from Mexico; 15,499 tons (16.9 per cent.) from Canada; the balance from other countries.

The New York Lead Market During 1900.

During the year 1900 the lead market has been remarkably steady. The refining interests of the country, which, in 1899, were centered in a few strong hands, have exercised their influence toward the maintenance of a stable value for pig lead. At the close of the year it appears that a further consolidation of refining interests has been consummated, and this is expected to give a steadiness to the lead market which it never could have attained while there were so many conflicting interests.

The endeavor has been toward the maintenance of a price which would be satisfactory both to the miner and the consumer. Manufacturers have found that a steady market, even at a high price, is better for them than a fluctuating one. In the former case they can adjust their business to the price, and profits are assured; in the latter, profit depends upon favorable purchases, which must be to a large extent speculative.

Consumption throughout the year has been very good. Production has somewhat increased, especially in Missouri. No lead smelted from bullion has been retained here, as throughout the year it has been more profitable to ship it abroad.

The year opened with lead selling at 4.70c. at New York, which price continued to rule during the winter months. In the spring the market declined under pressure from the American Smelting and Refining Company, and in May lead sold at 4c., while in June it sold down to 3.75c. New York. At the end of the month, however, prices reacted to 4 1/4c.

Average Monthly Prices of Lead in New York.

Month.	1899.	1900.	Month.	1899.	1900.
January	4.18	4.68	August	4.57	4.25
February	4.49	4.68	September	4.58	4.35
March	4.37	4.68	October	4.58	4.35
April	4.31	4.68	November	4.58	4.35
May	4.44	4.18	December	4.64	4.35
June	4.43	3.90	Year	4.47	4.73
July	4.52	4.03			

In July the market fluctuated between 4 1/4c to 4 c., and in August it advanced again to 4 1/4c. In September it went up to 4 3/4c., which price ruled until the end of the year.

It will be observed that, as pointed out above, the fluctuations have been very slight. The average price for lead for New York is 4.73c., 1900, as compared with 4.47c. for 1899.

The London Lead Market in 1900.
(By Our Special Correspondent.)

The New Year opened with rather better inquiry and with foreign lead quoted at £16 12s. 6d. to £16 15s., English at 2s. 6d. more; but owing to the heavy arrivals in London, values declined to about £16 for foreign. The demand, however, from consumers was good and before the month was out we had recovered about 5s. from the bottom. February opened with values again up to £16 12s. 6d., and on account of the scarcity of supplies and the fact that producers were well sold, prices remained steady around about this figure. During March business was rather slow, but quotations were steady around about £16 12s. 6d. for foreign and £16 15s. for English. April saw a somewhat better demand and the market became firmer, advancing to £17 for good soft foreign eventually closing at about £16 16s. 3d. May opened with a slight setback in prices, but this brought forth a good demand and there was a rise to £17, and values remained at about this level throughout the month. During June the market was firm, owing to short supplies of available material, and this was accentuated by the strike in the London docks, and prices of near delivery were forced up to £17 5s.

Values in America having improved and strong reports coming from that side, coupled with a large demand from Germany and Russia, caused an advance during July to £17 12s. 6d. for soft foreign. In August the demand was active all around. Owing to the arrival of some large parcels in London the price of spot metal was brought down to the level of forward stuff, and this caused a setback to about £17 7s. 6d. for foreign and £17 10s. for English. The month, however, closed with values at about 2s. 6d. advance. September again found this article in good request, and prices rose to about £18 for foreign and £18 2s. 6d. for English. October found consumers somewhat less inclined to operate and values declined to £17 7s. 6d. for foreign and £17 12s. 6d. for English, closing about these rates. November opened with users showing very little inclination to buy, being well covered for their requirements out of the large arrivals during the previous month, and this caused values to gradually drift away to about £16 15s.

The fall in price seemed to drive all consumers out of the market, and during the early part of the month of December the article became quite neglected. Prices at one moment dropped as low as £16 for foreign and £16 2s. 6d. for English lead, but rallied toward the end of the month, the closing quotations being £16 3s. 9d. to £16 5s. for Spanish lead, £16 6s. 3d. to £16 7s. 6d. for English lead.

NICKEL IN 1900.

The only production of nickel from ores mined in the United States was 20,000 lbs. made from ore mined at the Mine La Motte in Missouri. This was a decrease of 2,500 lbs. from 1899. We have continued to turn out a large quantity of the metal refined from Canadian ores and matte. The demand for nickel has continued active and prices have been well maintained throughout the year.

The Mond Process of Extraction.—The Mond Nickel Company informs us that during 1900 the mining properties which Dr. Mond acquired in the Sudbury District in Ontario, consisting of 18 mining locations covering about 2,900 acres in the Denison and Garson districts, have been further explored and developed, with satisfactory results. The Denison property, to which most attention has been paid, is being developed by the sinking of shafts, etc., for the production of ore, and a smelting plant for producing matte is in course of erection under the supervision of Mr. Hiram W. Hixon, the well-known metallurgist. At the same time active work has been proceeding on the property Dr. Mond has acquired at Clydach, near Swansea, in South Wales, in the erection of works for the refining of the matte produced in Canada, by the Mond process, and it is expected that these works when completed will produce from 1,000 to 1,500 tons of nickel and from 4,000 to 6,000 tons of copper sulphate per annum. It is expected that the refinery will be started during the summer of 1901, and that the smelting plant will be in operation in the spring of the same year. A company was registered on September 20th, 1900, under the title of the Mond Nickel Company, Limited, with a share capital of £600,000, to take over from Dr. Mond the mining properties and plant as well as the patents relating to the Mond process, and the refining works at Clydach. A small plant was put up at Southwick, England, some time ago for the purpose of working out the process on a manufacturing scale. As this has now been done, the extensive plant is being put up at Swansea, this being a very much more favorable site for a

process of this nature than that where the experimental plant was located.

PLATINUM IN 1900.

The world's supply of platinum has for several years past ranged between 160,000 and 170,000 troy ounces. In 1900 the total, so far as ascertained, was about 165,000 oz., which is somewhat below the demand, so that the metal has commanded high prices throughout the year, its cost gradually approaching that of an equal weight of gold. The uses of the metal are limited by the high prices and could be much extended if the supply could be increased.

Over 90 per cent. of the total comes from the Russian placers, the output of which in 1900 was approximately 153,000 oz. The conditions of production in Russia have not changed materially, though the business is gradually passing into the hands of the combination of Russian mine owners and of Belgian and French refiners, which was formed in 1898. The details of this combination have been kept from the public, and it is hard to obtain definite knowledge about its operations or the exact production.

The only considerable production outside of Russia is in Colombia, in South America. The output of that country is about 11,500 oz. An increase was promised in 1900, but the revolution there and the prolonged contest between the Government and the insurgents prevented any extension in mining.

The production in the United States is insignificant; it amounts to about 200 oz. yearly, which is obtained at the San Francisco Mint in parting and refining gold from certain localities in Trinity, Shasta and Plumas counties. Imports into the United States increased in 1900, the total for the 10 months ending with October being 6,305 lbs., indicating a total for the year of about 7,000 lbs., or 800 lbs. more than in 1899. A considerable part of the imports is in crude form, the metal being refined here.

A small quantity of platinum is obtained from British Columbia, being parted from gold, as in California. Some platinum is known to exist in nickel matte from the Sudbury District in Ontario, but we are not advised of any production from that source.

New discoveries were reported in 1899, but have not yet resulted in the marketing of any quantity of the metal. The most promising of these is on the Hootalinqua River in the Yukon Territory in Canada. No work has been done on the discovery, which was reported in Algeria two years ago.

The price of platinum in New York at the close of the year is \$18.20 to \$18.50 per troy ounce. In London the quotation is 75s. an ounce, or about on a parity with New York. Manufactured into chemical ware or wire, the price in New York is 72c. per gram.

QUICKSILVER IN 1900.

Of all the metals of secondary importance, quicksilver showed the most active demand throughout 1900, although there was a slight decrease in production. The use of the metal is extending, both in mining and for industrial purposes, while the production does not increase. Few new discoveries are noted anywhere, the most promising being at Yugalbar, in New South Wales, where development work is in progress.

The production of quicksilver in the United States is estimated at 32,315 flasks, or 1,122 metric tons, in 1900. This compares with 28,879 flasks in 1899 and 30,493 flasks in 1898. The details of this production are given below:

California.—For various reasons the companies have not furnished their usual statement of production. The receipts from the mines at San Francisco during the year were 25,810 flasks. If we allow the same proportion of the output for shipments from the mines direct to consumers, as in 1899, this would bring the production for 1900 up to a total of 30,365 flasks. This compares with 28,618 flasks in 1899, and 30,116 flasks in 1898, showing a recovery in production for last year. While some of the older mines are reported worked out, or nearly so, there was an extension of operations at others.

Texas.—The Marfa & Mariposa Mining Company, in Presidio County, produced about 950 flasks of quicksilver during the last three months of 1900, and from present indications will add to the total output of this country something like 3,500 flasks during 1901. The mines at Del Rio report a total of 800 flasks for the year.

Oregon.—An output of 200 flasks is reported from the Black Butte Mine.

Other Countries.—Spain is reported to show a decline, though full figures are not available. The production for 1900 is estimated at 1,225 metric tons, against 1,357 in 1899. In Austria the output for the year is estimated at 550 metric tons, against 504 in 1899, though the Government works at India and St. Anne lessened their output. In Italy, Sr. Vincente Spirek writes us, the production was 220 metric tons, against 201 tons in 1899. During 1900 the following works were in operation: Siele, Conacchino, Abbadia, S. Salvatore, Montebuone and Cortevicchia. The amount of ore treated was larger than in the preceding year, but of poorer grade. All the works, except Cortevicchia, are supplied with Cemak-Spirek furnaces and condensers, which are particularly adapted to the low-grade ores (0.5 to 0.8 per cent Hg) of these mines.

The London reports show a remarkable decrease in imports, while that in exports was much less. The large stocks usually carried in London have been almost exhausted. The circular of Messrs. Wm. Sargent & Company give the following figures for the year ending December 1st, in flasks:

	1899.	1900.	Changes.
From Spain	45,729	10,963	D. 34,766
From Italy	6,202	6,045	D. 157
From other countries	80	20	D. 60
Total imports	52,011	17,028	D. 34,983
Exports	31,903	24,958	D. 6,945
Excess	I. 20,108	E. 7,990	

The falling off of two-thirds in the imports indicates that the business of the Spanish mines has been transacted for the most part directly with consumers and not through London.

Prices.—The prices of quicksilver have been high throughout the year, and have also been remarkably even. In New York there has been practically no change, the quotation for large lots having been \$51 per flask throughout the year, while \$52.50 to \$54 has been asked for smaller quantities. The range of prices in San Francisco is shown in the following table:

Month.	—Domestic—		—Exports—	
	Highest.	Lowest.	Highest.	Lowest.
January	\$52.00	\$51.50	\$47.50	\$47.00
February	51.50	51.50	47.50	47.50
March	51.50	51.50	47.50	47.50
April	52.00	51.50	47.50	47.00
May	51.50	51.50	47.50	47.00
June	51.00	49.50	47.50	47.00
July	51.00	49.50	47.00	47.00
August	50.00	48.00	47.00	45.00
September	49.00	48.50	46.00	45.50
October	48.50	47.50	45.50	45.00
November	48.50	48.00	45.00	45.00
December	48.00	48.00	45.00	45.00

*Prices withheld.

The average for the year on domestic orders was \$50.05; on export, \$46.38 per flask.

London prices fluctuated very slightly during the year, the extreme range being 10s. The highest quotation of the year was £9 12s. 6d.; the lowest £9 2s. 6d. per flask, at which rate the market closes.

TIN IN 1900.

The United States produced no tin in 1900. Toward the close of the year reports were circulated of the discovery of tin ore in several localities in South Dakota. They have not been substantiated, however, and it is to be feared that they will result in no more actual production of the metal than did the well-known Harney Peak "discoveries" some years ago in the same locality.

The supply of this country has continued to come from abroad, chiefly from the Straits Settlements. For the 10 months ending October 31st the imports of tin into the United States were 59,171,708 lbs., against 65,619,547 lbs. in 1899, showing a decrease of 6,447,839 lbs., or 9.8 per cent. Owing to the peculiar conditions affecting the freight markets and ocean tonnage, there was a large falling off in the receipts here direct from Singapore, and a corresponding increase in the imports through London and Amsterdam.

The world's production of tin showed a very small increase, and the demand has continued to exceed the supply. This condition has favored the great speculation in tin which marked the year just closed, and which is more fully referred to below. The disturbed condition of affairs in China has had much to do with the small increase in production in the face of large demand and high prices. This seems somewhat singular in view of the fact that China produces no tin; but the fact is that fully 95 per cent. of all the tin produced is mined by Chinese labor, and during 1900 it seemed almost impossible to add to the forces engaged in the mines in the Malay Peninsula, in Sumatra and elsewhere in the East. It is not easy to understand the workings of the Chinese mind; but last year there was an evident determination on the part of the Chinese at home to stay there, and on the part of those abroad to return home. The consequence was a scarcity of labor in the tin mines, which could not be supplied from other sources.

By comparing such statistics as are obtainable, we estimate the total production of tin in 1900 as in the table below, the figures being based chiefly on the very carefully compiled tables of Messrs. Ricard & Freiwald, of Amsterdam. The quantities are in long tons, of 2,240 lbs.:

	1899.		1900.		Changes.
	Tons.	Per ct.	Tons.	Per ct.	
Straits Settlements, shipments.....	45,872	62.2	46,041	60.6	I. 169
Australia, shipments.....	3,305	4.5	3,200	4.2	D. 105
Banka, shipments and increase in stocks.....	9,934	13.5	12,843	16.9	I. 2,909
Billiton, sales.....	5,920	8.0	5,678	7.5	D. 242
Bolivia, shipments to London.....	4,700	6.4	4,350	5.7	D. 350
Cornwall, production of mines.....	4,013	5.4	3,910	5.1	D. 103
Totals.....	73,744	100.0	76,022	100.0	D. 2,278

It will be seen that the only important increase in production was that of 2,909 tons, or 29.4 per cent., in the Banka output. All other sources combined showed a decrease of 631 tons. Even with the enlarged sales of Banka tin the total increase was only 3 per cent. The Banka and Billiton tin mines are controlled in Holland entirely. Singkep tin no longer appears on the market. The Cornwall production is naturally sold in England. The Bolivian tin and nine-tenths of the Australian tin go to Great Britain. The distribution of Straits tin for the 12 months ending November 30th was as follows:

	Exports of Tin from the Straits, in Long Tons.		Changes.
	1899.	1900.	
To United States.....	17,320	12,380	D. 4,940
To Great Britain.....	20,550	27,000	I. 6,450
To other European countries.....	6,518	5,361	D. 1,157
To India and China.....	1,484	1,300	D. 184
Totals.....	45,872	46,041	I. 169

As explained above, the decrease in shipments to the United States was apparent only, a larger proportion being sent here through London.

The visible stocks of tin on November 30th are reported as below, in long tons, the figures including that known to be afloat as well as that in store:

	1899.	1900.	Changes.	Per ct.
United States.....	3,543	2,019	D. 1,524	43.5
London.....	9,170	10,586	I. 1,416	15.7
Holland.....	4,796	3,207	D. 1,589	33.1
Other European countries.....	325	725	I. 400	123.1
Banka tin unsold.....	3,732	3,944	I. 212	5.7
Totals.....	21,566	20,381	D. 1,185	5.5

This decrease in stocks brings the world's consumption in 1900 approximately up to 77,200 long tons of tin.

The New York Tin Market During 1900.

In our review of a year ago we expressed the opinion that 1899 would long be a memorable year in the history of the tin market, and we rather anticipated that 1900 would not prove as interesting. However, such has not been the case, and while we cannot chronicle so continuous an upward movement, the wide fluctuations and the excitement and heavy speculations that ruled in the tin market during the past year will long make it remembered.

The average price of tin at New York for 1899 was about 25c.; for 1900 it has been about 30c. The highest price reached in 1899 was about 32½c., and in 1900 the market were as high as 34½c.

Consumption in this country has increased. Supplies continue to be drawn principally from the East Indies both by direct shipment and via London. The latter point continues to be center of the world's market; and while at frequent periods the American market did not closely follow the gyrations of the London market, and it sometimes happened that tin was selling here at considerably above the London parity and again at considerably below, still the general course of the market was established in London. We must, therefore, keep the London market well in view in reporting the New York tin market for 1900.

The year opened here with spot tin selling at 25c. and February delivery at a discount of ½c. to 1c. The London market opened at £110. The market fluctuated a great deal, but always with an upward tendency, and early in February £130 was reached. Meanwhile, there was a heavy discount for three months' tin; at one time it was £3 per ton.

During February the market advanced to 30½c. The London market went as high as £153, and a large business was done. Meanwhile, an enormous backardation had ruled, frequently as much as £10. The upward movement was mainly speculative, being an anticipation on the part of large operators of a scarcity in consequence of the large demand from America and the apparent short supply at the Straits.

In March the market continued very strong and prices went higher, spot tin selling at 25½c. At these prices, however, consumers generally held off and business for a time was restricted to spot tin. Toward the middle of the month the London market broke to £138 and the New York market followed suit, spot tin selling down to 31c. The sharp break was chiefly caused by the announcement on the part of the Netherlands Trading Company that at their sales during the second half of 1900 an extra 2,000 tons of tin would be offered.

Meanwhile, the statistical position of the article continued to be very strong. Shipments for the first quarter of the year were 1,000 tons less than in 1899, and deliveries both in Europe and America showed an increase.

In April the market was quiet, consumers pursuing a hand-to-mouth policy. Prices fluctuated but little until the end of the month, when a decline took place to 29½c.

Next month a large business was done at about the same figure. The London market fluctuated constantly, but within comparatively narrow limits.

In June the London market moved wildly. Speculators had sold short for June delivery and the market was pushed up from £133 to £148. Toward the end of the month it fell again to £138 and closed on the 29th at £146; then, the shorts having covered, the upward movement was stopped. The statistical position of the article continued to be good, but a heavy backardation for future deliveries appeared to indicate a lack of confidence in the maintenance of the high prices ruling. The New York market did not closely follow the fluctuations in London, stocks on this side being much larger, and no short interest to be squeezed. The prices during the month ruled about 29½c. to 30½c. until the end of the month, when stocks of spot tin being exhausted, early deliveries sold at 32c.

During July our market was extremely active and a large business was done both for early and distant deliveries. Spot tin sold as high as 34½c., and it was only toward the end of the month that larger arrivals relieved the situation. The American buying influenced the London market, which rose from £139 to £144.

During August a heavy decline of £10 took place in consequence of the decrease in the American demand, owing to the idleness of the tin plate mills, which had been shut down early in July. During the month there were rumors that they had started up again, and this affected prices somewhat. However, these proved to be premature, and the American market was dull and weak, spot tin selling down to 30c. The same conditions prevailed during the first half of September, and then, in sympathy with a heavy drop in London, the market declined to 28½c. The cause of the decline was principally to be found in the announcement that the Banka sales for 1901 would be increased to the extent of 25 per cent.

Average Monthly Prices of Tin in New York.

Month.	1899.	1900.	Month.	1899.	1900.
January.....	22.48	27.07	August.....	31.53	31.28
February.....	24.20	30.58	September.....	32.74	29.42
March.....	23.82	32.90	October.....	31.99	28.54
April.....	24.98	30.90	November.....	28.51	28.25
May.....	25.76	29.37	December.....	25.88	26.94
June.....	25.85	30.50	Year.....	25.12	29.90
July.....	29.63	33.10			

In October the market dropped considerably, selling down to 25½c., but at the lower figures consumers generally took hold, and during November the volume of business was very heavy; toward the end of the month an advance set in to 29c. However, early in December the London market experienced a violent slump, and while on this side spot tin held comparatively firm, in consequence of the short supplies, later deliveries sold down. Spot metal sold at 26½c., and 26c. was done for January delivery.

At the close of the year heavy purchases for American account changed the tone of the market and an advance took place both in London and New York, 28½c. being paid for spot delivery and futures selling at 27½c. Heavy arrivals on this side, however, again brought the price down, and we close the year with spot tin selling at 27c., while 26½c. is quoted for futures.

The London Tin Market in 1900.
(By Our Special Correspondent.)

The year opened with the total stock in England and the Continent at 13,487 tons, and the price was £117, cash, and £118, three months. America and the Continent sent large orders, but these were counteracted by free offerings from the Straits, and prices were driven down to £108 5s. for cash. America, however, at this time was very short of spot material, and this caused prices to rise rapidly until cash touched £130 10s., three months at the same time selling at £125, and these figures were about the closing ones for the month.

February showed a decrease in statistics to 12,798 tons, cash and three months' prices being about £130 and £125 respectively. Holders, however, at this time began to realize and caused a decline to £128 5s. for cash and £125 10s. for three months; but America was still buying, and the Straits were not offering freely, so that before the middle of the month was reached cash was fetching £147 10s. and three months £140. Cash tin at this period was very scarce in London, owing to the available supplies being in the hands of a few operators, and to the fact that large quantities which had arrived in the Thames were unable to be discharged, owing to labor troubles. At this point a steady decline set in, owing to the free selling of forward metal by American operators and realizations of speculative holdings, values declining to £143 10s., cash, and £133 15s., three months.

Statistics published at the end of February showed a further decrease, and the total supply of England and the Continent only amounted to 11,592 tons, and during the second week of March the record price of £153 was paid for large quantities of cash metal by the bears who wanted to square their positions, three months at the same time realizing only £145 10s. After these high figures had been paid the leading bull operators let go a large line of cash metal, which caused a rapid shrinkage in value, and as low as £139 was accepted for cash, three months selling at £135 15s. The free offerings of cash metal caused the backwardation—which had lasted for some months—to almost disappear, and values tumbled to £133, spot, and £131, forward. The decline, however, seemed to have been too rapid, and values were soon again run until, at the end of the month, the market closed at about £140 for cash, forward selling at about 10s. less.

Statistics published at the beginning of April showed an increase of about 1,500 tons, and this caused holders to realize and tempted bears to sell, so that values once more declined until £134 15s. was accepted for cash and £133 10s., three months. Values in the East were stiffer and American operators were purchasing both Straits and Banca, causing a better tone to be shown, and cash improved to £140 5s. and three months to £139 5s., but toward the end of the month the market again took a downward course and prices fell to £135 5s., cash, and £135 2s. 6d., three months.

May opened with very favorable statistics, showing 3,000 tons decrease for the previous month, and leaving the visible supply of England and the Continent at 9,938 tons. Cash at one time touched £137 15s. and three months £1 below these figures; but there was then a pause, values declining to £131, cash and £130 10s., three months, and after several fluctuations the month closed at about £134, spot.

June statistics showed an increase of over 1,500 tons, but the scarcity of cash warrants prevented sellers from unduly depressing prices. The tinplate industry was rather disturbed, owing to the threatened strike of workers in South Wales and America, and this, together with the weakness that was apparent in nearly all branches of trade had a bad effect, causing values to decline to £136 10s., spot, and £127, three months, but notwithstanding the cheap offers of forward stuff which came from the Straits, the bulls were able to drive the price of cash up to £148 for June deliveries, while three months only improved to £131. When the bulk of those short had adjusted their prompts the heavy backwardation on forward metal was reduced and the month closed with a strong market at £145 10s., cash, and £134 5s., three months.

July figures gave another increase in the English and Continental stock of about 1,500 tons, and at the opening cash metal sold at £147, but the biggest holders released large quantities, and this gave rather more confidence to sellers, so that prices suffered and dropped to £138 5s., spot, and £132, forward. Consumption remained good and America was buying freely, which again improved prices to £145 10s., cash, and £140, three months, but the month closed rather lower at £144 and £138 15s., respectively.

There was again an increase in the figures published at the beginning of August, which caused dealers to accept lower prices, but there was a continued good demand from consumers, and the market soon rallied, remaining fairly steady throughout the first three weeks of the month in the region of £143 10s. for cash. The market then began to fluctuate violently and prices were driven down to £134 15s., spot, and £132 5s., three months, eventually closing better at £136 15s. and £135 10s. for these positions.

September commenced with the total stock of England and Continent standing at 12,053 tons, which was an increase of only 71 tons, compared with the previous month, and the cash price was £138 10s., three months being worth £135 10s., then declining to £134 15s. and £132 5s., at which level there was some good buying from America, caused by the restarting of the American tinplate trust mills, and cash touched £136 15s., three months, £134 10s. It was at this time that the Dutch Government announced its intention to sell during 1901 about 2,000 tons more Banca than it was doing in the present year, and this caused values to rattle down to £125, cash, £124, three months, but a strong speculative movement then set in, and before the month was over we had a recovery to £133, cash, and £126 10s., three months.

The total stock of England and the Continent published at the beginning of October was at 12,802 tons, being an increase on the previous month of about 750 tons, but the bull clique forced the price up to £135, cash, and £130, three months. Owing to rather free selling of the East and the cessation of speculative buying, prices dropped to £128, cash, and £124 10s., three months, closing at about these figures.

November statistics showed a decrease in stocks of about 1,230 tons and cash tin was very plentiful, owing to the lightermen's strike, which

prevented deliveries being made from warehouse. After the market opening at about £128 for cash and £125 2s. 6d., three months, values eased off until £124 2s. 6d. and £121 15s. was accepted for cash and three months respectively. America at this time was taking fair quantities and the consumers on this side were also buying against tinplate orders, and these purchases caused values to improve to about £129, cash and £128, three months.

At the beginning of December there was a determined onslaught made on the market by the bears, who sold large lines of forward metal, which, however, was readily absorbed by the operators for the rise, causing a decline to £123 15s., cash, and three months. The visible supply at the commencement of this month amounted to 14,154 tons. The tendency, however, was weak, and after several small improvements prices drifted very gradually until we touched £113.

At the close of the year the market showed a somewhat firmer tendency, and closed at £121 10s. for both spot and futures.

ZINC IN 1900.

The production of metallic zinc, or spelter, which, in 1899, reached a total the highest on record, and nearly double that of five years previously, showed in 1900 a serious falling off. The production for that year—estimated for only a very small proportion of the total—is given in the table below, in comparison with that for 1899, in short tons:

	1899.	1900.	Changes.	Per ct.
Eastern and Southern works.....	8,803	8,270	D. 533	6.0
Illinois and Indiana.....	49,290	37,510	D. 11,780	24.0
Missouri and Kansas.....	71,582	77,070	I. 5,488	7.6
Totals	129,675	122,850	D. 6,825	5.3

The eastern and southern works show little change; if the output of zinc oxide be taken into account, their production actually increased. Missouri and Kansas production showed an increase. The great falling off was in the Illinois and Indiana district. It is probable that the large output of 1899 somewhat exceeded the consumption, and the falling prices discouraged makers.

As in former years the eastern works have drawn their supplies of ore from the mines of New Jersey and Southwest Virginia, while the mines of the Joplin Region have furnished ore for a large part of the Western works. The removal of smelting plants from Missouri to the gas belt in Kansas has continued. With this exception there have been few changes during the year.

A source of supply which has heretofore been neglected, has been found in the mines of the Leadville District in Colorado. These ores had been tried by the Missouri smelters occasionally, but with little success; their plants being specially adapted to the simple ores of the Joplin Region, did not work well on the more complex Leadville ores. A market for them has been found with some of the Illinois works, however, and also with foreign zinc smelters. The Vielle Montagne and other European companies have already taken some of these ores and have contracted for more.

The exports of spelter from the United States, estimating December, reached a total of 24,800 short tons, or 21 per cent. of the total production. In 1899 the exports were only 6,755 tons.

The production of zinc oxide (zinc white) has increased considerably, in contrast to that of the metal. The total in 1900 was 44,568 short tons, which compares with 39,663 tons in 1899, showing a gain of 4,905 tons, or 12.3 per cent. Nearly all of this is made at the works of the New Jersey Zinc Company. The market for zinc oxide as a paint is continually increasing.

The demand for our zinc ores abroad is increasing. The total exports from the United States in 1900 were 37,920 short tons. The total in 1899 was 23,221 tons, while in 1898 it was 11,782 tons; so that the exports were more than three times greater last year than in 1898. In 1900 a considerable part of the exports were from Leadville, Colo. Contracts for considerable quantities of Leadville ore, and also of Joplin ore, for export have been made, so that the year 1901 will probably show a large increase in these shipments.

The Joplin Zinc District in 1900.

(By Our Special Correspondent.)

The closing year of the Nineteenth Century has been one of change and progress in the Missouri-Kansas zinc mining district and many problems which confronted the operator at the opening of the year have been solved.

The influx of a flood of new capital during 1899 led to many changes in methods and business management. The change from the loose methods which formerly prevailed has been of decided advantage to the entire district, while the losses and delays experienced by some of the large companies in experimenting with new and untried machinery and in trying to work large tracts by new methods have been to an extent offset by the gains from careful management and the system of checks and comparisons in cost of operating.

It was feared by many well-wishers of the district that the advent of large companies with great capital would lead to the abolition of the "sub-leasing" system under which the mining industry has grown and to which is largely attributable the fine character of the mining population, but the system proved too deeply rooted to be affected by changes in ownership, and one big company after another has either abandoned all attempts to work large bodies of land directly with its own employes or has so modified its plans that they bear no resemblance to the original schemes.

Among the big companies that started in to mine their own lands directly, but who have since abandoned the plan and are deriving large profits from sub-leasing their ground, are the Missouri Lead and Zinc Company, American Zinc, Lead and Smelting Company, Boston-Little Circle Zinc Company, Old Colony Zinc and Smelting Company, United Zinc Companies and others that are rapidly gaining in dividend-paying ability and will prove profitable investments for their stockholders. The Boston-Aurora Zinc Company will probably throw open its great tract at Aurora to miners in the near future and, it is reported, has abandoned

its plans to build an immense mill at Aurora, containing much novel machinery.

There have been a number of object lessons during the year on the folly of replacing tried machinery successfully used in this district for concentrating ore for years past with experimental machinery successful enough in other mining camps for other minerals, but never tried here. In all cases where the cardinal principles of the machinery used here have been abandoned, the changes have proved utterly unsuccessful. The most costly object lesson of this kind during the year was that of the Missouri Blanket Vein Zinc Company, which spent \$40,000 in building a mill on its property at Centre Valley, between Webb City and Oronogo. The mill has been torn down and is now being rebuilt and entirely remodeled on the company's property at Prosperity.

As was to be expected, during 1899 and the early part of 1900, a large number of unscrupulous promoters flocked to the district and the great returns from legitimate investments were used to further swindling enterprises; these resulted in heavy losses to gullible investors and the reputation of reliable promoters and reliable zinc companies suffered in consequence. These frauds, coupled with the wasteful and extravagant management of many really good productive properties, discredited zinc investments for a few months and checked mining transfers during the summer and early fall. The reports made by so-called "experts," particularly by some men of prominence in their profession, showed either a woeful ignorance of ore formations in this district, or a willingness to sacrifice present and future professional reputation for immediate financial gains. However, from all this experience has arisen a better knowledge of conditions and a better understanding of the best and most successful methods of operation, and the unscrupulous and the ignorant have been largely eliminated as factors in the district.

The recorded investments in the entire district this year foot up a little over \$5,500,000, as against \$12,000,000 last year, the largest single purchase being that of Frank Rockefeller, of Cleveland, O., who bought the Gross 440-acre lease at Wentworth, Newton County, during December, for \$150,000. The investments this year have been mostly by close corporations or private individuals who have bought productive properties to operate at a profit, in place of "wild cat" property to capitalize at big figures and then unload on the public.

It was predicted by pessimistic people who were either ignorant of the district or had lost money by poor judgment in investments, that the large number of mills built for speculative purposes on unproductive ground during 1898 and 1899 would be a standing reproach to the district with their idle wheels and smokeless stacks for years. This is so far from the case that there are no idle mills in the district to-day which can be purchased and removed to other locations, and there are more new mills in course of erection than at any one time in 1899. On the 80-acre tract at Joplin of the United Zinc Company's five new mills were completed in December or were so nearly completed that they are practically ready to run. Half a dozen mills are going up on the ground of the Missouri Zinc Fields Company at Cartersville, three are going up or are completed on the land of the Calumet Zinc and Lead Company at Neck City, and like conditions prevail elsewhere.

There never was a time at the beginning of winter when the district was as prosperous as now. There is probably an accumulation of five thousand tons of high-grade zinc ore in the various camps, not because there is no demand for it, but because operators refuse to sell and are able to make the jack and hold it for better prices. There are no idle men, and there has been no appreciable cut in wages this year, in spite of the lower prices prevailing for zinc ore.

The successful use of gas as a fuel at the smelteries in the Kansas natural gas belt, and the superiority of gas smelteries in economy and speed have resulted in the abandonment of the old coal smelters at Pittsburg, Nevada and other locations in Missouri and the building of great gas smelters at Iola, La Harpe, Gas City, Coffeyville, Cherryvale and other Kansas points and to the conversion of the coal furnaces of the Matthiessen & Hegeler Zinc Company at La Salle, Ill., into coal gas furnaces. The decrease in demand for ore while these changes were in progress has had much to do with the unsettled and lower ore prices, but there have been no sudden and violent changes in the market as last year, and the prices for both lead and zinc ores have been fairly satisfactory to those possessing good mines.

The Missouri & Kansas Zinc Miners' Association has been reorganized and was incorporated during December with a cash capital sufficiently large to enable it to either hold or export large quantities of zinc ore. The association has been purged of the directors and officials who used their positions to further private promotion schemes, and its control is now in the hands of large producers of ore.

The year opened with the best grades of zinc ore selling at \$36.50 per ton; the price fell to \$25 per ton for the week ending June 30th, the lowest point during the year. The first week in December a large sale was made at Stotts City for \$30.75 per ton, and the closing price was \$27.50 per ton. The average top price for 60 per cent ore or better for the year was \$30.28, but the average selling price of all grades was much lower.

The fight between the gas and the coal smelters during 1899 forced zinc prices up to the highest point ever known, but the fight ended with a compromise at the close of the year. The bitterness of the contest can be judged by a comparison of the top prices paid for zinc ore, as follows:

Month.	1899. Price.	1900. Price.	Month.	1899. Price.	1900. Price.
Jan.	\$32.25	\$35.12½	July	\$44.20	\$27.50
Feb.	43.37½	34.50	Aug.	45.00	28.37½
March	43.40	32.60	Sept.	43.75	27.70
April	51.50	32.87½	Oct.	43.50	28.50
May	50.50	30.62½	Nov.	35.00	28.87½
June	45.50	27.80	Dec.	36.00	28.95

The combined value of zinc and lead ore for 1900 was \$7,977,304, against \$10,863,628 for 1899. The zinc output decreased 26,997,070 lbs., but the lead sales increased 10,800,670 lbs. The decrease in zinc production was due to the closing down of properties which were bought when zinc ore was selling at high figures. Owing to low grade ore or extrava-

gant management, with big charges for monthly dividends on watered stock, these ceased to be profitable when zinc ore fell to a fair price.

Miners have been scaled down relatively little, and unskilled labor is paid \$1.75 to \$2 per day, while good ground men and ground bosses receive from \$2.25 to \$3.25 per day. There have been no labor disturbances of any kind during the year except a few trifling disagreements.

The low prices for zinc ore and the good market for lead caused the men who were thrown out of employment by the shut-down of low-grade zinc mines to prospect for themselves. The great increase in the output of lead, which in this district usually occurs above the zinc, illustrates the benefits of the sub-leasing system, for it enabled a large number of men to be self-supporting who in other camps would have had to seek new locations when they lost their positions.

The increase in the output of lead ore was 10,800,670 lbs. This compares with a decrease in 1899 from 1898 of 4,193,160 lbs. Lead ore opened the year at \$28 per 1,000 lbs. and prices were well maintained until the second week in May, when they dropped to \$23 per 1,000 lbs. The lowest point during the year was \$20.25 per 1,000 lbs. for the third week in June. The price varied until the first week in September, when \$23 per 1,000 was paid, and from then until the close of the year there was no change. The average monthly prices for 1899 and 1900 were as follows:

Month.	1899. Price.	1900. Price.	Month.	1899. Price.	1900. Price.
Jan.	\$23.94	\$27.94	July	\$26.90	\$22.66
Feb.	26.50	27.62	Aug.	27.25	23.25
March	25.80	27.35	Sept.	27.00	23.00
April	25.25	27.00	Oct.	26.90	23.60
May	26.00	23.75	Nov.	27.00	23.00
June	26.00	21.85	Dec.	27.20	23.00

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

	Zinc ore, lbs.	Lead ore, lbs.
Year 1899	511,637,470	48,212,720
Year 1900	48,660,410	59,013,390
Decrease	26,997,060	.....
Increase	.....	10,800,670

The total selling price of these ores in 1899 was \$10,862,464. In 1900 it was \$7,977,304, showing a decrease in the market value for 1900 of \$2,885,160.

The New York Spelter Market During 1900.

In contrast with 1899, the year 1900 does not show wide fluctuations in the price of this metal. While in the former year both foreign and domestic demand was very heavy, and at frequent periods supplies proved inadequate, resulting in an advance of price to 6½c. per pound, in the latter year production was always sufficient to meet both the home and European demand.

American consumption appears to have slightly decreased. For brass purposes the same quantities were used as heretofore, but the galvanizers did not take the usual quantities. The depression in the iron trade affected the demand for galvanizing material. At the close of the year the iron market is in better shape, and a larger demand for galvanizing purposes can be looked for. The exports for 1900 were 20,669 tons, as against 6,482 tons for 1899. The foreign market was not able to bear the pressure of these quantities, their home production being quite sufficient for the demand. In fact, at times considerable stock accumulated in the hands of the European smelters. Under these conditions the European market was frequently below the parity at which exports were possible. This, in turn, re-acted upon our market in so far as the quantities available for delivery in this country became larger.

The production of spelter in the United States has decreased for the reason that the price ruling for zinc ore has been lower and has made the mining of this commodity less attractive. It has, furthermore, made it impossible for companies floated on the basis of last year's values and prices to pay dividends, and in many cases operations were suspended.

The smelting industry has become still more concentrated in the natural gas producing districts, the old coal smelters, with few exceptions, being unable to compete.

The year opened with spelter selling at 4¼c. St. Louis. The market had a downward tendency until the end of January, when a good domestic demand sprang up, and the foreign market also began to advance. It became apparent that the foreign market would absorb considerable quantities, and buying became quite aggressive.

At the end of January, and during February, a large export business was done and prices moved up to 4.70c. St. Louis. The demand being satisfied, a dull and dragging market followed, which, during March, carried prices down to 4.35c. In April a turn came, home buyers had quite depleted their stocks and entered the market both for early and distant deliveries; the European market also took large quantities, and prices advanced again to 4.60c. St. Louis. May was another dull month, during which the market moved sluggishly downward to 4¼c. St. Louis.

Average Monthly Prices of Spelter in New York.

Month.	1899.	1900.	Month.	1899.	1900.
January	5.34	4.65	August	5.65	4.17
February	6.28	4.64	September	5.50	4.11
March	6.31	4.60	October	5.32	4.15
April	6.67	4.71	November	4.64	4.29
May	6.88	4.53	December	4.66	4.25
June	5.98	4.29	Year	.....	.....
July	5.82	4.28		5.75	4.39

During June the metal sold down to 4c. St. Louis. At this low price buyers took hold quite largely, and the production of zinc ore became heavily curtailed, as the miners would not go on at the figures then ruling. At the end of the month a sharp advance took place to 4.15c. St. Louis. The market continued active during July, when 4¼c. was reached. During August the market was very dull, and in September it declined to 3.95c. St. Louis.

In October demand improved somewhat and the market advanced

to 4.05c. St. Louis, but requirements were soon filled and the market became very dull, when a heavy domestic business, together with a decrease in production, owing to the shutdown of the coal smelters, brought prices to 4.15c. St. Louis. During December a fair business was done, though at a lower figure, St. Louis selling at 4c.

The London Spelter Market in 1900.
(By Our Special Correspondent.)

January commenced with ordinaries quoted at £20 12s. 6d., but in face of the free offerings from America there was a drop to £20 5s. On the cessation of these offers, however, there was a sharp advance, owing to the demand for galvanized iron and sheet zinc, to about £20 10s.

February found producers on the Continent holding for full values, but America was selling rather freely, and as the quantities available seemed to be in excess of what was expected, consumers became shy, and owing to the want of demand prices suffered and declined from £22 10s., which had been touched earlier in the month, to £21 12s. 6d. Early in March there was again a resumption of buying both here and on the Continent, and an improvement was noted to £22, specials being worth about 10s. premium; but on the renewal of free offers from America there was a quick retrograde movement to £21 2s. 6d.

In April the published statistics showing exports of galvanized iron at 26,441 tons for the month helped to make the tone firm, and owing to the withdrawal of American offers prices quickly recovered to £22 10s. for ordinaries. After a good business had been done at this level there was a slight setback of about 5s. per ton. May opened with a somewhat dull tone, caused principally by the weakness of the other metal markets, this fact causing the realizations of some speculative parcels, and the market was forced down to £21, improving again, however, owing to the strength of the sheet zinc trade, to £21 15s.

June commenced with a dull market at £21 for ordinaries, £21 10s. for specials, and America was offering freely, and those offers continued throughout the month, causing prices to recede to £19 5s., ordinaries; £19 10s., specials. A good demand from galvanizers and consumers of sheet zinc being found early in July, there was a quick recovery to £20 5s., but this level could not be maintained, in consequence of the unsatisfactory state of the galvanized iron market, and prices quickly dropped to £19, steadying, however, to the extent of about 10s. a ton before the end of the month. Throughout August the market was fairly steady, hovering between £19 7s. 6d. and £19 12s. 6d. for ordinaries.

September again witnessed free offerings of American metal from second-hand holders, causing a decline to £18 15s., but at this period good orders for galvanized iron were placed by the English Government and Indian merchants, and this caused consumers to come in, and values improved to £19 7s. 6d. October commenced with ordinaries quoted at £18 15s., but consumers on the Continent were paying high prices there, and this caused a quick rally in London to £19 10s., followed, however, shortly after by a break, sales again being made as low as £18 15s. November commenced at this figure, but when it was found that the position in America was sounder, and that they were not offering material for export, the market again took an upward turn and advanced to £19 7s. 6d.

December found an extraordinary apathy on the part of buyers, and the market was quite neglected for days at a time; prices consequently suffered, and they declined to £18 10s. A small improvement in the demand brought prices up to £18 12s. 6d. for good ordinaries, £18 17s. 6d. for specials at the end of the year.

CEMENT IN 1900.

Owing to great industrial activity during 1899 with the increased use of iron, steel and concrete as structural materials, the demand for cement was greatly stimulated and new factories were started in many parts of the country. Many of these factories began production this year, and in consequence the total output of cement for 1900 is easily the largest on record. The output of natural rock cement, however, suffered from the competition of artificial cement and shows a decrease. Several producers of slag cement are now established in this country and are meeting with more or less success, those producing a superior article finding no difficulty in disposing of their output. The total production of all kinds of cement was 17,828,698 bbls., valued at \$16,918,919 in 1900, compared with 16,201,324 bbls., valued at \$15,978,181 in 1899.

We give below a tabular statement of the production of Portland cement by States:

	1899.		1900.	
	Barrels.	Value.	Barrels.	Value.
California	48,000	\$112,000	51,000	\$112,200
Michigan	402,000	701,000	731,709	990,755
New Jersey	960,000	1,776,000	1,220,000	1,479,500
New York	507,931	939,672	515,724	676,598
Ohio	482,542	916,830	524,711	771,325
Pennsylvania	3,250,209	5,687,865	4,891,664	6,750,486
Other States	154,938	308,064	568,500	1,176,750
Total	5,805,620	\$10,441,431	8,503,308	\$11,947,614

The increase shown in this class of cement was 2,697,688 bbls., or 46.5 per cent.

COAL IN 1900.

While the past year has not seen the same world-wide activity in all lines of industry that prevailed during 1899, yet in this country, manufacturing and transportation companies have been busy. Abroad there has been a more decided reaction, but wars have not interfered with commerce in spite of the anti-foreign uprising in China and continued fighting in South Africa. As a result the consumption of coal, that barometer of industrial progress, has not fallen, but has rather risen and the output of the world this year undoubtedly exceeds the enormous total of 1899. It is of interest, however, to note that the increase is principally from the United States, and that the total increase in tons from the United States will probably exceed the total increase of all other countries in the world put together. Under such circumstances it is

hardly necessary to point out that the United States' position as the greatest coal producing country in the world is now unchallenged, and bids fair to remain so for years to come. Not until the vast coal fields of China are developed on a systematic scale by powerful corporations will there be any danger of this country losing its supremacy. Last year we were the first to announce, in our annual number, that Great Britain had taken second place as a coal producer. This statement was doubted and indeed contradicted by papers that should have known better, but the final returns amply confirmed our preliminary estimate. This year there is no chance for doubt. The total coal production of the United States exceeds 270,000,000 short tons, while the production of England shows but a trifling increase over last year and will probably not exceed 225,000,000 long tons. There were no strikes or serious interferences with production at the English collieries and the small percentage

COAL PRODUCTION OF THE UNITED STATES.

States.	1899.			1900.		
	Tons.	Value at Mine.		Tons.	Value at Mine.	
		Total.	Per Ton.		Total.	Per Ton.
Bituminous:						
Alabama	7,484,763	\$7,484,763	\$1.00	9,000,000	\$10,800,000	\$1.20
Alaska (b)	2,300	32,282	5.34	2,600	14,300	5.50
Arkansas	913,743	1,233,553	1.35	950,000	1,380,000	1.40
California	167,161	430,631	2.58	171,106	468,068	2.74
Colorado	4,747,812	8,308,671	1.75	5,486,490	10,872,980	2.00
Georgia	203,775	183,081	0.90	224,190	202,885	0.91
Illinois	23,434,445	18,443,946	0.78	25,153,929	22,510,360	0.89
Indiana	6,158,234	5,542,402	0.90	7,081,957	7,081,957	1.00
Indian Territory	1,404,442	2,106,663	1.50	1,900,127	3,135,209	1.65
Iowa	4,675,000	5,937,350	1.27	4,908,750	6,412,338	1.31
Kansas	4,906,895	5,124,248	1.25	4,100,000	5,125,000	1.25
Kentucky	4,638,800	3,730,100	0.80	5,000,000	3,879,425	0.78
Maryland	5,080,348	4,318,211	0.85	3,900,000	4,173,000	1.07
Michigan	500,000	720,000	1.44	950,000	1,377,500	1.45
Missouri	3,191,811	3,582,111	1.12	2,995,022	3,643,975	1.21
Montana	1,409,882	2,227,998	1.58	1,621,364	2,577,969	1.59
Nebraska (d)	1,000	3,000	3.00	900	2,500	2.78
New Mexico (d)	1,004,034	1,495,588	1.49	1,145,739	1,722,780	1.50
North Carolina	26,994	37,732	1.40	18,000	22,500	1.25
North Dakota (b)	120,597	120,597	1.00	138,000	138,000	1.00
Ohio	16,695,949	14,191,557	0.85	21,704,733	21,270,688	0.98
Oregon	86,886	232,854	2.68	49,560	133,812	2.70
Pennsylvania	73,066,943	57,722,885	0.79	87,680,331	82,419,511	0.94
Tennessee	3,736,134	3,706,617	0.99	4,000,000	4,400,000	1.10
Texas (c)	940,622	1,646,088	1.75	1,013,006	1,671,460	1.65
Utah	882,496	1,553,193	1.76	1,281,800	2,448,238	1.91
Virginia	2,111,391	1,372,404	0.65	2,394,295	1,984,151	0.85
Washington (d)	1,917,697	3,355,812	1.75	2,175,000	4,398,750	2.25
West Virginia	18,201,189	11,830,773	0.65	21,153,340	14,165,183	0.67
Wyoming	4,525,207	5,656,500	1.25	4,600,000	5,625,000	1.25
Total bituminous	191,456,350 173,688,061	\$172,301,679	\$0.90	220,592,239 200,119,966	\$224,502,483	\$1.02
Cannel:						
Kentucky	36,639 33,239	\$91,597	\$2.50	25,000 22,680	\$60,750	\$2.43
Anthracite:						
Colorado	59,067	\$162,434	\$2.75	59,244	177,732	3.00
New Mexico	45,000	105,000	2.33	41,535	114,385	2.75
Pennsylvania	60,518,331	103,486,346	1.71	54,154,701	96,996,915	1.79
Total anthracite	60,622,398 54,906,279	\$103,753,780	\$1.71	54,255,540 49,220,303	\$97,229,032	\$1.79
Grand total coal	252,115,387 228,717,579	\$276,147,056	\$1.10	274,872,779 249,362,949	\$321,792,265	\$1.17

(a) Fiscal year. (b) All lignite. (c) One-third lignite. (d) One-half lignite.

COKE PRODUCTION OF THE UNITED STATES.

States.	1899.			1900.		
	Tons.	Value at Oven.		Tons.	Value at Oven.	
		Total.	Per Ton.		Total.	Per Ton.
Alabama	1,798,612	\$4,676,391	\$2.60	2,150,000	\$7,095,000	\$3.30
Colorado	455,783	1,233,403	2.75	575,447	1,726,341	3.00
Georgia	44,529	92,748	2.08	48,624	117,026	2.41
Illinois	2,000	3,300	1.65	2,000	3,300	1.65
Indiana	2,105	4,105	1.95	1,249	3,122	2.50
Indian Territory	(a) 29,362	95,426	3.25	(a) 47,800	191,200	4.00
Kansas	200,000	600,000	3.00	275,000	618,750	2.25
Kentucky	55,580	79,201	1.42	60,000	126,230	2.10
Missouri	4,560	8,808	1.93	2,218	5,641	2.54
Montana	59,072	401,779	6.80	72,500	500,250	6.90
New Mexico	(a) 33,961	110,046	3.27	(a) 42,803	138,409	3.00
Ohio	73,391	183,477	2.50	47,887	122,591	2.56
Pennsylvania (c)	12,192,570	29,871,796	2.45	11,831,593	30,749,662	2.60
Tennessee	440,157	864,073	1.91	498,157	996,314	2.00
Utah	26,700	122,820	4.60	31,000	146,320	4.72
Virginia	555,507	1,027,688	1.85	588,831	1,142,332	1.94
Washington	31,283	117,311	3.75	38,416	148,634	4.65
West Virginia (b)	(a) 2,058,378	2,580,175	1.25	(a) 2,598,847	4,547,982	1.75
Wyoming	15,979	55,926	3.50	16,000	57,280	3.58
Total coke	18,079,229 16,401,369	\$42,148,468	\$2.33	18,928,372 17,171,706	\$48,456,384	\$2.56

(a) Fiscal year. (b) Includes 40,537 tons made in Wisconsin in 1899, and 38,000 tons in 1900; also 53,973 tons made in Virginia in 1899, and 64,740 tons in 1900. (c) Includes 4,800 tons made in Wisconsin in 1900.

of gain is therefore very noticeable. The competition of American coal may have affected English export trade somewhat, although owing to the high freight rates from this side and the difficulties attending the introduction of a new fuel, American competition has not been so seriously felt by English mine owners as it will be in a few years when American coals have an established market and colliers, built especially for the foreign trade, are in the employ of the great companies that will control shipments from the Atlantic seaboard.

In Europe the search for new coal fields has continued with little success, though there are reports of recent finds of value in Southeastern Europe. In Western Europe, where coal is most wanted, there has been little new coal found. The French fields may show some extension west, but the great cost of getting out the coal will hinder development. In Germany the extent of the coal fields has been pretty definitely determined, and there have been no discoveries of importance during the

year. The explorations in Kent, England, to locate a southeastern extension of the English field have progressed very slowly and it is not likely we shall have definite knowledge of the coal seams there for some time.

Of the great coal producing countries of the world Russia will undoubtedly show an increase for the year, this increase coming mostly from the mines of Donetz Basin in Southwestern Russia. The mines in Poland have worked steadily, but their production does not differ very much from that of 1899. The total production of Russia in 1899 was 14,565,000 metric tons, and for the first half of 1900, 7,806,455 tons. The French output shows a slight percentage of gain. In 1899 the output was 32,933,788 metric tons. Coal has been scarce in France during the whole year, and at its close prices have risen to very high figures, retailing as high as \$15 per metric ton at Paris. The small increase in production under such circumstances is remarkable and shows that the French collieries are unable of responding to increased demand. It is not surprising, therefore, that there have been considerable importations of American coal, particularly in Southern France, with a strong probability of these importations increasing. In Belgium mining has been very active with high prices stimulating output, but the mines were producing about to their limit last year and the gain will be slight.

Germany is going through a small industrial crisis and manufacturers find trouble in disposing of their products. This has naturally affected the demand for coal, but owing to the restrictive policy of the German colliery owners, who sell through syndicates which control output in the interest of high prices, the total production for the year has not been materially affected. Parts of Germany have relied for years on importations of coal, principally from England and Belgium, and this year there have been importations from America. The German production in 1899 was 135,824,427 metric tons, and in 1900 is approximately 149,400,000 metric tons. The percentage of increase in the output of the lignite mines is noticeable, being nearly 20%.

As we have noted, production in England has not been hindered by strikes, and there has been a good demand in France and a fair one in Germany for English coal, although exports to other countries, notably South America, have felt American competition more severely. The English iron industry, like that of this country and of Germany, has seen a reaction from the high prices of 1899, and consequently the demand for fuel from the great manufacturing centers of the north of England and Scotland has not been as heavy as last year. In spite of this the price of coal during the greater part of the year has been high enough to give every inducement to colliery owners and the comparatively small increase in production is therefore noticeable. The Welsh mines, which supply the export trade, have doubtless felt American competition somewhat, and have also been affected by military operations in South Africa and China, which removed from regular service a large fleet of steamers which, if employed in trade, would have used more coal.

Austria-Hungary shows a decrease in output, due to a bitter and prolonged strike in the Bohemian brown coal fields, which affected coal mining all over Upper Austria and Moravia. The strike resulted in some advantage to the miners, but the reduction of output made coal high in Austria during the year and greatly stimulated shipments of American coal to Trieste.

In Asia there has been far less work done in opening new fields than was promised a year ago. The Russian Government has done considerable work in Central Siberia along the line of the Trans-Siberian Railroad, and also in Eastern Siberia at the mines on the Island of Saghlien and west of Vladivostok. All industrial activity, however, in Eastern Asia has been more or less at a standstill during the last half of the year on account of the situation in China. In that country, where wretched government has prevented the development of great natural resources, an uprising against foreigners has completely stopped whatever mining operations were under way in the disturbed provinces and interfered with industry generally. The Japanese mines have found their product in demand throughout the year, and undoubtedly show a gain. These mines are being opened and equipped with the best mining devices and after most approved modern practice. They are the largest producers in the East.

In the Australasian colonies production has been heavy, though probably not much in excess of that of last year owing to the difficulty the operators have had in getting a supply of miners. In the principal coal producing colony, New South Wales, the miners' union is virtually in control of the industry and its restrictions are frequently burdensome and prevent the output from increasing in response to increased demand.

In Africa, though the British forces have occupied the capitals of the Free State and the Transvaal, the Boer forces still in the field have made it impossible for the Witwatersrand gold mines to resume, and indeed in practically all South Africa military exigencies govern and commerce and manufacturing must wait. Some of the mines supplying the railroads have been worked by the British forces, but otherwise coal production has amounted to nothing.

Coming to the Western Hemisphere, South America maintains its inert attitude. There are good deposits of coal known in Peru and in Colombia, but there is no probability of these deposits being developed through native inception. In the Argentine Republic, where foreign blood predominates, and in Chili, industrial activity continues and the output of coal will doubtless show a gain.

In North America, outside of the United States, there have been practically no important new developments during the year, though projects already started have met with success. The collieries and coke ovens at Fernie, B. C., that started work last year, have found a ready market for their total output among the mines and smelters in surrounding districts, and the plant is to be further enlarged while new collieries will probably be opened in the same region. The coal mines on Vancouver Island, and on the west coast, owing to the Alaskan trade, and the general increase in shipping from Pacific Coast ports, have had an excellent year and their output should show a substantial increase. In the Northwest Territory some fair grade lignite beds have been opened

near Dawson. The demand for coal at San Francisco has led to increased imports there of British Columbia coal.

On the Atlantic seaboard the collieries of the Dominion Coal Company on Cape Breton have had a very busy year, and the output of all the Nova Scotia coal mines has been heavy. The Dominion Iron and Steel Company has erected its blast furnaces at Sydney; other similar plants are already projected, and the outlook for Nova Scotia coal mining is most excellent. The local demand for coal has been so heavy during the year as to retard the growing movement to the United States which was so prominent a feature of the 1899 trade; indeed, though receipts of colonial coal at Boston amounted to fully 500,000 tons, during the last months of the year the New England Gas and Coke Company, a branch of the Dominion Coal Company, made contracts to use West Virginia coal in its by-product coke oven plant at Everett, Mass.

No new developments are reported from Mexico. There have been large sums of money spent in exploring for coal in the Republic, but as yet not with satisfactory results, and the lack of adequate fuel supply is likely to handicap the country's industrial development. The Southern Pacific Railroad has conducted extensive explorations in Sonora, where a limited field of fair quality coal lying in thin beds has been known to exist for some time. The field has never been worked to any extent. In Michoacan and Coahuila other coal deposits are known to exist, but the coal, while if anything of better quality than in Sonora, lies in such uneven and pockety beds as to make its development under present conditions unprofitable.

In Alaska seams of lignite have been opened on the Yukon and along the coast, but their production during the year was slight.

In the United States itself coal mining has gone on with little check. While industrial activity has been less feverish than during 1899, there has been a steady market at profitable figures for all the coal produced and the output this year will probably exceed that of 1899 by fully 20%. There have been some labor disturbances, but only two prolonged strikes, those in the anthracite regions of Pennsylvania and in the George's Creek field in Maryland. The anthracite strike was the largest in the history of this country so far as number of strikers is concerned. The George's Creek strike, while involving a smaller number of men, lasted much longer. In the coal fields of the South and the Southwest and of the Rocky Mountain country there have been few strikes of importance. The total production for the year was 274,872,779 short tons, compared with 252,115,387 short tons in 1899.

Coming to the production by States, we find that Pennsylvania still retains its great pre-eminence in coal mining. Figures received to date indicate for the year a production of 141,835,032 tons, as compared with 133,585,274 short tons in 1899. The advance is wholly from the bituminous fields of the State, as the anthracite region shows a falling off from 60,518,331 short tons in 1899 to about 54,154,701 short tons this year, owing to the strike, which greatly reduced shipments for two months. This strike had been impending for some time. In fact it had been threatened for over a year. The United Mine Workers of America, an organization which started in the soft-coal fields of the Central West, sought to extend its control over all the eastern coal mines. Its opportunity in the anthracite region came with the great revival of mining in the last months of 1898 and during 1899. With coal selling at better prices and the output increasing, the union organizers found it easy to stir up the men and promote dissatisfaction by stories of low wages and large profits. The miners for years have had grievances, some real, some more or less imaginary, which various organizations among the men from time to time sought to remedy. Practically none of these movements accomplished the ends desired by their organizers, the anthracite coal region being a field governed by unique conditions which have developed with the growth of the industry so that methods and regulations which are general in soft coal regions are out of the question there. After the collapse of the Knights of Labor's attempt to control the anthracite miners in 1887 no serious effort at such control was made until the United Mine Workers started work in the district on a large scale in 1898.

There were scattered strikes as a result of the agitators' activity during 1899 and the early months of 1900. The climax came in August when at a convention at Hazelton of representatives from the various district lodges of the union on August 27th, resolutions were adopted demanding the abolition of the company store system and of company doctors, a reduction in the price of powder, the abolition of the sliding scales based on the selling price of coal in the Lehigh and Schuylkill regions and compliance with the State semi-monthly pay law; also a demand that 2,240 lbs. constitute a ton in mining, and that there be a general advance in wages, from 20 per cent. for men earning under \$1.50 a day, to 10 per cent. for men earning over \$1.75 per day. Special mining scales based on bituminous mining practice were asked for several regions. These demands covered all the grievances that the delegates could think of. Some of the grievances were more imaginary than real; the company doctor, for instance, and the company store system, were not abuses with the companies that controlled by far the larger part of the anthracite output. These companies considered some of the demands of the men arbitrary and others unreasonable, and refused to enter into any negotiations whatever with the officials of the United Mine Workers, claiming that an organization controlled by bituminous miners could not deal fairly with anthracite practice. Finally President Mitchell, of the Mine Workers, ordered all men to stop work on September 18th. This order was obeyed so generally that production was almost completely stopped in the Wyoming and Lackawanna fields and greatly reduced in the Lehigh and Schuylkill regions. The exigencies of a political campaign apparently hindered the State officials from taking efficient measures to stop intimidation, and even bloodshed, and the strike spread.

The miners, as a general rule, behaved better than in any previous strike in the region. There was very little damage done to property and no such burning of breakers as marked the strikes of the Molly Maguires in the '70s. There were local riots, and a number of men were killed, necessitating calling out the militia, which, however, did not take a very active part in suppressing disorder. Apparently not more than a tenth of the men in the region were actual members of the union when the

strike was called, but by well-known union methods they compelled other men to go out, and steadily increased their power over the miners in the Schuylkill and Lehigh regions until finally nearly all the Schuylkill miners were idle, and the only large company running with anything like full force in the Lehigh region was the Lehigh Coal and Navigation Company, having collieries in the Panther Creek Valley. The steady progress made by the union in getting the men out, due in part to the inactivity of the State officials, and the generally good behavior of the strikers, had a decided influence on public sentiment. The Presidential campaign was fairly on and political parties were appealing for the votes of labor organizations. As a result the chairman of one party brought strong influence to bear on the financial house that owns a controlling interest in anthracite securities and the mine officials received orders to settle the strike. It was formally declared off on October 29th, after lasting six weeks. The companies generally offered their men a 10 per cent. advance in wages with a reduction of \$1.25 per keg in the price of powder to miners working on contracts. The men also secured the abolition of the sliding scales of wages in the Schuylkill and Lehigh regions, though this change, if anything, was to the advantage of the companies. In the last week of the strike fully 130,000 men and boys were idle, and shipments from the region had dwindled to almost nothing. The final settlement was apparently a decided victory for the men, though nothing was said in it about most of the demands made by the Hazleton convention, while the operatives were in a position to grant increased wages owing to the higher prices made certain by the approach of winter and the scarcity of coal. The strike leaves a wave of minor strikes and a general feeling of unrest among the miners which is likely to be shown by a demand for the unconditional recognition of the Miners' Union next April, when the present agreement regarding wages expires.

The bituminous fields of the State have been extremely active. Owing to the strike in Maryland, the mines shipping to tidewater found their coal in great demand all summer and made a phenomenal output. In the Pittsburg region coal consumption fell off the last half of the year as well as the production of coke in the Connellsville District, but the activity during the first months of the year was so very great that the decrease during the fall was not enough to keep the output from being the heaviest yet recorded.

Illinois holds its second place as a coal producer. Industrial activity has been the rule throughout the State, and the consumption of fuel by mills and railroads has been correspondingly large. There have been no labor troubles of importance to check the output, and the figures for the year are the best yet, being 25,153,920 short tons, as compared with 23,434,445 short tons in 1899.

West Virginia is now in fourth place, although the State seems likely to take second place from Illinois within a few years. The operators in the regions shipping to tidewater, like those in Pennsylvania, profited by the strike in Maryland and got out every ton of coal they could. The formation of new mining companies, due to the general industrial boom, the opening market for coal abroad, and to the influx of operators of mines from Pittsburg District bought up by consolidations, has continued. Operators in other parts of the State have found a ready market for their product in the Central States or in the Lake trade. An enormous amount of capital has been invested in coal lands during the past two years, and there is every probability that the output will increase greatly the coming year. The 1900 output was 21,153,340 short tons.

Ohio, like the other Central States, has seen a prosperous and busy year for its coal fields, and a phenomenal increase in output, particularly from the Hocking Valley. The production in 1899 was 16,695,949 tons, while last year it was 21,704,733 short tons. Indiana shows an increased output with no labor disturbances or other checks on production. The figures are estimated at 7,081,957 short tons, compared with 6,158,224 short tons in 1899. Iowa also has been free from labor disturbances and mining has been active. The State's output for the year was 4,908,750 short tons, compared with 4,675,000 short tons in 1899.

Maryland alone of the States shipping to the eastern seaboard shows a reduction in output due to the bitter and protracted strike in the George's Creek Region. This seems to have had no good foundation, but to have been due solely to a demand made by representatives of the United Mine Workers for an increase in the mining rate of 5 cents per ton, this demand virtually involving a recognition of the union. The increase was demanded because some mining companies in Pennsylvania had granted a similar increase. Officials of the George's Creek companies pointed out that the 60-cent per ton rate paid for pick mining in Pennsylvania affected but a comparatively small proportion of men, since the great bulk of the Pennsylvania coal was gotten out by machines, and pick miners cut little figure in the output. The operators also pointed out that the Pennsylvania coal seams were only 4 feet thick, whereas the George's Creek mines worked seams from 8 to 20 feet thick, and a man could make better wages at 50 cents per ton there than at 60 cents per ton in Pennsylvania. The operators in March had promised an increase of 5 cents per ton, making the pick mining rate 55 cents. In view of the utter disparity between George's Creek and Pennsylvania conditions they flatly refused to grant 60 cents. The men controlled by the union finally struck on April 12th. The strike was nominally for the 5 cents advance but really for a recognition of the union. A large percentage of the men, it was said, were against going out, but were induced to quit work by the usual union methods. There was some rioting and a number of labor leaders were arrested and convicted of unlawful assembly. The United Mine Workers brought all their strength to bear on the region, but their efforts failed, and the men returned to work in August at the 55-cent rate. The strike completely stopped shipments from the George's Creek Region for four months. Poor car supply interfered with shipments during the remainder of the year.

Of the Southern States, Alabama has had an extremely prosperous year. Iron has sold at figures which must have yielded handsome profits to furnacemen; railroads have been very busy and the demand for coal has taxed the ability of the mines to the utmost. At the same time the miners have been well paid, the rate during the first half year being highest recorded and there were no large strikes. As a result the State's output of 7,484,763 short tons in 1899 has increased to 9,000,000 short

tons, a gain of 20 per cent. Tennessee and Kentucky have seen labor troubles and disturbed political conditions and have also found mine laborers scarce, with the result that coal production does not show the same advance as in other sections of the country.

In the Southwest field, covering Kansas, Arkansas, Missouri and Indian Territory, there have been some labor troubles and the long strike at certain mines along the line of the Missouri, Kansas & Texas Railroad was not settled definitely until well into the year. Indian Territory, however, was less troubled by strikes, and the output of coal has increased from 1,404,442 tons in 1898 to 1,900,127 short tons in 1900.

In the West and Northwest coal mining was active throughout the year. The mines and smelters were generally steadily busy, mining showing more activity than ever before, and the demand for coal was consequently great. There were no labor troubles of importance and the output was heavy. Of the States that are small producers North Dakota is showing considerable activity at the lignite deposits near Bismarck and the companies working there are reported to be quite busy. The output is small as yet, but with improvements in preparing the fuel for market promises to increase considerably. The production in Wyoming during the last half of the year was very heavy. Montana and Utah mines have been busy to meet the demands of smelters and railroads. There were no labor disturbances during the year, but the Utah output was checked by a frightful accident at the Castlegate Mines on April 28th, which ranks as one of the worst in the whole history of coal mining. Owing either to insufficient ventilation or to the failure to prevent dust from accumulating in the entries and gangways a terrific explosion of dust occurred while the mine was running with full force. The explosion wrecked the mine and checked ventilation and the miners who were not instantly killed were suffocated by the great volume of "white damp" which spread through the workings. The total number of deaths was 242. The mining company and the community took active part in relieving the sufferings of survivors, and though the accident was clearly the result of neglect the popular verdict seems to have attached no blame to the company. The mine was put in order as rapidly as possible and is now running as usual.

The Colorado mines have been busy, and there has been less friction between employers and miners in the northern coal fields than for some years past. The anthracite mines at Crested Butte have been lightly worked owing to practical difficulties in mining and getting the coal to market. The bituminous and lignite mines have made substantial increases in output, the production being 5,495,734 tons as compared with 4,806,879 tons in 1899. New Mexico, which has a few good mines, has seen these mines much busier than usual, the output being limited by the difficulty of the companies in getting a sufficient number of miners.

On the Pacific Coast the mines at Tesla, Cal., have worked along as usual with no great increase in output. The discovery of extensive oil fields in the southern and central parts of the State is not likely to stimulate coal mining, as the present boom in oil production is bound to reduce the market price per barrel greatly, and even now a large part of the State oil is a considerably cheaper fuel than coal. Washington mines, owing to the activity in shipping from Pacific Coast points have had a very good year, in fact the best yet recorded. Prices were high and the output, which is about half lignite and half bituminous coal, increased from 1,917,607 tons in 1899 to 2,175,000 in 1900.

The Alabama Coal Trade in 1900.

(By Our Special Correspondent.)

Coal mining prospered largely in Alabama last year. The output of coal was more than 1,500,000 tons over that of 1899, when the production was 7,484,778 tons. A number of new mines were opened, railroads to the mines built and other mines started. The production has been steady and heavy, except for about three weeks, when the miners and operators were dickering over the scale of wages to last till July 1st, 1901. The number of fatal accidents was less than in 1900, notwithstanding the great activity at the mines. The prices obtained were fair and more satisfactory than during 1899. There were few strikes, and these were short lived. The production will approach 9,000,000 tons. Secretary J. B. Gibson, of the Birmingham Commercial Club, who has been gathering statistics of the mineral production of this State, has figures which warrant this estimate, while State Mine Inspector J. de B. Hooper several months ago estimated the output at fully 8,500,000 tons.

The railroads have increased their facilities and there are no reasons why the coming year should not show as great a percentage of gain as last year. There has been an active demand for all the coal mined, and some of the railroads were forced to buy from 15 to 25 car loads of coal per day from mines in Kentucky to use in Alabama. Generally speaking the mine operators fared well, no complaints are heard. Prospects for the coming year are very bright.

Utah Coal Production in 1900.

(By Our Special Correspondent.)

Save for supplying the needs of a few isolated localities, the mines of the Pleasant Valley Coal Company furnish all coal used in Utah, not shipped into the State. Besides this, the Pleasant Valley Company ships a great deal of coal away, over 2,000 tons a day being now marketed in San Francisco. In point of production, the Pleasant Valley mines furnish by far the greater part of the coal mined in Utah, and the company has the only coke ovens in commission in the State. In 1900, for the first time, the 1,000,000-ton point is passed by this company, notwithstanding the loss and serious tie-up due to the sand calamity at Winter Quarters, May 1st, 1900, when 200 men were killed. Allowing for the coal used at the mines and sent to the coke ovens, the total coal mined in the past 12 months was 1,172,500 tons. Total tons of coal marketed, 950,000 tons, compared to 775,516 tons in 1899; total tons coke marketed, 35,000 tons, compared to 26,760 tons in 1899. The pay rolls for the year amount to \$960,000 and show an average of 1,059 men employed each month. Since January 1st, 1900, there was expended for improvements at Winter Quarters mines \$37,000; Clear Creek mines, \$46,000; Castle Gate, \$79,000, or an outlay for betterments aggregating \$132,000 for the year.

All other Utah coal mines, as near as can be learned at this writing, mined 109,300 tons. This gives a total of 1,281,800 tons coal mined in the State during 1900, which compares with 882,496 tons in 1899; showing an increase of 399,304 tons, or 45.3 per cent.

The Anthracite Coal Trade in 1900.

The anthracite coal regions of Pennsylvania cover an area of about 500 square miles, but owing to their nearness to the seaboard and to great commercial and manufacturing centers, they are well developed. Shipments on a large scale did not begin before 1830. Since then production has increased enormously, and a few years ago it looked as though the ultimate productive capacity of the fields would be soon reached. Competition of bituminous coal, however, has greatly reduced the consumption of anthracite for industrial and commercial uses and restricted it almost wholly to domestic use. Even there it meets the competition of gas in cities and oil stoves in the country. As a result, the production of anthracite for several years past has not shown the progressive increase anticipated, and speculations as to the length of time that the available supplies will last are altogether idle.

The coal is consumed along the Atlantic seaboard from Chesapeake Bay north; also throughout the larger part of New England and the North Atlantic States, and in a narrow belt of country including northern Ohio, Indiana, Illinois, Wisconsin, Minnesota and part of Missouri. In the Eastern States, particularly in the Northern States, it is a necessity, and in the country districts has only wood as a strong competitor; but in the States west of New York, where soft coal of fair grade may be had cheaply, anthracite is more or less of a luxury, and its use fluctuates according to the prosperity of the country.

The coal from the mines is forwarded to the seaboard or lower lake points for vessel transportation, or goes direct to centers of consumption. Owing to causes often described and probably familiar to the majority of our readers, it has come about that the railroad companies which transport the coal are also interested in coal mining, and consequently the railroads are the controlling factors in production. This control of production has led to much competition between the different railroads, with resulting poor profits. To remedy losses many attempts have been made from time to time to provide a fair distribution of the output among the different railroad and mining companies. Some of these attempts have been fairly successful for a while, but all have ultimately failed, owing to dissatisfaction at the results achieved, or to the downright dishonesty of some companies, which apparently regarded agreements simply as promises to be broken at the first opportunity. The railroads interested of late years are the Delaware, Lackawanna & Western, the Delaware & Hudson, the Lehigh Valley, the New York, Ontario & Western, the New Jersey Central, the Philadelphia & Reading, the Erie and the New York, Susquehanna & Western. The last-named line is now controlled by the Erie. The change from the old policy of reckless competition and unstable agreements really started in 1898. In that year the house of J. P. Morgan & Company, already a large holder of anthracite securities, began to increase its holdings, and to work for a systematic control of output; the Delaware, Lackawanna & Western, with the retirement of Mr. Samuel Sloan from the presidency early in 1899, became a less disturbing factor.

During 1899 the Pennsylvania Railroad and the New York Central virtually came to an understanding under which the Pennsylvania started out to control the seaboard bituminous trade, and the Central, or gentlemen interested in that company, to take a larger interest in anthracite business. The house of J. P. Morgan & Company continued its aggressive policy. As a result, by the end of the year, a number of independent producers, who were talking of building a railroad to tidewater, were bought out, the Erie Railroad was handling a large part of the tonnage of the Delaware & Hudson, and the Lehigh Valley was under Morgan control. This left as practically the only disturbing factor some independent coal companies about Scranton and Wilkesbarre and the Pennsylvania Coal Company; these were already talking of another railroad to tidewater over the abandoned line of the Delaware & Hudson Canal. It is now quite evident that much of this talk was for speculative purposes. A large number of the Pennsylvania Coal Company's stockholders had agreed in 1899 to sell out to a certain railroad, but could not offer a controlling interest in the company's stock. During 1900 negotiations to get such a control of the Pennsylvania Company were started by J. P. Morgan & Company, and in December came the announcement of the purchase, control being secured by purchase of shares in open market, a course open only to a house having large resources. Present plans indicate that this coal will be shipped over the Erie. This purchase and the formation of the Elk Hill Coal and Iron Company by the New York, Ontario & Western, to control a number of collieries purchased within the year about Scranton, with recent purchases of collieries by the Delaware & Hudson show that Morgan and Vanderbilt interests are now in full control of the anthracite trade and that the independent producer has had his day. There are two large independent concerns, Coxe Brothers & Company and the Lehigh Coal and Navigation Company, in the southern fields, but these concerns have always worked in harmony with the large companies and have never been regarded as disturbing interests. With the progress of the consolidations referred to above, there has been little complaint of cutting prices and broken agreements, and trade during the year has been marked by harmony and a pretty firm control of the output.

January opened with good prospects, though the weather was mild. This mild weather and the activity of labor agitators at the collieries were the only clouds on the horizon from the producers' point of view. The agitators were very active and were already talking of substantial concessions or a general strike. Weather was generally mild until late in February, when a cold wave stimulated buying. For the last half of January and first half of February the Schuylkill collieries paid the highest wages recorded in over twenty years with the exception of a month or two in 1888. The January output was 4,455,000, the best for any January on record, and the February output was 3,198,000 tons.

March opened with the coldest weather of the winter and consumption increased. Chestnut coal was, as for a winter or two previous, the size

most wanted, and its price advanced to that of stove coal. Pea coal was in short supply and was hard to get until late in spring. The March output was estimated in advance at 2,750,000 tons, but the actual output was considerably larger, being 3,736,895 tons, most of which was consumed. With the coming of April and warmer weather, demand dropped and there was talk of stocks accumulating. Supplies at Chicago and other Western points had proved ample for the winter, but there was a considerable movement of coal west in May, owing to the favorable rates for return cargoes up the lakes and the late opening of navigation. In the East the dull season started, and during May and June business was very quiet. The output for April was 3,273,818 tons, compared with 3,078,088 tons in 1899, showing that the companies were restricting shipments to market needs. The May output was also a record breaker, 3,803,755 tons, and for the first five months of the year 18,467,468 tons, or an increase of 1,884,728 tons over the corresponding months of 1899. During June a cargo of 3,500 tons of anthracite was shipped from Philadelphia to Kronstadt, Russia, the first shipment of the sort ever made to a European port.

The nominal prices for free burning white ash coal, f. o. b. New York Harbor, which in January were, broken \$3.30, egg \$3.80, stove \$4.15, nut \$4.25, had by April fallen to \$3 to \$3.20 for broken, \$3.30 to \$3.50 for egg, \$3.60 to \$3.75 for stove and chestnut, with pea at \$2.40 to \$2.80 and buckwheat \$2.10 to \$2.25. These prices showed little improvement for months. By the first of June it became evident that the labor agitators were working for a strike at the collieries in September, when winter buying started. Late in the month the companies announced new circular prices, f. o. b. tidewater, as follows: Stove and chestnut, \$4 a ton; egg, \$3.75. The advance and the prospects of labor troubles called out considerable inquiry, but not much buying. The June output was 4,668,800 tons, considerably larger than was expected, and for the first half year, 23,136,268 tons, or 2,445,170 tons more than the first half of 1899. This excess seems to have been pretty well absorbed, for there was little talk of accumulating stocks. Demand at Western points was easy, lake freights fell to 50c. from Buffalo to Chicago, but the lake movement of coal in July, which had been heavy during May and June, was light. The f. o. b. prices at New York Harbor were nominally circular figures, but sales were quite generally made at \$3.30 and \$3.50 for egg and \$3.50 and \$3.70 for stove and chestnut. The July production was 3,581,516 tons, which compared well with the 3,500,000-ton estimate at the opening of the month, and showed that production was in good control. The figures show a considerable decrease from the 4,186,000 tons of July, 1899. By the middle of August even the dullest men in the trade could see that a general strike at the mines was not improbable, and buying took on more activity, in spite of hot weather. Shipments up the lakes were light, though freight rates had fallen to 35c. from Buffalo to Duluth. The movement from the collieries was quite liberal and the total output for the month was 4,919,000 tons, the largest output for any August and larger than that for any month in 1899 except October. The mining companies were evidently looking for trouble and getting ready. The total production for the year to September 1st was 31,635,984 tons, an increase of 2,418,425 tons over the same period of 1899 and the largest amount of coal ever shipped from the collieries in any corresponding period.

September saw the long-threatened strike a reality, and by September 10th there was a general rush to buy. July 1st prices were realized on some of this business, but not on all of it. Broken and nut coal and the small steam sizes, which are most wanted at cities having smoke ordinances, were in chief demand. By the 20th there was almost a panic. The strike went into effect on the 17th and choked off a large tonnage at once. Even old men in the trade lost their heads and prices of coal soared. The companies nominally were selling at circular figures—\$3.50 for broken, \$3.75 for nut and \$4 for stove and chestnut—but they refused new business, and after the first week or so told transient buyers they had no coal to sell except to their regular contractors. All sorts of prices were offered and retail buyers who were most scared gladdened the hearts of small dealers and jobbers by paying almost any price the latter chose to ask. Stove coal sold as high as \$6.50 a ton and over at retail in New York City. October opened with the companies mining in the Wyoming Region selling coal only on contract orders, while the Lehigh Valley and the Reading, which were less affected by the strike, were selling more freely. Prices were firm and high everywhere, but were purely nominal, being a matter of bargaining. As the strike progressed the scare subsided a little. It was seen that the higher prices brought forward coal enough for all pressing needs, thanks to preparations made by the companies, but the output continued to dwindle as the strikers compelled men to quit at one colliery after another. The output for September was 2,959,550 tons, a good showing, considering that production in the Wyoming region ceased on the 18th. During October warm weather helped reduce demand and the scare of a coal famine died away. Prices of coal at New York fell. It is said that broken sold at wholesale at \$4.80, stove \$4.80 and \$5 and nut \$4.80 and \$5, f. o. b. The steam sizes, which were very scarce during the strike, sold as high as \$4 for pea and \$3 or over for buckwheat. The October output was but 813,531 tons, compared with 4,899,303 tons in October, 1899, and the total production for ten months was 35,409,965 tons, compared with 38,435,569 tons the year before. This great drop in production shows how effectively the strikers stopped work. It also showed that the total production for the year would be behind that for 1899. The strike was called off on October 25th and most of the men returned to work on October 29th. It was then evident that some time would be required for the mines to get into smooth running order, that buying had been kept down and that winter was at hand. Under these circumstances, everything favored high prices and a demand that would take all that the mines could supply. The mining companies announced new tidewater f. o. b. prices for free-burning white ash coal, as follows: Broken, \$4; egg, \$4.25; stove and chestnut, \$4.50; pea, \$3; buckwheat, \$2.50. At Chicago, Milwaukee and Lake Superior ports broken was \$5.75, egg and stove, \$6. These quotations were 50c. above the circular prices of July 1. Production during November was hampered by a short water supply at many collieries, a general difficulty in getting cars to handle all the business in sight and by the mines not being in smooth

running order. The output was badly needed, and by the end of the month coal for spot delivery at Eastern points was harder to get than in over 20 years. The output was 4,971,576 tons, but this did not begin to satisfy consumers. During December production continued heavy and the demand showed little decrease, in spite of the end of shipments up the lakes with the close of navigation. Prices continued firm and occasional spot cargoes even commanded a premium. The year ended with every indication that in spite of the strike the mining and transportation companies would show more favorable returns than in many years. The December output was about 4,800,000 tons and the total for the year 45,180,641 tons, a decrease from last year's record-breaking figures, 47,665,203 tons.

The average selling prices of prepared sizes of free-burning white ash coal, f. o. b. New York Harbor ports, compare as follows:

Months.	Broken.		Egg.		Stove.		Chestnut.	
	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.
Jan.-June	\$3.13	\$3.14	\$3.27	\$3.37	\$3.59	\$3.72	\$3.53	\$3.73
July-Dec.	3.22	3.33	3.49	3.57	3.92	4.07	3.93	4.08

It will be seen that the year has on the whole been the most noteworthy in the whole history of the anthracite industry. For the first time since hard coal shipments on any scale began, the various mining concerns are bound to restrict output to market needs and to refrain from unprofitable competition; they are not bound by paper agreements, easily broken, but by alliances in ownership, not likely to be easily shaken. Never in late years has so large a proportion of the mines been controlled by so few men. With this concentration of ownership the way is open for a concentration of mining at the best situated collieries and the abandonment of unprofitable workings. The independent operator is now of little importance as a factor in production. This means the elimination of much squabbling over petty details and improvement where improvement is most likely to give profitable results.

The great strike of mine employes was memorable in the number of men that stopped work and for the general conduct of the strike. It is unique as being the only successful large strike that ever occurred in the anthracite region. The miners secured substantial concessions and are now more firmly organized than ever before. It is at least worthy of note that great progress toward consolidation in mine ownership and toward the organization of mine labor should have taken place in the same year. It is altogether likely that the movements will result in better wages and steadier employment for the miner, at least a chance for profit for the mining and transportation companies, and higher prices for anthracite coal.

The Atlantic Seaboard Bituminous Coal Trade in 1900.

The Atlantic Seaboard bituminous trade of the United States, which is beginning to assume international importance, is supplied by mines in Central Pennsylvania, the Cumberland Region in Maryland, and by mines along the lines of the Chesapeake & Ohio in Virginia and Norfolk & Western in Virginia and West Virginia. The coal supplied by these mines meets all the demands of bituminous consumers. Some of it is coking, and excellently fitted for gas manufacture; most of it is well adapted for ordinary steam production, while some is the finest coal for naval use to be found anywhere. The coal from the Pennsylvania and Maryland fields is shipped to tide-water over the Pennsylvania and the Baltimore & Ohio railroads, to South Amboy, on New York Harbor, Port Richmond, near Philadelphia, and to Baltimore. The coal from West Virginia and a small area in Southwestern Virginia goes either by the Chesapeake & Ohio Railroad or the Norfolk & Western, to tide-water at Newport News or Norfolk. The coal for domestic use, after arriving at the shipping ports, is taken by barges or schooners, large and small, to the tide-water distributing ports along Long Island Sound, Narragansett Bay, Buzzards Bay, Massachusetts Bay, or the various ports on the Maine coast. From these it goes by rail to the manufacturing towns in the interior. The four railroads that control shipments from the mines have been competitors in the past, and have often by giving through rates from the mine to the tide-water receiving ports, competed for consumers not only in the same district, but in the same city. This competition led for years to a cutthroat policy on the part of the Baltimore & Ohio Railroad, with the Chesapeake & Ohio or Norfolk & Western often acting as foolishly. As a result freight rates have not been satisfactory to the railroads, and the competition of different coals in the same market has caused low prices and unsatisfactory returns to the mine owners.

The gentlemen most prominently concerned in the management of the Pennsylvania Railroad saw the folly of excessive competition, and realizing the great and all-important part that the mines of the Atlantic seaboard are to play in the supply of Western Europe and of South America, started to remedy matters in 1898 by bringing all the coal-carrying roads under their control. This was finally accomplished in March, 1899, by the acquisition of a controlling block of stock in the Baltimore & Ohio and by the purchase of large holdings in the Chesapeake & Ohio and Norfolk & Western. With the conclusion of these purchases came the announcement of higher freight rates from the mines to tide-water ports and the adoption of a territorial policy in distributing the various coals; that is, certain railroads were told that certain territory was more directly in their line and that they would be expected to supply it. Norfolk & Western coal, for instance, was not to be shipped heavily to New York Harbor. It was also made clear that more determined efforts were to be made to secure foreign business by securing agents at foreign ports and by providing adequate shipping facilities for deep-water vessels on this side.

Turning to the progress of the trade through the year, January opened with a very strong demand and producers showing a pretty firm attitude regarding new business. It was already evident that the Baltimore & Ohio Railroad would probably no longer be a demoralizing factor in freight rates and it was also known that the Chesapeake & Ohio was likely to be brought into sympathetic relations. Coal sold as high as \$3.75 f. o. b. New York Harbor, and at Boston as high as \$5. Production during the month was heavy and the seaboard consuming ports,

particularly those along Long Island Sound, took all the coal they could get. Ocean freight rates were high early in the month, the current rate from Philadelphia being \$1.25 to Providence, New Bedford and Long Island Sound, and \$1.75 to Boston, Salem and Portland.

February saw no diminution in activity at the mines. The demand for coal at manufacturing centers in Eastern Pennsylvania, about New York Harbor and in Southern New England continued extremely heavy, but the movement of coal was large and prices declined. Coastwise freight rates from Philadelphia were generally high, \$1.25@\$.1.60 to Sound ports, and \$1.80@\$.2 to Boston. The railroads announced an increase of 35c. in freight rates, making the rate from Clearfield Region to New York \$1.30 per ton, to Philadelphia \$1 and Baltimore 93c. Foreign trade, which had first attracted attention, during 1898, became a subject of more general interest and a considerable space was given by the daily press to describing American coals and their market abroad, much of this material being merely the product of a facile pen and a vivid imagination. But inquiries were coming in from abroad, particularly from Mediterranean points, and representatives of European firms sought contracts with responsible houses. Numerous difficulties, however, had to be overcome in shipping to European markets. The European consumers are accustomed to buy at delivered prices, while American producers are accustomed to sell at f. o. b.; vessel rates were high and neither producer nor consumer liked to make long contracts ahead which included ocean freights. The demand abroad was due to a short supply under the stress of great industrial activity, and consumers found themselves compelled to pay extremely high prices to British exporters, best Welsh coal selling as high as \$7.20 per ton at Cardiff during the month.

March saw little falling off in domestic demand, while speculative business had been stopped by high demurrage charges. Inquiries and orders from abroad continued to come in, and the possibilities of our export coal trade were much discussed. Coastwise freight rates declined to \$1.50 Philadelphia to Boston, and standard coals sold to \$2.90 to \$3 f. o. b. New York Harbor, and poorer grades of Clearfield as low as \$2.15. There were labor troubles in Pennsylvania and others were threatened in Maryland, although the George's Creek miners were promised a 10c. advance April 1st, making the mining rate 55c. per ton, the highest rate paid in 18 years.

During April the demand showed some abatement, but was strong along Long Island Sound. Clearfield coal on April 1st was selling f. o. b. New York Harbor ports at \$2.65 per ton and George's Creek at \$2.85; at Philadelphia, Clearfield was selling for \$2.25, and Pocahontas, New River and George's Creek for \$2.50 at Chesapeake Bay ports. The miners in the George's Creek field struck on April 12th, nominally for a 5c. advance in wages, but really for a recognition of the union. The strike involved all the large companies in the field, employing about 6,000 men, and shipments of George's Creek coal stopped entirely, causing a temporary speculative movement in prices. Coastwise freight rates fell off to 75c. from Philadelphia to Boston, and 65c. from Philadelphia to Providence, New Bedford and Long Island Sound ports. By the end of the month coal, though in good demand, sold at slightly lower figures. The speculative price at Boston, where there had been considerable irregular buying, receded from \$4.50 per ton for good coal to \$3.50. The demand along Long Island Sound continued brisk, and coastwise freight rates advanced to 80 and 85c. from Philadelphia to Boston and 70 and 75c. from Philadelphia to Providence, New Bedford and Long Island Sound. By May the demand began to fall off and prices weakened. The consumer of George's Creek coal went without their usual supplies and used other grades. Clearfield coal by the middle of the month was quoted as low as \$2.50 at New York Harbor and \$3 alongside at Boston, where, it is said, sales were made as low as \$2.50. The demand from abroad continued heavy and all producers of good coal had genuine inquiries. Coal was exported steadily, but owing to the uncertainty about freight rates no concern took very large orders for future delivery.

June opened with little material change in demand or prices. Some large buyers, notably the New Haven Railroad, did not contract for full amounts, feeling that coal was to be cheaper, and bought at current prices. Some Clearfield coal is said to have sold as low as \$2.15 alongside at Boston, though regular quotations were \$2.50 and \$2.75 f. o. b. New York Harbor ports and \$2.15 and \$2.40 f. o. b. at Philadelphia, while Cumberland coal was quoted at \$2.25 and \$2.50 f. o. b. Baltimore. Shipments abroad continued to gain and were pretty well distributed, the coal going to Sweden, Spain, Germany and Austria. Coastwise freights fell off to 65 and 70c. from Philadelphia to Providence, New Bedford and Long Island Sound, and 75 and 80c. to Boston, Salem and Portland.

July found trade still dull and export business fair. Ocean freight rates from Philadelphia, Baltimore and Norfolk to French ports were \$4.08 per ton. Coastwise freights were unchanged, and the poorer grades of Clearfield coal were selling at \$2.25 f. o. b. New York Harbor. By August demand showed signs of improvement, while coastwise freight rates were weak and declining, being 55 and 60c. from Philadelphia to Providence, New Bedford and the Sound, and 65 and 70c. to Boston, Salem and Portland.

Early in August demand began to pick up. About 60 per cent. of the men in the George's Creek field returned to work on August 7th, and within a few weeks the mines were getting out coal as fast as car supply would permit, finding a ready market for all they could produce. Prices stiffened, Clearfield selling at New York Harbor from \$2.55 to \$2.65, and other standard grades at \$2.25 to \$2.50 at the further lower ports. Export trade continued, and freights to European ports remained firm at \$3.94 and \$4.06 per ton. Domestic demand improved, and by September consumers at points beyond Cape Cod were eager to lay in supplies. Coastwise traffic was hindered by calms and head winds, and vessel freights took an unexpected jump to 90c. from Philadelphia to Providence, New Bedford and the Sound, and \$1 to Boston, Salem and Portland, but soon declined. Foreign trade held up pretty well. Prices for coal increased to about \$2.50 per ton f. o. b. for Clearfield at Philadelphia, and \$2.50 and \$2.60 per ton for Pocahontas, New River and George's Creek coal at the Chesapeake Bay ports.

By the middle of September the anthracite strike was on. Bituminous shippers who had expected that car supply, which had been giving trouble for some weeks, would improve with the stopping of anthracite shipments, were surprised to find the Pennsylvania management cutting the number of cars allowed to Maryland and Pennsylvania mining companies as low as 25 to 50% of the total number needed, although it is said that certain companies were more liberally treated. Coastwise vessel freights were 75c. from Philadelphia to Sound ports and 85c. to Boston. Demand from points beyond Cape Cod and along Long Island Sound by the end of the month was very strong and there was considerable speculative buying, speculative prices ranging as high as \$3 f. o. b. New York Harbor ports. The railroads showed no desire to help the mines, and either by short car supply or poor transportation the movement of coal during the whole of October did not satisfy demands. The down-East ports began to stock up. Coastwise freights weakened. Foreign trade began to fall off with the decline of prices for Welsh coal, while ocean freights were firm and higher. By the middle of the month coal at Cardiff was selling for \$6.60 and \$7.08 for best grades. November opened with an easier market. Car supply improved when the anthracite strike was declared off, though the improvement was temporary, and by the end of the month producers were complaining again. Shipments to down-East points continued liberal and along Long Island Sound the demand for good coal was nearly as heavy as ever. Export business continued to decline, best Welsh steam coal having by this time fallen to \$5.04 and \$5.16 per ton. This fall continued nearly to the end of the year and killed off inquiries from Europe so that export business became of no particular importance. Best Welsh coal by the middle of December fell to \$4.20 and \$4.44 per ton at Cardiff.

During November and December producers found the domestic market growing steadily easier for all but the very best grades of coal. Coastwise freight remained low after October 1st; 60@65c. from Philadelphia to Long Island Sound ports, and 70@75c. to Boston, Salem and Portland. Good Clearfield coal sold at \$2.35@2.75 f. o. b. Philadelphia. There was no check in the gradual decline in demand and by the end of December Clearfield coal was selling at about \$2.25 per ton at Philadelphia, while coastwise freight rates, singularly enough, did not rise. The year closed with the better coals in active demand and poorer grades in plentiful supply.

A rather important event in December was the formation of the Kanawha & New River Coal Company by a number of West Virginia mines that ship over the Chesapeake & Ohio Railroad. To handle the output of tributary mines the railroad organized over a year ago the Chesapeake & Ohio Coal Company. The management of this company did not satisfy the mine owners, hence the new company. It is understood that the Kanawha & New River Company will act simply as a sales agent and exercise influence in seeing that cars are properly distributed to different mines.

The main-line roads, which now is but another term for the Pennsylvania Railroad Company, have decided on a 10c. per ton increase in freight rates from the mines to tide-water points for the coming year. This increase has checked a movement toward lower selling prices. Whether or not the control held by the Pennsylvania has benefited the producers as much as was promised seems doubtful. It certainly has not benefited the public. The Pennsylvania Company's policy has been at times arbitrary, particularly in the matter of car supply, and has not met with favor from producers, who saw possible sales cut off. At the same time there has been an absence of cut-throat competition; the prices realized have been satisfactory, in some fields fully 50c. net above the average for 1899, and the mining companies have had a busy and very prosperous year. The outlook for 1901 is excellent and American coal producers enter the new century ready to take advantage of any demand abroad. While, as we have pointed out, shipments of American coal to England on any scale are altogether improbable in the near future, yet there are ports in Southern Europe where our coals have been tried and found satisfactory, and a good market may be had with effort. With a fall in ocean freight rates and with the construction of vessels specially designed for the coal trade, the American producer is bound to cut a very large figure in the world's coal trade, and it does not require much imagination to see our coal supplying the industrial centers of Continental Europe before the century is half finished. Ultimately the bituminous fields of the Eastern United States will supply all countries bordering on the North Atlantic, as the great fields of Eastern Asia will in time supply the countries bordering on the Pacific.

PETROLEUM IN 1900.

The production of petroleum in the United States, as shown by the figures in our table, showed an increase in 1900. The output of the Eastern fields has been generally good, and some strikes of more importance than we have had to note for a good while have been made in West Virginia. The new fields which have attracted most attention have been those in California, where substantial progress has been made in development, while there has been great excitement and active public interest in this new source of wealth. The California fields are of especial importance on account of the high prices and scarcity of fuel on the Pacific Coast. Already in southern California oil is entering largely into use as fuel and this movement will doubtless extend as the permanency and abundance of supplies become better assured.

California Petroleum in 1900. (By Our Special Correspondent.)

Oil development in California has reached that point where the chief interest centers in new strikes in some hitherto untried field. Present operations are distributed through many of the counties of the State from the northern to the southern extremities. Recently news has come of continued discoveries in various wells, yet no new developments of any great importance have been recorded. The item of greatest moment is the report of a strike of paraffine oil in Marin County, north of San Francisco. The petroleum found in California is, almost without exception of an asphaltum base. Some slight traces of paraffine have been found, but not of sufficient quantity to give it importance, hence the un-

usual importance of the reported Marin County discovery. Over 76,000 acres of land have been located for oil purposes at or near the point where this oil was found. Capital is ready to commence development.

In production of petroleum in California in 1899, as reported by "The Mineral Industry," was 2,677,875 barrels, of which over one-half was from Los Angeles County. Ventura, Fresno, Santa Barbara, Orange and Kern counties followed in order. The production for 1900 largely exceeded that of the preceding year, the additions coming from new producing fields, among which those of Kern County are the most prominent.

Some idea of the magnitude of oil contracts in this section may be gained from the contract recently made between a firm of oil operators and the Santa Fe Railroad Company, the terms of which call for the delivery of 1,250,000 barrels of oil per year for the next five years. Petroleum is readily taking the place of coal in all the locomotives in Southern California.

Prospecting work near San Pedro Harbor, where the Government is building an extensive jetty and other harbor improvements, is rapidly nearing a point where some definite developments may be expected. The oil sand is said to have been penetrated in one of the wells now drilling in that section, but the operators, as is customary in such cases, are averse to giving out any information regarding their work. The beach for miles in both directions from the harbor has been located by oil-land claimants. Certain of these will start development work soon.

The search for oil has been carried into San Bernardino County. Active operations are now in progress at Kramer, over 150 miles distant from present developments. There are now 15 different companies which have land holdings in this county.

Oil securities find a better market now than at any previous time. The introduction of a great deal of Eastern capital and the withdrawal of considerable blocks of oil stocks to the Eastern market are two causes of this betterment of the sale of stocks. The fact also that many prospective companies have made good discoveries on their territory has created considerable interest in this line of investment and speculation.

In its relation to the oil industry, Ventura County is entitled to a leading position among the petroleum districts of the State, for it was here that oil was first discovered and here also has been found one of the most prolific fields. For 35 years operations have been carried on in this county, but there remain hundreds of acres of known oil land that is practically unexplored. One of the earliest wells drilled in this field was put down by United States Senator Thomas Bard. After this development came the Pacific Coast Oil Company, followed later by the Hardison & Stewart Company and finally the merging of lesser companies into the Union Oil Company, which is to-day the most important and extensive in the matter of oil production of the oil corporations of the State.

The little town of Santa Paula has been the active center of the Ventura fields. Here was formerly located the refinery of the Union Oil Company, toward which converged 500 miles of pipe lines, coming from every direction. This refinery has since been moved to Oleum, on San Francisco Bay, but the company still maintains storage tanks with a capacity of 111,000 barrels. The oil which is collected here is now mostly shipped to Ventura, whence it goes by tank steamer to San Francisco and by cars to various points in the State.

The oil produced in these fields varies considerably, ranging from 14 to 32 gravity, the latter being particularly well adapted to refining. The lower gravity oils are used in their crude state as fuel.

Thus far, in the neighborhood of 500 wells have been drilled in Ventura County. Of these, about 250 are still in operation. The average production per well will run between 25 and 125 barrels per day. They have been known to run as high as 300 and even 500 barrels a day. The Union Oil Company has one well drilled in 1893 on Tar Creek, in the Little Sespe District, which started off with a daily yield of 300 barrels and still continues to produce 50 barrels per day. The depth of these wells ranges from 500 to 2,000 ft., the average being about 1,000 ft. Owing to the character of the country, drilling may be said to be expensive in this field. This is true at least as compared with several of the other petroleum centers of California. The oil-bearing sections of the county are mostly rough and hilly, with occasional low mountains, which are indented by innumerable canyons and small valleys.

Up to the present time Adams and Torrey canyons have proved the richest pools; each has been exploited for a number of years, and still contributes largely to the output. There yet remain within this field many localities which show indications of oil, but have not been tested by the drill. When the extent of pioneering work is taken into consideration, the percentage of dry holes in this district is comparatively small. Notwithstanding the almost phenomenal activity of operators and the large amount of capital that is being invested here, it will be many years before the full possibilities of this rich oil section are developed.

The McKittrick Oil Field in California.

Written for the Engineering and Mining Journal by Wm. G. Young.

Kindred to the great Kern River and Sunset oil fields is the McKittrick Pool, situated in Kern County, about 60 miles from Bakersfield in a southwesterly direction. In point of discovery this is one of the oldest oil districts in the State, although its development came considerably later than that of most of the other important centers. Originally this field was opened for its asphaltum, there being great deposits of this valuable commodity in this section. The Southern Pacific Railroad built a branch road to McKittrick for the purpose of marketing its asphaltum. Soon after the discovery of oil in the Kern River, attention was directed to McKittrick, and numerous prospectors and investors flocked to the place in search of oil. Although there are many excellent wells there, this district is as yet practically undefined. Time has wrought a great change in the place, and it is only within the last few months that McKittrick has been established as a connecting link between the Temblor Field, about 13 miles northwest, and what is known as the Midway, lying between McKittrick and the famous Sunset District.

The first efforts to obtain a well at McKittrick were in a measure un-

successful, as a strong flow of artesian water was struck at a depth of about 800 ft. While this supply proved extremely valuable, it was nevertheless a disappointment to those who were seeking oil; not so great, however, as to deter another attempt, which resulted more favorably. The credit of securing the first producing well is due to Milton McWhorter, whose perseverance demonstrated beyond a doubt the existence of oil in paying quantities. The best producers of this district are the property of the Dabney and the Kern River oil companies. Both of these corporations have shipped and are shipping many car-loads of petroleum from the district. The Kern River company's first effort resulted in a gusher. The well showed a troublesome tendency to clog up with sand, which, being very fine in this district, occasioned considerable trouble. By experiment it was learned that this impediment could be overcome by keeping approximately an even pressure at the outlet. This naturally decreased the flow to a considerable extent; not, however, to such a degree as to make the well unprofitable, as it produces a trifle less than 100 barrels per day under present conditions.

The petroleum of the McKittrick Field is somewhat lighter than either the Kern River or the Sunset product, some of it being as light as 33° gravity. It has proved a very fair refining oil, yielding nearly 53 per cent. kerosene of a very clear, high grade. The refining of this oil is considered of sufficient importance to warrant the erection of a refinery at Bakersfield for the purpose of handling the output. This project is now receiving serious consideration and is one of the possibilities of the oil business at that important center. The present output of this field averages about 7 car-loads per day, a considerable portion of the product being used locally. A very meager idea of the importance of the McKittrick Field is gained from the amount of oil which is marketed. Generally speaking, it may be said that the pioneer work has only just been fairly done, sufficient to demonstrate the richness of the district. There are numerous rigs now dotting the hills in every direction from the known center. In many cases drilling is now in progress, and in many others, active operations will be commenced within the next few months. Already sufficient work has been done in the direction of Temblor to the north, and Sunset toward the southeast to demonstrate a continuous stretch of rich oil-bearing deposits for an extent of many miles. Now that this pioneering work has been accomplished, it will be only a matter of time until the three districts will be merged in one, the productiveness of which may possibly exceed that of any other district known in the State.

THE PHOSPHATE INDUSTRY IN 1900.

In the first half of the year the various producing fields showed much activity and shipments were large. But with the approach of the rainy season, and less demand from foreign superphosphate manufacturers, the phosphate industry became very quiet; shipments fell off noticeably, and many mines were compelled to close down owing

UNITED STATES PHOSPHATE ROCK PRODUCTION.

State.	1896.	1897.	1898.	1899.	1900.
Florida	498,400	543,490	546,881	706,677	582,900
Tennessee	49,047	131,251	272,191	462,561	436,000
South Carolina	382,008	333,626	434,273	635,153	562,000
North Carolina	7,418	7,000	2,200	15,000	15,250
All other	499	2,000	2,100	3,900	3,750
Total, long tons	997,372	1,007,367	1,257,645	1,823,391	1,599,900

to their large stocks. The continued high ocean freight rates to foreign markets, and the scarcity of suitable vessel room, acted very unfavorably on the phosphate industry here. At the close of the year little encouragement is heard for 1901, and it is believed the output in that year will show a further decrease—at least in the high-grade rock districts.

Prices did not fluctuate violently, as miners exercised better judgment in making f. o. b. contracts, and middlemen also were more careful in booking c. i. f. orders from foreign consumers.

The production of phosphate rock in the United States in 1900 was approximately 1,599,900 long tons, against 1,823,391 tons in 1899, showing a decrease in the past year of 223,491 tons, or 12.3 per cent. This falling off was due chiefly to the smaller production in Florida.

The shipments for 1900 were 1,418,790 long tons, against 1,657,122 tons in 1899; a decrease of 238,332 tons, or 14.4 per cent., in the past year. Of these shipments there were sent abroad 634,290 tons, against

UNITED STATES PHOSPHATE ROCK SHIPMENTS.

State.	Domestic.		Foreign.		Total.	
	1899.	1900.	1899.	1900.	1899.	1900.
Florida	88,321	101,000	583,132	430,790	671,453	531,790
Tennessee	277,447	275,000	163,114	140,000	440,561	415,000
South Carolina	432,187	389,500	94,961	63,500	527,108	453,000
North Carolina	15,000	15,250	.....	.....	15,000	15,250
Pennsylvania	3,000	3,750	.....	.....	3,000	3,750
Total, long tons	815,955	784,500	841,167	634,290	1,657,122	1,418,790

841,167 tons in 1899, showing a decrease of 206,877 tons, or 24.6 per cent. in 1900. The domestic shipments amounted to 784,500 tons, against 815,955 tons in 1899; a drop of 31,455 tons, or 3.8 per cent., in the past year.

Florida.—The continued high ocean freight rates and subsequent scarcity of vessel room have affected export trade very unfavorably. As this is the most important branch of the industry in this State, it will be understood that the mines have felt the depreciation in exports very keenly. High-grade rock exports this year show a falling

off of 101,555 tons, or 22.8 per cent., and pebble phosphates 59,787 tons or 37 per cent., as compared with 1899. Exports were chiefly to Mediterranean countries, though some were for Australia and Japan.

FLORIDA PHOSPHATE EXPORTS.

Shipping Port.	1899.		1900.	
	High-grade Rock.	Pebble.	High-grade Rock.	Pebble.
Brunswick, Ga.	50,516	.....	4,225	.....
Fernandina, Fla.	246,106	.....	178,700	500
Punta Gorda, Fla. ....	.....	37,692	.....	18,670
Savannah, Ga.	100,540	.....	124,163	1,156
Tampa, Fla.	47,513	100,765	36,082	67,844
Total, long tons	444,675	138,457	343,120	87,670

Mining for hard rock was very active during the early months of the year, and the product was sold by miners to middlemen principally, at f. o. b. prices. The middlemen sold c. i. f. to consumers abroad, 6 months in advance, consequently much of the rock mined was under contract.

In January about 80 hard-rock plants were working, but with decreased exports production fell off, and by early September not more than 35 plants were in operation. When the trade was brightest, several of the large concerns talked of consolidating the hard-rock and pebble mines, but this syndicate idea fell through, as the operators' valuation of their property exceeded by far the intentions of the promoters of the scheme. On the other hand, the cost of producing rock has increased. Laborers' wages have advanced about 25 per cent, lumber nearly 50 per cent., and machinery correspondingly. Prices of 77 to 80 per cent. rock, f. o. b. Fernandina, were, in January, \$9.50 to \$10 per long ton, and weakened to \$7.50 to \$8.50 in the following months, closing in October at \$7.50 to \$8. In 1899 the outside f. o. b. prices were \$8.50 to \$11, showing a drop in 1900 of about \$1 per ton. Abroad, quotations c. i. f. United Kingdom, North Sea and Mediterranean ports, opened at \$12.75 to \$13.65 per long ton in January; \$12.57 to \$13.06 in April; \$12.48 to \$12.57 in May; \$12.09 to \$12.48 in June-August. Thereafter quotations fluctuated between \$12.48 and \$13.65. In 1899 the outside quotations were \$13.13 to \$14.42, showing a recession in 1900 of \$1.04 to 77c. per ton.

Freight rates from Florida ports to the Baltic were \$4.90 to \$5.28; Continent, \$4.62 to \$4.88, and to the Mediterranean \$4.75 to \$5.01, while from Savannah to the United Kingdom charters were taken at \$4 to \$4.56.

In the pebble phosphate region operations were irregular owing chiefly to the decreased export trade. The domestic demand for land pebble, however, has improved. Shipments in 1900 were about 75,000 tons land pebble for home consumption and 69,000 tons for export; of Peace River pebble about 26,000 tons domestic and 18,760 tons foreign.

The f. o. b. Fernandina price of land pebble (68 to 73 per cent.) was held at \$4.35 per long ton, while in the foreign market quotations fluctuated from 7d. per unit (\$9.80 per long ton) in January, c. i. f. United Kingdom or North Sea ports, to 6½d. (\$9.10) in May. At this price a German house took contracts aggregating about 60,000 tons for 1900 to 1902 delivery, c. i. f. Venice, Italy. In June 6¾d. (\$9.45) was quoted; in August, 7d. to 7¼d. (\$9.80 to \$10.15), and in October-November, 7½ to 7¾d. (\$10.50 to \$10.85) c. i. f. all European ports.

Peace River rock or pebble phosphates show a heavy falling off in exports this year, though the home trade has been pretty regular. Prices, f. o. b. Fernandina, were \$4.50 per long ton for 58 to 63 per cent. in January; \$3 to \$4 in March, and \$3 to \$3.50 in April; which prices held until the end of the year, as the product was under contract. Abroad, c. i. f. European ports, quotations were 7d. per unit (\$8.40) per long ton in January; 6¾d. (\$8.10) in February; 6¼d. to 6½d. (\$7.50 to \$7.80) in March; 6¾d. to 7d. (\$8.10 to \$8.40) in April; 6½d. to 6¾d. (\$7.80 to \$7.95) in May; 7 to 7¼d. (\$8.40 to \$8.70) in August, and 7d. to 7½d. (\$8.40 to \$9) in November, while contract orders for summer, 1901, were quoted at 6¼d. (\$7.50) in the last quarter of 1900.

Tennessee.—Demand for this rock was good, though not as active as a year ago. Prices, however, were more satisfactory, as a result of the understanding between miners. In 1900 the total shipments were about 415,000 long tons of 2,240 lbs., as against 440,561 tons in the previous year, showing a decrease of 25,000 tons, or 6 per cent. This falling off was due to the interruptions in production owing to heavy rains; the fall in June alone amounted to 5.09 in. against only 0.05 in. in the same month last year. The high ocean freight rates also curtailed exports. The largest producing district is still Maury County, in which the Mount Pleasant Field is located. This county shipped approximately 385,000 long tons of rock, or 92.8 per cent. of the total for the State. The remaining 30,000 tons were shipped by mines in Hickman, Davidson and Williamson counties. New discoveries were reported in many places in all these counties, but the rock was mostly lean and limited in depth.

Of the total shipments the domestic market received about 275,000 tons, against 277,447 tons last year; while there were exported about 140,000 tons, against 163,114 tons in 1899. The exports were largely to Germany and other Mediterranean countries, while some were also made to Japan.

Prices, f. o. b. Mount Pleasant, were better than last year. Export rock sold at \$2.85 to \$4.75 per long ton; domestic at \$2.75 to \$3.75 for 78 per cent, \$2.50 to \$3.25 for 75 per cent, and \$2.25 to \$2.75 for 65 to 72 per cent. In the foreign markets high-grade rock brought \$9.36 to \$11.70 per long ton, c. i. f. United Kingdom, North Sea and Mediterranean or Baltic ports. Ocean freight rates from Pensacola, the leading export port for Tennessee rock, varied from 20 to 22s. (\$5 to \$5.50). Acid phosphates, high-grade, sold f. o. b. Nashville at \$10 to \$12 per ton, and \$8 to \$10 for low-grade.

South Carolina.—Mining has been extended somewhat by the purchase

of phosphate lands by Armour & Company and Swift & Company, packers, of Chicago, for the purpose of establishing a fertilizer factory near Charleston. Wages paid pickers of rock at the large mines averaged this year about \$1 per ton, while other ordinary laborers received between \$5 and \$8 per week.

The shipments of phosphate rock in 1900 were approximately 389,500 long tons domestic and 63,500 tons foreign, a total of 453,000 tons, as against 527,108 tons in 1899; a decrease of 74,108 tons. This falling off was due principally to the smaller domestic shipments, although exports were also less than in 1899.

Prices have been maintained, as the industry in this State is in the hands of a few large companies. In January crude rock was selling at \$4.25 to \$4.50 per ton, f. o. b. Feterressa, S. C., and dried at 50c. more. Abroad, quotations were 6½d. per unit bone phosphate of lime, or about \$7.80 per long ton, c. i. f. United Kingdom.

In March, sales were made f. o. b. Feterressa at \$3.75 to \$4 for crude, and \$4.50 to \$5 for dried rock, while in Great Britain the quotations remained at 6½d. In June Feterressa prices were \$3 for crude and \$5 for dried, and in October, sellers named \$4 for crude and \$4.50 for dried. Abroad the quotations were 6½ to 6¾d. (\$7.80 to \$8.10) per long ton. Acid phosphates, high-grade, sold at \$6 to \$6.50 per ton, f. o. b. Charleston. In the last quarter of the year the phosphate industry of this State was demoralized, only half the dredges of the Coosaw Company were in operation, as in November 50,000 tons of rock were waiting shipment. The Beaufort Company, which had 25,000 tons on hand, closed down for 60 days, while the Empire works of the Virginia-Carolina Company were closed down altogether. Demand fell off considerably both for home and export, and prices were lower.

North Carolina.—Production is limited to the Castle Hayne Phosphate Mines, and amounted to about 15,250 tons in the season ended August 31st, 1900.

Pennsylvania.—The only producer in this State is the Tuscarora Fertilizer Company in Juniata County. The output in 1900 is estimated at 3,750 tons, mostly low-grade. Nearly all this has been consumed by the company at its superphosphate plant near the mines. This plant has a daily capacity of 150 to 200 tons, with a storage room for 25,000 tons.

Alabama.—New discoveries of phosphate rock similar to that of Mount Pleasant, Tenn., were reported in Madison and Lancaster counties.

SALT IN 1900.

The production of salt in the United States shows a substantial increase, as was to be expected. There is little new to be noted under this head except that with the development of the chemical industries an increasing quantity of salt is now used in the production of various heavy chemicals and alkalies. This is especially the case with the Michigan salt output. As noted in another place, several important chemical works have been located in the neighborhood of the Michigan deposits.

The Utah Salt Business in 1900. (By Our Special Correspondent.)

Matters have remained about in statu quo in the salt manufacturing business in the Utah field as they were in 1899. As was explained in the "Engineering and Mining Journal" last January, this business is now in the hands of one company, which has been able to maintain prices at figures so that the products could not be shipped from other fields, which means a reasonable profit. Prior to the formation of the salt consolidation, local competition was so active that it was a losing business for all. From the beginning to the close of the year prices were practically stationary in all products, including crude grades for stock feeding and chlorination purposes. There is a move on foot for a new salt enterprise, which may change matter quite materially, though at present everything is in embryo.

About 1,000 tons of crude solar salt were marketed from Davis County and a small increase is noted in Salt Lake County, while, contrary to expectations, there was no material increase in the rock salt output from Juab and Sevier counties. The plant of the Nebo Salt Manufacturing Company, at Salt Springs, near Nephi, has been idle all year. This plant was under lease to the so-called salt trust and is now turned back to its owners, who at once planned some needed improvements, looking to an increased capacity. Perhaps by February a yield of 12 tons per day of pan evaporated table salt and dairy salt may be made. No crude salt is produced at this point. The output of red rock salt from Sevier Valley is from open cuts in the hills, and as the title to these deposits is in the State, systematic mining has never been inaugurated. Davis County possesses admirable sites for salt making, but it is questionable if the production from that section of the Great Salt Lake will be of moment for some time to come.

Salt Lake County is the home of the so-called trust, and the bulk of the business is performed either at their works at Saltair or at a near-by point convenient to their refinery, just before reaching the Saltair pavilion. This refinery is very complete, possessing a capacity largely in excess of the ability to market the production that could easily be maintained.

During the past 12 months the production of the various products marketed may be quite accurately summarized as follows: Refined salt, 15,000 tons; stock salt, crude, 4,000 tons; coarse salt for chlorination, 15,000 tons; artificial rock salt, 500 tons; mined rock salt, 3,000 tons; total, 37,500 tons.

All things considered, the situation may be looked upon as satisfactory. The projected Los Angeles & Salt Lake Railroad may prove an important factor later. Salten salt, as well as salt from the many known deposits in southwestern Utah and southern Nevada, may come in competition with the local products when a railroad line from southern California is completed on the ground, rather than built on paper, as is annually done.

SLATE IN 1900.

The production of slate in the past year showed quite a falling off, owing to the smaller demand, both at home and abroad. The gutting of some of the quarries, especially in Pennsylvania, as a result of the heavy export business in the two previous years, also tended to keep down production. On the other hand, the prices obtained in the domestic market were better than in 1899, though with the close of 1900 quarrymen are again at sea as to quotations on their product, and in a number of instances are cutting the schedules from 25 to 50 per cent.

In Pennsylvania some of the older and larger quarries were late in beginning work this year, while others opened new territory to meet their orders. Production of roofing slate shows a marked decrease, and the same may be said of some mill stock, notably switchboards and black-

PRODUCTION OF ROOFING SLATE IN THE UNITED STATES.

	1899.		1900.	
	Squares.	Value.	Squares.	Value.
California.....	810	\$5,900	3,600	\$27,000
Georgia.....	2,500	12,500	Nil.	.....
Maine.....	23,412	99,033	29,500	125,375
Maryland and Pennsylvania.....	701,691	2,049,086	608,167	1,721,200
Vermont and New York.....	316,395	711,889	300,645	751,612
Virginia.....	53,060	175,630	45,000	148,500
Other States.....	500	2,000	500	2,000
Totals.....	1,098,374	\$3,055,968	987,412	\$2,775,606

boards, which were shipped from Pennsylvania regions. The f. o. b. quarry prices for standard brands of roofing slate varied from \$4.50 to \$3.25 per square for merchantable sizes of No. 1 Bangor; \$3.50 to \$3.25 for Bangor ribbon; \$3.75 to \$3 for Albion or Jackson Bangor, and \$3.50 to \$2.80 for Lehigh, the latter experiencing much competition and cutting of prices. Blackboards were sold by manufacturers at 12c. for 3 sq. ft., 13c. for 3½ ft., and 14c. for 4 ft. Slate flour was quoted f. o. b. Easton at \$7.50 to \$8.25 per ton. Fewer quarrymen worked for the export trade, owing to the excessively high ocean freights, which were quoted in the open market at 15s. to 17s. 6d. to London, and 13s. 6d. on contract. The average cost of the American roofing slate of good quality sold in British markets during the year 1900 may be summarized as follows, per long ton of 2,240 lbs.:

	U. S.	Sterling.
Slate at quarry	\$9.60	40s. 0d.
Freight to New York.....	3.50	14s. 0d.
Ocean freight	3.24	13s. 6d.
Unloading, storing, etc.....	1.44	6s. 0d.
Total	\$17.64	73s. 6d.

The competition with Welsh quarrymen was very keen throughout the year, and at different times prices were cut so deeply that little or no profit accrued to the American exporter. On the other hand the Welshmen were also compelled to reduce prices, contrary to their custom in the past.

The Peach Bottom Region in Maryland did well in 1900, and the producers in the Association held to their agreement to regulate the industry. The refuse dumps are to be worked by a new company formed this year, which intends to make bricks, cement, etc., from pulverized slate. Prices of roofing slate showed a little change, being \$5.35 to \$4.75 per square for No. 1 grades f. o. b. quarry.

What has been said about Pennsylvania may also be applied to the Vermont region which is furnishing the colored slates both for home and foreign consumption. In the Vermont slate belt, which extends into New York, quarrymen had a smaller production than in 1899 at many of their quarries. Wages are higher, while selling prices were satisfactory, notwithstanding the frequent cuts in the published schedules.

SLATE EXPORTS FROM THE UNITED STATES.

Month.	Roofing, squares.		Mill stock, value.	
	1899.	1900.	1899.	1900.
January.....	13,968	14,151	\$7,913	\$4,489
February.....	20,392	12,062	11,568	6,701
March.....	27,277	6,249	13,245	10,978
April.....	24,782	6,368	15,332	19,887
May.....	33,936	8,809	16,987	17,594
June.....	18,269	10,803	9,868	24,442
July.....	17,738	17,611	15,315	6,738
August.....	20,728	12,727	10,594	5,566
September.....	19,690	8,387	7,670	7,073
October.....	13,042	10,372	4,900	6,391
November.....	21,392	7,402	5,613	19,714
December.....	21,314	8,500	8,728	10,250
Total.....	252,496	123,441	\$127,733	\$129,818

The f. o. b. quarry list prices for No. 1 roofing slate were \$3.15 to \$2.50 per square for sea green; \$4.25 to \$3.25 for unfading green, and \$11 to \$8.50 for red. The red slate production is well controlled by the Matthews Slate Company. Mill stock manufacturers did a fair business both for home and export consumption, while prices were unsettled by the aggressive competition of the Vermont marble producers.

In Maine the output of roofing slate is estimated at 29,500 squares, and of mill stock at 300,000 ft. The Brownville quarries were the largest producers of roofing slate, while the mill stock was made principally at Monson. Roofing slate sold at \$7.10 to \$4 per square, according to size.

In the other slate-producing States, California showed increased activity at the Strahle quarries, Tennessee reported the opening of new deposits in Blount County, and in New Jersey the old Newton quarries were reopened by a new company, while in Virginia a little work was done. In Arkansas the large deposit in Polk County is producing, and the slate will be shipped to Mena, where a mill is to be erected. A good vein of purple slate was reported found in

Alabama, about 50 miles from Birmingham, and only 3/4 mile from the main line of the Louisville & Nashville Railroad. Other discoveries were announced in Western States, but as they are too far from a railroad, remunerative work cannot yet be done on the slate beds.

MINING PROSPECTS IN AUSTRALIA.

Whitten for the Engineering and Mining Journal by John Plummer.

The Australasian mineral outlook for 1901 is decidedly encouraging, and there is every reason for believing that with the establishment of the Australian commonwealth there will be a great expansion of the mining industry, in consequence of the removal of the interstate duties which have hitherto largely impeded the movements of machinery and material. In future the Federal States will form a single mining field, however much the mining laws and regulations in each may differ. It is also anticipated that whatever may be the character of the Federal tariff, it will largely favor the importation of mining machinery and appliances. A marked feature of late years has been the establishment of smelting works on a large scale for the treatment of gold, silver, lead, copper and other ores. This has been followed by a decrease in the quantity of ore shipped to Europe. The New South Wales Government has entered into a contract for the establishment of iron smelting works in that State, and others are to be contracted by private enterprise in Victoria. Much of the ore used in New South Wales will be from the Mount Blyth field in Tasmania, which is declared to be of the finest quality known. The existence of considerable quantities of nickel ore in New South Wales has caused arrangements to be made for its treatment at Newcastle, in that State, together with considerable quantities from New Caledonia.

Gold dredging in Australian rivers, so far as it is being permitted, has been attended with such satisfactory results that a rapid extension of the industry is inevitable. The great difficulty to be overcome is that connected with the water rights of shore owners or occupiers. Considerable improvements have been effected in the construction of the dredges, especially the gold saving appliances, which are found remarkably effective.

The production of gold shows a satisfactory increase in New South Wales, the total being the largest yet recorded in the State, a result of the introduction of the dredging system. There have been two or three phenomenal finds, but they were not of considerable extent, one, of which much notice was taken by American papers, being simply a rich pocket. Fresh discoveries are being made in northern Queensland, and it is believed that others will be recorded in the near future in the Northern Territory of South Australia, despite the somewhat disappointing experiences of recent explorers.

Silver production, which is confined largely to New South Wales, is rapidly regaining the proportions of earlier years, a result, in some measure, of improved methods of treating refractory ores from Broken Hill, although there is room for further improvements. The quantity of silver raised in the other States is comparatively small, being less than one-fourth of that obtained from New South Wales. It is believed that further silver discoveries will be made as the country around Broken Hill becomes opened up by railways.

There has been a marked revival of the copper mining industry throughout the commonwealth, especially in New South Wales, where the ore is found so largely impregnated with gold that the State Government is claiming royalty on all the precious metal recovered. The value of the copper obtained in New South Wales in 1899 was £395,456, the highest amount ever reached, with the exception of £472,982 in 1883. The amount for 1900 is expected to considerably exceed £400,000. There has been an improved output in South Australia, but Tasmania has lately taken the lead in production, furnishing more than half the copper raised in Australia, the metal proving to that colony what gold is to western Australia, silver and coal to New South Wales.

The output of coal has been considerably increased during 1900, and despite advanced prices and fresh trade restrictions the rate of production will be more than maintained in 1901, as the abolition of interstate duties will lead to an increased consumption of coal throughout the Commonwealth, possibly at the expense of the Victorian, South Australian, Queensland and Tasmanian fields. Alleged discoveries of coal in hitherto unsuspected localities continue to be reported, and there can be no question that the mineral is more abundant in Australasia than has hitherto been supposed.

There is some prospect that during 1901 attempts will be made to utilize the iron ores of Victoria, New South Wales and Tasmania; also to ascertain the probable source of the diamonds found in the northern districts of New South Wales, recent discoveries having apparently furnished a clue in this direction.

NITRATE OF SODA.

The year 1900 showed a good demand for nitrate of soda, especially in the manufacture of explosives. Prices were higher than 1899, owing chiefly to the increased cost of fuel, supplies and labor at the oficinas, and to the extraordinarily high ocean freight.

In the United States the estimated imports in 1900 amounted to 192,591 long tons, against 146,492 tons in 1899; showing an increase of 46,099 tons, or 23.9 per cent., in the past year. The deliveries to consumers in 1900 are estimated at 188,661 long tons, as against 152,594 tons in 1899, being an increase in 1900 of 36,067 tons, or 19.1 per cent. Of these deliveries about 103,764 tons, or 55 per cent., went to explosive manufacturers, 56,593 tons, or 30 per cent., to acid makers, and the remaining 28,299 tons, or 15 per cent., to fertilizer factories.

We give below the monthly imports and deliveries of nitrate of soda by our own and European countries.

The largest consuming territory is continental Europe, and much of the nitrate of soda consigned to the United Kingdom from Chilean ports is consumed in Germany, France and Holland. Quantities of nitrate of soda shipped from Chile have also gone to the far East,

NITRATE OF SODA IN UNITED STATES AND EUROPE.

Month.	United States.		Europe.		Total.	
	Imports.	Deliveries.	Imports.	Deliveries.	Imports.	Deliveries.
January	6,406	6,373	142,570	92,120	148,976	98,493
February	14,684	12,866	106,300	174,530	120,984	187,396
March	8,897	8,220	86,270	203,820	95,167	212,040
April	14,714	12,476	151,880	171,450	166,544	183,926
May	16,085	19,109	135,130	125,820	151,215	144,929
June	19,223	18,755	83,140	92,130	102,363	110,885
July	10,142	9,502	55,110	48,530	65,252	58,022
August	21,402	25,378	84,840	37,140	56,302	62,518
September	11,843	9,700	58,420	35,820	65,263	45,550
October	15,492	20,321	90,690	44,920	115,182	65,241
November	28,616	25,461	92,130	57,570	120,746	83,031
December	25,027	20,500	87,500	65,000	112,527	85,500
Total, long tons..	192,591	188,661	1,127,930	1,149,870	1,320,521	1,337,531

including India and Japan, and to the Central and South America, the West Indies and Mexico.

Market prices of nitrate of soda in New York are shown in the following table, in which we give the monthly production, exports, selling prices in Chile, and ocean freight rates during the past year:

NITRATE OF SODA IN CHILE.

Month.	Production, Qtl.	Exports, Qtl.	Oficina. Selling Prices, per qtl.				Ocean Freights, per long ton.
			Ordinary.		Refined.		
January ...	2,679,310	1,956,000	4s 9 3/4d @ 5s 1d	5s 1 1/4d @ 5s 4d	28s 9d @ 30s 0d		
February ...	2,169,190	2,502,000	4s 11d @ 5s 2d	5s 3d @ 5s 3 1/2d	30s 0d @ 32s 6d		
March	2,671,500	2,031,000	4s 11d @ 5s 4d	5s 3d @ 5s 5d	32s 6d @ 33s 9d		
April	2,518,867	1,439,000	4s 11 1/4d @ 5s 3 1/2d	5s 3d @ 5s 5 1/2d	32s 6d @ 36s 0d		
May	2,668,734	1,107,000	4s 9d @ 5s 2 1/2d	5s 1d @ 5s 4d	35s 0d @ 36s 0d		
June	2,709,000	2,546,000	5s 1 1/4d @ 5s 3 1/2d	5s 3 1/2d @ 5s 5d	37s 6d @ 38s 9d		
July	2,784,000	1,698,000	5s 2 1/4d @ 5s 5d	5s 4d @ 5s 5 1/2d	36s 3d @ 38s 9d		
August	2,841,000	2,650,000	5s 0d @ 5s 4 1/2d	5s 0d @ 5s 5 1/2d	33s 9d @ 35s 0d		
September ..	2,478,000	2,339,000	5s 0d @ 5s 6 1/2d	5s 5d @ 5s 7 1/2d	35s 0d @ 36s 3d		
October	3,000,000	4,765,000	5s 1 1/4d @ 5s 7d	5s 7d @ 5s 8d	33s 9d @ 35s		
November	2,750,000	4,500,000	5s 6 1/4d @ 5s 8 1/2d	5s 8d @ 5s 10d	31s 3d @ 33s 9d		
December	3,000,000	4,500,000	5s 8 1/2d @ 5s 10d	5s 10d @ 6s 0d	32s 6d		
Year	32,264,601	32,105,000	5s 2d @ 5s 5d	5s 4d @ 5s 6 1/2d	33s 2 3/4d @ 34s 11d		

A feature of the industry was the successful organization in October, 1900, of a combination among the producers. There are in Chile about 81 oficinas, 35 of which are British incorporations. Few are paying dividends, owing to the keen competition and subsequent low prices. The compact is for a period of 5 years, from April 1st, 1901, and the first year's exports have been fixed at 31,243,000 qtls. Thereafter the exports for each year are to be fixed before May 15th, liable to alteration, on or before July 15th, at an extraordinary general meeting by a majority of 65 per cent. of the allotted quotas. The yearly exports cannot be less than the consumption during the previous period from

NITRATE OF SODA PRICES AT NEW YORK IN 1900. (PER 100 LBS.)

Month.	Spot.		Futures.		Month.	Spot.		Futures.	
January	\$1.80	\$1.60 @	\$1.70		July	\$1.72	\$1.67 1/2 @	\$1.72 1/2	
February	1.96	1.65 @	1.90		August	1.75	1.65 @	\$1.67 1/2	
March	2.18	1.70 @	1.85		September	1.76	1.77 1/2 @	1.80	
April	2.04	1.75 @	2.10		October	1.82	1.77 1/2 @	1.82 1/2	
May	1.78	1.72 1/2 @	1.78 1/2		November	1.82	1.83 1/2 @	1.85	
June	1.68	1.65 @	1.70		December	1.76	1.82 1/2 @	1.85	
					Average, year..	\$1.86	\$1.72 @	\$1.82	

May 1st to the following April 30th. Stocks held on December 31st, 1900, which are not shipped on or before March 31st, 1901, are considered as part of the quota corresponding to the first year, as also that part of the production of the first three months which the Directory resolves during the month of January should also be shipped before March 31st. In this way the promoters of the combination hope to regulate production. Incidentally, freight rates have risen from 28s. 9d. (\$6.90) in January to 38s. 9d. (\$9.30) in June and July, closing the year at 32s. 6d. (\$7.68).

CHEMICALS AND MINERALS IN 1900.

Though not as active as 1899, the past year nevertheless showed an increased production, and good consumptive demand in most lines. We also built up a fair export trade, entering some of the markets that were heretofore largely supplied by Great Britain. The only drawback to greatly increased export at present is the high ocean freight rates.

Concerning our consumption of imported substances we give some interesting figures in the accompanying table.

An increased production and higher prices characterized the domestic industry in 1900. The Pennsylvania Salt Manufacturing Company early in the year began the erection of large works at Wyandotte, Mich. The Midland Chemical Company's plant at Midland, Mich., has been absorbed by the Dow Chemical Company of the same place. The Midland Company's buildings have been abandoned, but the brine wells will be operated by the Dow Company. The Solvay Process Company, owing to the enlarged production of its Detroit, Mich., works, is erecting a large storehouse for its surplus product. The Columbia Chemical Company, in which the Pittsburg Glass Company is largely interested, started work on a new soda ash plant at Barberton, O. This plant is to be ready early in 1901. The process to be employed in making soda ash is not new, but the apparatus is to be of the latest design. A new process, however, will be adopted for manufacturing caustic soda. The product—about 300 tons soda ash and 40 tons caustic soda daily—will be consumed by the Pittsburg Glass Company, of Pittsburg,

IMPORTS OF CHEMICALS IN 1900.

Substance.	Imports.	Re-exports.	Entered for Consumption.	
			1900.	1899.
Bleaching powder.....lbs.	143,000,000	148,250	142,851,750	123,583,061
Potash, chlorate.....lbs.	1,275,000	342,500	932,500	1,478,948
" muriate.....lbs.	96,000,000	279,000	95,721,000	117,219,080
" nitrate.....lbs.	12,090,000	26,500	12,063,500	18,849,853
" other.....lbs.	49,750,000	14,500	49,735,500	46,441,086
Soda, ash.....lbs.	67,000,000	43,250	66,956,750	48,641,284
" caustic.....lbs.	7,800,000	1,025,000	6,775,000	12,330,708
" sal.....lbs.	4,600,000	1,200	4,598,800	6,238,772
" nitrate.....lbs.	192,591	3,980	188,611	144,032
" other.....lbs.	18,000,000	260,000	17,740,000	26,469,718
Salt.....lbs.	416,000,000	3,550,000	412,450,000	381,162,816
Brimstone.....long tons	153,000	415	152,585	142,757
Pyrites.....long tons	335,000	415	335,000	310,615
Graphite.....long tons	12,500	4	12,496	20,760

Pa. The Laramie, Wyo., soda ash plant, which was started about a year ago, was destroyed by fire early in September, and will not be rebuilt. The Acker Process Company began operation at its new works at Niagara Falls, N. Y., and is making a 77 per cent. pure caustic soda. The American Alkali Company, which was formed by Philadelphia people in 1899, with \$30,000,000 capitalization, is erecting works at Sault Ste. Marie, Mich. The company has acquired the American rights to the Rhodin electrolytic patents from the Commercial Development Company, of Great Britain. In England the Commercial Development Company has been in litigation with the Castner-Kellner Alkali Company, the latter claiming that the Rhodin patent is an infringement on those of Mr. Castner. In July, however, the case was decided by the House of Lords in favor of the Commercial Development Company after long litigation in the lower courts.

Abroad competition has been lessened by the purchase of Bowman, Thompson & Company's works by Brunner, Mond & Company, of England. The Castner Electrolytic Alkali Company of London has been formed to obtain control of the Mathieson Alkali Works, using the Castner patents in America. The Castner-Kellner Company has been amalgamated with the Aluminum Company, of Oldbury, Eng. The plant of the Aluminum Company has been transferred to the site of the Castner-Kellner Company at Weston Point with a view of cheaper cost of making sodium.

Consumption of caustic soda is increasing, owing to the development of the "mercerizing" process for giving a silky texture to cotton goods.

Domestic high-test alkali, in bags, sold in New York at 85 to 95c. per 100 lbs. in March, and 64 to 70c. in October, owing to free selling by second-hands. Large contracts for 1901 and 1902 delivery were taken at 70 to 90c. per 100 lbs. f. o. b. works, according to quantity and seller. Foreign high-test alkali sold at 80c. to \$1.12½ per 100 lbs. in New York. Advancing ocean freight rates limited imports and caused prices to rise. In England 48 to 58 per cent. alkali in bags sold at £4 to £5 10s. per long ton, f. o. b. Liverpool. Contracts for 1901 delivery were booked at £4 5s. to £6 2s. 6d. This advance is partly due to the higher cost of fuel and raw material.

Domestic high-test caustic soda sold at \$2.37½ per 100 lbs. f. o. b. works in March, and \$1.70 in October. Contracts for 1901 and 1902 were large at \$1.70 to \$2.10 f. o. b. works. These prices compare with \$1.55 to \$1.85 at which 1900 contracts were taken in the previous year. Foreign high-test caustic soda sold in New York at \$2.30 to \$2.60 per 100 lbs. In the last quarter of the year jobbers controlled the market, forcing prices down to \$1.85 to \$1.87½. Abroad makers quoted high-test alkali £9 15s. to £11 10s. per long ton, net cash, f. o. b. Liverpool.

Sal Soda.—Production in the United States in 1900 showed an increase over last year and imports were less. Domestic sal soda sold in January at 60 to 70c. per 100 lbs. f. o. b. works, according to package. In February to middle October the price was 70 to 80c., and thereafter receded to 50 to 70c. Concentrated sal soda held at \$1.12½ to \$1.75 per 100 lbs. f. o. b. works. Foreign sal soda fluctuated in price according to the visible supply here. The highest price was 72½c. per 100 lbs. in April, and the lowest 65c. in February and December. Concentrated sal soda sold at \$1.60 to \$1.75 per 100 lbs. in New York. Abroad the English makers of soda crystals reported sales at £2 15s. 6d. to £3 0s. 6d., in bags, per long ton, f. o. b. Liverpool.

Bicarb. Soda.—Consumptive demand has increased at home and a good export business is reported. Our production has increased and prices of American fluctuated little; ordinary grades selling at \$1.06½ to \$1.37½ per 100 lbs. f. o. b. works, and extra grades at \$3.25 to \$3.50 per 100 lbs., f. o. b. works, less the usual discounts. In England makers quoted ordinary grades at £5 5s. to £6 15s. per long ton, f. o. b. Liverpool in January.

Bleaching Powder.—Consumption shows a large increase over 1899. Home production has been added to by the operation of the Acker Process Company's new works at Niagara Falls, N. Y. The Dow Chemical Company, of Midland, Mich., has enlarged its output. The other American works have all increased their production. Prices of domestic bleaching powder were based on the selling quotations of the foreign article and the entire production was under contract with consumers. Of the total imports into the United States in 1900 shown in the accompanying table, England furnished about 110,000,000 lbs. and Belgium, France and Germany the remaining 33,000,000 lbs.

The American agents of the United Alkali Company reported in January that they had sold their entire allotment for delivery on contract, and that sales made of their goods in the open market during the remainder of the year were by second hands. The highest selling price for prime English bleach in New York was \$3 per 100 lbs. in January, and the lowest \$1.60 in October. Contracts for 1901 delivery were booked at \$1.75 to \$2.10 per 100 lbs. The English makers renewed their agreement with Continental producers. Continental brands of bleach sold highest at \$2.37½ per 100 lbs. in January, and lowest at \$1.35 in October, owing to free offerings by second-hands. Contracts for 1901 were taken at \$1.75 to \$2. In England makers quoted prime bleach in hardwood

packages at £6 to £7 5s. per long ton, f. o. b. Liverpool. Contracts for 1901 delivery were taken at £6 15s. to £7 10s.

Chlorate of Potash.—The enormous manufacture of explosives, particularly gunpowder, in 1900 has greatly increased the consumption of chlorate of potash. Production in the United States has been larger than in 1899, especially at the works in the Middle West. This, coupled with the high ocean freight rates, has naturally lessened imports. Domestic chlorate of potash in crystals sold at \$8.25 to \$10.35 per 100 lbs., and for powdered at \$8.25 to \$10.50; the lowest price was for 1901 contract deliveries. Foreign crystals sold at \$9.25 to \$10.50, and powdered at \$9.50 to \$11.25, in New York. In England makers quoted 3¼ to 4¼d. (7½ to 9c.) per lb., f. o. b. Liverpool.

Cyanide of Potassium.—Demand is increasing, and among the large orders taken this year may be mentioned one for 400,000 lbs. placed by the Consolidated Mercur Gold Mining and Milling Company, of Mercur, Utah. The consumption of cyanide in this country is satisfied by importations from England and Germany. The revised import duty is 12½ per cent. ad valorem, as against 25 per cent. which had ruled for some time, notwithstanding the protests of importers. Market prices fluctuated but little throughout the year, as two firms have the monopoly in America. Wholesale quotations in New York for 98 to 99 per cent. cyanide of potash were 28 to 30c. per lb., but at the close of the year the price fell to 28c., at which a good-sized business for future delivery is reported.

Acids.—The consumption of the more important acids increased, and through the regulation of the General Chemical Company—the acid-makers' union—New York market prices have been well maintained. The commercial acids, as mentioned below, were delivered largely under contracts taken late in 1899 and early in 1900. This also helped to steady the market prices for such orders as were taken from other than regular customers.

Sulphuric acid showed a very large business. New York prices per 100 lbs. were \$1.05 for 60° and \$1.20 for 66°, while 50° chamber acid sold f. o. b. factory at \$14 to \$16 per ton.

Nitric acid quotations at New York were \$3.87½ for 36° per 100 lbs.; \$4.12½ for 38°; \$4.37½ for 40°, and \$4.75 for 42°.

Muriatic acid was bought in a good way, and quotations were \$4.20 per 100 lbs. for 18°; \$1.35 for 20°, and \$1.50 for 22°, all f. o. b. prices New York.

Oxalic, owing to the dissolution of the agreement between the German and English manufacturers at the end of 1899, sold at lower prices. New York quotations were \$5.62½ to \$6.25 per 100 lbs., closing the year at \$5.75 to \$6 for prompt shipments and for 1901 delivery sales were made at \$5.50 to \$5.75.

Blue vitriol was in good request for export; these shipments amounted in 1900 to about 42,500,000 lbs., against 29,391,586 lbs. in 1899; an increase of 13,200,000 lbs. in 1900. Much the larger part of the exports were to France and Italy, to be used in the vineyards. The largest individual consumer in the United States is probably the Western Union Telegraph Company. Prices were firm, owing to the well-regulated copper market. Blue vitriol in merchantable crystals ranged from \$4.50 to \$5.50 per 100 lbs., f. o. b. New York, and at the close of the year makers quote \$5 to \$5.25, offering little.

Acetic acid was consumed largely by Paris green makers, and sold at \$1.60 to \$1.75 per 100 lbs. in New York.

Brimstone.—Consumption has increased materially and New York prices have been well maintained in co-operation with the schedule of the Anglo-Sicilian Sulphur Company, which has regulated the industry in Sicily—our main source of supply. The imports of brimstone into the United States for the year 1900 amounted to about 153,000 long tons, against 143,234 tons in 1899; showing an increase of over 20,000 tons. Best unmixed thirds were quoted about \$2 per ton less than seconds. Freight rates from Sicilian ports to the United States varied from 9s. to 12s. 6d. (\$2.16 to \$3); the advance was due to a scarcity of vessel room, as brimstone is shipped as ballast, usually in vessels carrying fruit through the Mediterranean. In Sicily the Anglo-Sicilian Company's five years' compact with the miners expired in December, 1900. A new agreement has been submitted to the miners for an extension from July 31st, 1901, to July 31st, 1910. It is also proposed to increase the production from the original estimate of 350,000 tons when the old agreement was made, and to raise the price. In the year end-

BRIMSTONE AT NEW YORK IN 1900. (PER LONG TON.)

Month.	Best unmixed seconds.		Month.	Best unmixed seconds.	
	Spot.	Shipments.		Spot.	Shipments.
January.....	\$21.78	\$20.65	July.....	\$21.16	\$20.07
February.....	21.97	21.19	August.....	23.80	21.92
March.....	21.88	21.31	September.....	24.06	21.72
April.....	21.38	21.25	October.....	23.10	20.80
May.....	21.43	21.10	November.....	22.25	20.98
June.....	20.90	20.65	December.....	22.50	21.15
			Average, year...	\$22.18	\$21.11

ing July 31st, 1900, the company's net profit was £84,578, out of which £34,335 has already been paid in dividends to its stockholders and a recommendation has been made for a further disbursement in dividends, after charging off other accounts. The production of brimstone in Sicily in 1900 amounted approximately to 530,000 long tons. About 550,000 tons were exported, against 479,031 tons in 1899, and 447,324 tons in 1898. Stocks in Sicily on December 31st, 1900, were about 245,000 tons, against 277,098 in 1899, and 248,023 in 1898; and the exports to all countries to 550,000 tons. Prices in Sicily varied, being the lowest in the closing months of the year, owing to free offerings by the Anglo-Sicilian Company in order to influence the mine owners to sign the new contract. Prices in July were up to 81s. 6d. (\$19.56) per long ton for refined block sulphur (100 per cent.); 77s. (\$18.48) for best unmixed seconds, and 67s. 9d. (\$16.26) for best thirds. In October the quotations receded to 77s. (\$18.48) for refined block sulphur, 75s. (\$18)

for best unmixed seconds, and 66s. 6d. (\$15.96) for best thirds. On November 1st quotations were: Best unmixed seconds, 74s. (\$17.76); best thirds, 65s. 6d. (\$15.72); refined block (100 per cent.), 78s. 6d. (\$18.84); refined roll, in casks, 85s. 6d. (\$20.52); sublimed flowers (extra pure) in bags, 93s. (\$22.32); sublimed superior flowers, 90s. 6d. (\$21.72); sublimed flowers current, 89s. (\$21.36). Freight rates to New York or Philadelphia were 9s. (\$2.16).

Pyrites.—Consumption was large, owing to the increased production of sulphuric acid for fertilizer manufacture. The output of pyrites has grown in the past year, showing an increase over 1899. New deposits have been discovered in the South, especially in Virginia, Tennessee and Alabama. Deliveries of pyrites in 1900 were chiefly on consumers' contracts, consequently prices showed little change throughout the year. Producers in Virginia quoted f. o. b. Mineral City \$4.50 to \$4.75 per long ton for lump ore and \$4.20 for fines (basis 42 per cent. sulphur). Massachusetts miners quoted f. o. b. Charlemont, \$5.50 for lump ore and \$5 for fines. The pyrites from these two States carry from 42 to 45 per cent. sulphur. Imports of foreign pyrites were made chiefly from Huelva, Spain, as the Pilley's Island, Newfoundland, deposits have been worked out. The total imports of pyrites into the United States in 1900 amounted to about 335,000 long tons, as against 310,615 tons in 1899, showing an increase of 25,000 tons in 1900. The Pennsylvania Salt Manufacturing Company received a good part of these imports. In the first half of the year shipments from Spanish mines were delayed by the laborers' strike. With the close of June,

however, the strike was settled at the larger mines, and shipments resumed. Shipments this year were larger than 1899, especially of ore containing little or no copper. Spanish pyrites usually carry from 46 to 51 per cent. sulphur. Prices f. o. b. shipping port in Spain varied from 3 1/2 to 4 1/2 d. (7 1/2 c. to 9 c.) per unit. Freight to the United States fluctuated between 10s. 6d. and 13s. 6d. (\$2.52 to \$3.23), while the pyrites sold f. o. b. at all Atlantic ports at 12 to 15c. per unit (\$4.00 to \$7.20).

Coppers.—Competition between the American Steel and Wire Company and other makers resulted in car-load prices dropping from 72 1/2 c. per 100 lbs. to 45c. and at the close of the year large orders were taken at the lower figure.

Fertilizing Chemicals.—Higher prices, owing to dearer raw material, resulted in a hand-to-mouth run of trade. Sulphate of ammonia, gas liquor (25 per cent.), domestic, sold at \$2.90 per 100 lbs. f. o. b. works, Everett, Mass.; late in the year prices were \$2.77 1/2 to \$2.80. Foreign gas liquor sulphate of ammonia sold at \$2.95 to \$3.05 1/2 per 100 lbs. in January; late in the year at \$2.75 to \$2.82 1/2. In Liverpool, England, makers quoted gray, 24 to 25 per cent., gas liquor sulphate of ammonia at £11 7s. 6d. to £11 17s. 6d. in January, and about 5s. less at the close of the year.

THE MINING EXCHANGES IN 1900.

The reviews which we present below show that the mining stock markets generally have been prosperous during the year, and that the

FLUCTUATIONS OF MINING STOCKS AT NEW YORK DURING 1900.

Table with columns for Name and Location of Company, Par Value, and monthly price fluctuations (January to December) for various mining stocks, including Acacia, Adams, Alamo, Alice, Amalgamated, Anaconda, and many others.

* Assessment of 25c. on. C., copper; g., gold; l., iron; l., lead; s., silver.

had been familiar for years, but who now seemed to have withdrawn from it altogether.

In the Lake coppers the notable features of the year were the advance in Tamarack, which closes at \$335, or nearly double its lowest price; the depression of Osceola, and the steady gain of a group of the newer stocks—Baltic, Mohawk and Wolverine—which have managements above reproach, and which seem likely to develop into steady dividend payers.

The blind pool group fluctuated from time to time, with an apparent irregularity, which was intended to prove attractive, but did not. The litigation which has involved the Montana mines of this group has become more involved than ever, and there is no settlement in sight, notwithstanding the rumors so persistently circulated of a settlement. The Heinze-Clark combination has the upper hand in Montana just

tana Coal and Coke showed occasional sales, and upon the whole held its own throughout the year. The most prominent stocks have been Dominion Coal and New England Gas and Coke. While both of these companies have made substantial progress during the year, their stocks have been from time to time the victims of raids undertaken by the unsavory Addicks-Lawson gas combination. The large owners of the stocks have paid but little attention to these raids, being more occupied in building up the business of their companies than in sustaining their stocks on the market. The combination has had whatever satisfaction might be derived from a fall in the nominal quotations, but has also had the reflection that these occasional upsets on the market have had practically no effect whatever upon the companies themselves.

It is this combination and the blind pool which the Boston Exchange

FLUCTUATIONS OF MINING STOCKS AT BOSTON DURING 1900.

Table with columns for Name of Company, Far Value, and monthly price fluctuations (January to December) for various mining stocks, including Copper, Zinc, and Miscellaneous categories.

(a) Montana; (b) Michigan; (c) Arizona; (d) Colorado; (e) California; (f) Nova Scotia; (g) Missouri; (h) Utah; (i) British Columbia; (j) New Mexico.

now, and seems disposed to make the best of it—as is entirely natural. The declaration of a dividend on Butte & Boston failed of the expected effect, because of the general belief that it had not been earned.

The outside or miscellaneous copper stocks—that is, those not included in the Lake or Montana groups—showed in the general depression early in the year and in the later recovery. Two of them showed especial strength during the later months of the year, and both Utah Consolidated and British Columbia Copper promised to become favorites on our market.

During the early portion of the year the gold stocks were comparatively neglected. Later, however, Centennial-Eureka became a considerable favorite and has been dealt in at rather high prices. In the closing week or two a little boom was engineered in Cochiti which may last—and again it may not. North American Gold Dredging, which was so prominent during the boom of 1899, has practically disappeared from sight, and Merced was very little dealt in.

Hardly anything has been done in the quicksilver stocks during the year. The companies have pursued the even tenor of their way, but their securities seem to be so closely held that a quotation for them is seldom found in the list.

In the general list but few prominent stocks can be mentioned. Mon-

has to thank for the fact that the post-election boom had so little effect upon those stocks which Boston considered peculiarly her property.

All things considered, there is a fair prospect for a better year in 1901.

Colorado Springs as a Mining Stock Market.

Written for the Engineering and Mining Journal by W. C. Edwards.

Wonderful as has been the development and production of the gold mines of the Cripple Creek District, its record in that regard has been at least equalled by that of Colorado Springs as a center of mining stock investment.

The growth and importance of the mining stock market of this city cannot be more forcibly illustrated than by the accompanying tables showing the volume and cash value of the stock transactions.

The fluctuations and growth of business on the Exchange since its opening, September, 1894, show in the following table:

Table showing Shares and Amount for 1894 (four months), 1895, 1896, 1897, 1898, and 1899, with a Total row.

The business by months for the year 1900 was as follows, the last week in December being estimated:

Table with 3 columns: Month, Shares, Amount. Rows include January through December and Totals.

Totals 193,656,227 \$30,240,719

A study and analysis of this table has peculiar interest. It is worthy of note that mining stocks of the value of almost \$100,000,000 were transferred in a city of the inconsequential size of 25,000 population.

a marvelously steady one and along as conservative lines as is possible in mining affairs.

These tables only represent the business done on the principal exchange of the city, and as there have been two and sometimes four exchanges operating here during the period mentioned, the total amount of investments of this character is probably fully 25 per cent. in excess of the figures given.

While the general range of prices for mining stocks has several times been higher than at present, there has been no time in the history of the stock movement, when the market exhibited more vitality and stability than it does now.

The Salt Lake Mining Stock Market in 1900.

(By Our Special Correspondent.)

From a speculative viewpoint, trading in Utah mining shares the past 12 months has generally lacked interest. This averment does not apply to the few investment stocks of unquestioned merit, as these have supplied spice and interest.

FLUCTUATIONS OF MINING STOCKS AT COLORADO SPRINGS, COLO., DURING 1900.

Large table with columns for Name of Company, Par Value, and months from January to December, plus Sales. Rows list numerous mining companies like Acacia, Alamo, American Con., etc.

Silver, Consolidated Mercur and Grand Central, but for litigation or other drawbacks other than physical condition of the mines, might be in this category, and about in the order named. Special emphasis is given to Consolidated Mercur as the softening of these shares since the consolidation in August is calling out criticism of the management.

Between the strictly investment shares and the prospects several, like South Swansea, Lower Mammoth, Star Consolidated, Daly, Ajax and May Day, had a spasmodic move toward the first class, and later sagged. The prospects for 1899 have not changed for the better, while those of the Mercur Region are all very discouraging.

The total sales for the year are 5,134,500 shares, which sold for \$2,489,600, the business of the closing days of December being estimated. Companies which paid dividends in 1900 and did not the prior year are the Gemini, Silver Shield, Utah and Rocco-Homestake, the last being a Nevada property. The total dividends paid were \$2,437,500, an increase of \$634,500 over 1899. Following are the dividend payers: Silver King, \$1,000,000; Daly-West, \$487,500; Centennial-Eureka, \$257,500; Mammoth, \$200,000; Mercur, \$115,000; Consolidated Mercur, \$110,000; Ontario, \$90,000; Swansea, \$70,000; Gemini, \$50,000; Grand Central, \$25,000; Horn Silver, \$20,000; Rocco-Homestake, \$9,000; Utah, \$2,000; Silver Shield, \$1,500.

Daly-West takes first place among the dividend favorites. In the beginning of the year it was an offering around \$12, while during the closing weeks it sold above \$26.50, with a bright outlook. Its neighbor, Silver King, has quietly crawled from \$55 to \$75; the latter figure gives a valuation of \$11,250,000 for the property. Swansea remained almost as firm as Government bonds, and is very strongly held. The uniformity with which dividends are paid has given these shares a peculiar standing in the east. Ontario stopped its quarterly dividend after the judgment obtained against it in the Crown Point suit. Centennial-Euroke has fallen far short of expectation and the cutting of the quarterly dividend one-half was proof positive that the average grade of ore was less than that given out at the time the shares were subscribed. Mammoth has been about as erratic as ever and the idiosyncrasies of the management are as much in evidence. The court in the suit with Grand Central has decided all points favorably to the latter. Horn Silver has done little at this end the past 12 months, though quotations have ruled firm and steady. Consolidated Mercur in August promised its shareholders that the mine would treat in the neighborhood of 1,000 tons a

industries, so little interest should be taken in the mineral wealth upon which our prosperity largely depends. But so it is, and while many mines are owned in San Francisco, it has seemed impossible to enlarge the scope of its Exchange. More than one attempt has been made to do so, which has ended in flat failure.

The Exchange has shown through the year the usual course of limited dealings and the taking of small profits on small fluctuations. It has been largely given over to the "chippers," a well-known class here. The only point of interest was in the little contest over the control of Gould & Curry, which really interests very few people, but was a harvest for the "chippers."

The lures which the Comstock operators devised to draw in the public during the year were the introduction of electric power and the working of the low-grade ores. The establishment of the Truckee River Electric Power Company and the partial completion of its work were heralded with great flourish of trumpets and in a spectacular excursion to Virginia City; while the low-grade question brought out some wonderful statements of results, which no man could comprehend. Both were flat failures so far as exciting any public interest was concerned.

A striking contrast to the Mining Stock Exchange is the Producers' Oil Exchange. Starting in a modest way, this Exchange in the latter half of the year built up an extremely active business, which is growing rapidly. Buyers for investment and speculators alike are interested and combine to make its sessions busy. This Exchange will surely be a prominent feature of San Francisco in 1901.

The London Mining Market in 1900.

(By Our Special Correspondent.)

The year 1900 has been a calamitous one for the company promoters and for the shareholders in mining companies. The war has rendered the South African market practically non-existent; the exhaustion of the free gold deposits at Kalgoorlie has caused a slump in West Australians; British Columbia has not fulfilled its original promise; many of the copper companies floated last year during the boom in the metal have ignominiously collapsed; Klondike and New Zealand are not heard of now, and the Stratton's Independence incident has set back the chances of American mines in England. If it had not been for the excellent dividend paid by the old copper companies and by some others of the established gold, lead and silver mines, the record of the year

FLUCTUATIONS OF MINING STOCKS AT SAN FRANCISCO DURING 1900.

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.
		Belcher, Nev.....	3.00	.12	.09	.27	.09	.23	.24	.32	.12	.23	.09	.22	.10	.18	.18	.23	.11	.20	.09	.26	.12	.20	.11	.18	.12
Best & Belcher, Nev.....	3.00	.27	.21	.37	.22	.48	.34	.34	.19	.38	.16	.31	.25	.28	.19	.22	.15	.31	.15	.45	.23	.26	.17	.29	.17
Caledonia, Nev.....	3.00	.55	.43	.50	.34	1.40	.60	1.65	.95	1.35	.82	1.15	.90	1.15	.71	.82	.38	.48	.40	.49	.34	.54	.32	.48	.35
Challenge, Nev.....	3.00	.24	.09	.20	.17	.29	.20	.24	.15	.16	.11	.20	.13	.19	.12	.31	.17	.27	.18	.30	.12	.23	.12	.24	.14
Chollar, Nev.....	3.00	.29	.18	.23	.17	.30	.16	.24	.10	.22	.16	.26	.18	.21	.14	.19	.13	.21	.14	.28	.16	.16	.07	.16	.07
Confidence, Nev.....	3.00	.75	.60	.75	.65	.88	.74	.95	.70	.80	.65	.77	.60	.80	.65	1.10	.60	.87	.30	.89	.60	.85	.55	.63	.50
Con. California & Va., Nev.....	2.50	1.65	1.35	1.45	1.05	1.80	1.40	1.75	1.50	1.60	1.40	1.60	1.45	1.50	1.45	1.55	1.20	1.30	1.10	1.40	1.00	1.40	.94	1.50	1.20
Crown Point, Nev.....	3.00	.14	.03	.11	.07	.21	.12	.22	.12	.12	.07	.10	.07	.16	.07	.18	.11	.13	.10	.17	.10	.13	.08	.13	.10
Gould & Curry, Nev.....	3.00	.26	.21	.24	.13	.21	.13	.20	.16	.22	.07	.15	.12	.25	.12	.23	.15	.37	.19	1.05	.29	1.25	.60	.56	.31
Hale & Norcross, Nev.....	3.00	.41	.30	.33	.30	.32	.24	.41	.20	.34	.22	.29	.24	.34	.20	.25	.15	.27	.20	.45	.25	.28	.18	.21	.17
Justice, Nev.....	2.00	.05	.02	.08	.01	.10	.05	.07	.02	.08	.01	.09	.06	.10	.06	.08	.02	.07	.02	.08	.02	.04	.02	.04	.01
Mexican, Nev.....	3.00	.39	.29	.33	.19	.33	.20	.38	.22	.32	.22	.29	.19	.22	.14	.28	.16	.34	.24	.51	.29	.33	.21	.33	.18
Occidental, Nev.....	3.00	.20	.15	.14	.10	.17	.12	.16	.08	.13	.07	.13	.11	.11	.06	.12	.06	.27	.06	.11	.07	.10	.04	.05	.08
Ophir, Nev.....	3.00	.76	.65	.73	.53	.91	.53	.88	.57	.66	.47	.78	.58	.73	.65	.72	.48	.56	.45	1.00	.52	.66	.73	.76	.59
Potosi, Nev.....	3.00	.38	.17	.29	.24	.33	.18	.31	.14	.25	.17	.25	.16	.20	.05	.24	.13	.21	.10	.24	.13	.20	.08	.15	.11
Savage, Nev.....	2.50	.25	.08	.13	.10	.16	.13	.15	.06	.16	.06	.19	.19	.22	.11	.14	.08	.18	.08	.36	.18	.20	.12	.17	.06
Sierra Nevada, Nev.....	3.00	.51	.41	.53	.34	.64	.36	.55	.39	.38	.29	.36	.27	.35	.24	.38	.25	.32	.22	.51	.24	.39	.29	.31	.20
Standard Con. Cal.....	10.00	3.00	2.40	2.35	2.40	3.05	2.75	4.00	3.05	4.50	2.80	4.70	3.50	4.50	4.00	4.45	3.90	4.15	3.90	4.00	3.25	3.40	3.00	3.20	3.00
Union Con., Nev.....	2.50	.32	.25	.32	.21	.25	.13	.33	.12	.27	.19	.24	.20	.23	.16	.24	.17	.20	.16	.31	.16	.17	.11	.26	.18
Utah Con., Nev.....	3.00	.06	.03	.10	.03	.12	.08	.12	.09	.10	.05	.14	.08	.13	.08	.08	.05	.04	.18	.04	.08	.06	.06	.03	.03
Yellow Jacket, Nev.....	3.00	.25	.21	.20	.16	.20	.75	.35	.13	.22	.13	.16	.10	.31	.12	.35	.19	.23	.18	.28	.16	.25	.17	.24	.16

day of ore carrying approximately \$8 gold, but not for a single month did the average grade hold up to \$7, and after but 4 months, it is lower yet. The selling price of the shares has hardly kept pace with affairs at the mines. Grand Central opened the year at \$6, dropping below \$5 after filing its trespass suit against the Mammoth, and since then has fluctuated considerably, closing at \$6.40. Under a more business-like management the shares should go higher.

Among the speculatives Star Consolidated supplied the biggest sensation. In January it did business at 25c., while in midsummer a sale was chronicled at \$1.50, following the uncovering of some rich ore. It closed the year in good demand around 80c. Lower Mammoth, after many fluctuations and several assessments, closes the year in strong demand. Daly strengthened somewhat in spite of the fact that an assessment was threatened. Ajax closes the year in better form than in the beginning. May Day has acted like a sky-rocket. Its contest with the Yankee Consolidated furnished life to the market on several occasions.

The shares of the prospect class have moved up and down with a few manipulated boomlets, without attracting other than professional attention. Since the national election the tone of the market has steadily improved. There were thrice as many outside inquiries from the middle of November up to Christmas, as for any like period during the year. If our stockbrokers have learned to promote propositions on merits within reasonable bounds, this confidence will continue, as the yield of the mines is increasing in magnificent form. Certainly the new year opens far brighter than last.

The San Francisco Mining Stock Market in 1900.

(By Our Special Correspondent.)

The San Francisco Mining Stock Market may be said to have no record for 1900. The persistent adherence to the Comstocks continues to deprive the Exchange of all interest. It is very strange that in the business center of a State which was originally brought into being by its mines, and in which mining is still one of the more important

1900 would have been uniformly black. There have been no new discoveries of metal in any part of the world that could be used for the purpose of a boom in new promotions. There have been fewer new mining companies advertised during the past year than for quite a long time now; in fact, since 1892 and 1893.

The South African market has been marked all the year by an almost entire absence of dealings. During the latter part of 1899 there was a good deal of speculation in Transvaal shares because it was thought that the war would be over in no time, but this idea was soon abandoned and ever since then the uncertainty as regards the future has made it prudent to suspend speculation entirely. At various times during the year some activity has been observable in Rhodesian land and mining companies, but there has been no feature of any importance. The De Beers Diamond Company has acquired the Bultfontein and other properties belonging to the London & South African Exploration Company, and now owns all except one of the successful diamond producing mines in South Africa.

The West Australian market has been utterly upset by the events which have proved that the free-milling gold zones have been gutted in a very unmineralike manner, and that the managers are quite at a loss as to the right treatment for the sulphides and tellurides. The most glaring instances of this are Lake View Consols and the Associated, and these two cases are mainly responsible for the present deplorable state of the market. A year ago Lake View Consols was producing 30,000 oz. of gold a month, but this production now appears to have been due to the using up of the reserves. The same thing exactly happened at Associated. Then, again, Hannan's Brownhill, from which so much was expected, turns out to be practically exhausted. These companies and others are now engaged in experimenting on their sulphide ores, and many are using patent processes, the chief value of which is the promoter's profit, which goes into the pockets of the controllers of the respective mining companies. There are still very large bodies of ore at Kalgoorlie, and when the various plants get into operation the output will once more advance and the market may recover its buoyancy.

The British Columbia market has consisted chiefly in dealings in the

became poor and it is for the purpose of further testing the property that the money has now been raised.

Among New Zealand mines, Waihi continues to hold first place, and owing to recent further discoveries on the property, the capital is being increased so as to provide money for development and plant. The Broken Hill mines in New South Wales have been quite inactive as far as the stock market is concerned, but they are all working successfully on the sulphide ores, using no patent metallurgical panacea, but simply reducing the zinc contents mechanically. Very little has been heard of Mount Lyell properties during the year, as the recognized lowness of the grade of the ore has taken the charm out of the shares as speculation counters. The Mount Lyell Mining and Railway Company has acquired adjacent properties from other companies, chiefly with a view of obtaining their supply of fluxes.

There has been little opportunity for novelties in the mining stock market this year and promoters are bewailing the fact that no new gold-fields have been discovered lately. In the absence of anything else available, the gold coast of West Africa and Ashanti have been re-

ous drawback. Again, the coal scarcity affected some classes of stocks unfavorably. On the whole, the last year of the century was not its best.

The metallurgical shares, which began the year well, were the first to be affected by the coal difficulty. Their increased expenses from this cause and from higher wages affected their profits. Toward the end of the year a falling off in new orders, an increased competition for business and consequent lower prices were evident.

The copper stocks were generally the strongest and most active until December, when the group of Paris speculators who have been operating in Rio Tintos withdrew their support. This was followed by a fall in copper shares generally, which seems hardly justified by the current prices and statistical position of the metal.

The zinc and lead shares were not active, but were generally well maintained in price. Le Nickel attained a figure far beyond any of its quotations in recent years. The coal stocks were so high throughout that dealings in them were limited.

Near the close of the year a tendency to sell South African stocks was developed among French investors. These stocks were generally

FLUCTUATIONS OF STOCKS AT PARIS DURING 1900.

Name of Company.	Location.	Par Val.	Latest Dividend.	January-March.		April-June.		July-September.		October-December.		Year.	
				Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
Acieries de Creusot, steel.....	France.....	2,000	85 00	1,998 00	1,900 00	1,880 00	1,880 00	1,775 00	1,775 00	1,795 00	1,715 00	1,998 00	1,715 00
Acieries de Firminy, steel.....	France.....	500	175 00	3,820 00	3,500 00	3,810 00	3,500 00	3,790 00	3,500 00	3,700 00	3,375 00	3,820 00	3,375 00
Acieries de Fives-Lille, steel.....	France.....	500	.....	590 00	505 00	564 00	525 00	510 00	495 00	590 00	475 00	590 00	475 00
Acieries de Huta-Bank, steel.....	Russia.....	500	.....	5,000 00	4,350 00	4,900 00	4,575 00	4,645 00	4,250 00	4,500 00	3,850 00	5,000 00	3,850 00
Acieries de la Marine, steel.....	France.....	500	60 00	1,980 00	1,700 00	1,850 00	1,665 00	1,768 00	1,635 00	1,675 00	1,550 00	1,980 00	1,550 00
Anzin, coal.....	France.....	500	260 00	7,300 00	6,730 00	6,990 00	6,800 00	6,930 00	6,475 00	6,875 00	6,205 00	7,300 00	6,205 00
Boleo, copper.....	Lower Calif.....	500	176 00	3,110 00	1,960 00	3,219 00	2,930 00	2,930 00	2,590 00	2,690 00	2,550 00	3,219 00	1,960 00
Briansk, coal, iron.....	Russia.....	500	.....	1,332 50	1,215 00	1,310 00	942 00	845 00	820 00	765 00	725 00	1,332 50	725 00
Champ d'Or, gold.....	S. Africa.....	25	8 75	40 50	32 50	41 50	35 50	41 00	37 00	39 50	32 00	41 50	32 00
Courrieres, coal.....	France.....	300	90 00	3,290 00	2,810 00	3,115 00	3,010 00	3,035 00	2,690 00	2,949 00	2,533 00	3,290 00	2,533 00
Donbrowsa, coal.....	Russia.....	500	12 50	1,140 00	1,105 00	1,111 00	990 00	1,020 00	940 00	1,030 00	980 00	1,140 00	940 00
Donetz, steel.....	Russia.....	500	.....	1,235 00	1,190 00	1,175 00	990 00	900 00	880 00	880 00	437 00	1,235 00	437 00
Dynamite Centrale.....	France.....	500	22 50	473 00	450 00	464 00	435 00	430 00	410 00	437 00	410 00	473 00	410 00
Escombrera-Bleyberg, lead.....	Spain.....	500	70 00	1,370 00	1,255 00	1,315 00	1,272 00	1,260 00	1,170 00	1,239 50	1,158 00	1,370 00	1,158 00
Fraser River, gold.....	Brit. Columbia.....	25	.....	10 00	6 50	12 50	9 25	11 00	7 50	9 00	7 75	12 50	7 50
Huanchaca, silver.....	Bolivia.....	125	5 00	142 00	57 75	176 00	147 50	146 00	135 00	155 50	144 00	176 00	57 75
Laurium, zinc, lead.....	Greece.....	500	30 00	620 00	585 00	609 00	585 00	580 00	550 00	509 00	408 00	620 00	408 00
Malfidano, zinc.....	Italy.....	500	50 00	1,400 00	1,350 00	1,350 00	1,210 00	1,223 00	1,138 00	1,173 00	1,045 00	1,400 00	1,138 00
Metaux Cie. Fran. de.....	France.....	500	10 00	539 00	502 00	510 00	475 00	570 00	465 00	560 00	484 00	570 00	465 00
Mokta-el-Hadid, iron.....	Algeria.....	500	35 00	1,320 00	1,220 00	1,225 00	1,195 00	1,190 00	1,125 00	1,152 00	962 00	1,320 00	962 00
Napthe Baku, petroleum.....	Russia.....	.....	.....	847 50	709 00	842 00	815 00	820 00	777 00	782 00	733 75	847 50	733 75
Napthe Le, petroleum.....	Russia.....	.....	.....	1,300 00	1,300 00	1,300 00	1,300 00	1,300 00	1,300 00	1,300 00	1,300 00	1,300 00	1,300 00
Napthe Nobel, petroleum.....	Russia.....	.....	.....	717 00	660 00	695 00	665 00	675 00	607 50	692 50	617 00	717 00	617 00
Nickel.....	New Caledonia.....	250	17 50	570 00	360 00	521 00	470 00	531 00	460 00	516 00	490 00	570 00	360 00
Penarroja, coal.....	Spain.....	500	100 00	2,949 00	2,300 00	2,820 00	2,750 00	2,780 00	2,500 00	2,800 00	2,595 00	2,949 00	2,300 00
Rebecca, gold.....	Colorado.....	25	.....	5 75	4 25	4 75	3 75	4 00	2 50	4 00	2 75	5 75	2 50
Salines de l'Est, salt.....	France.....	500	5 00	280 00	215 00	260 00	210 00	250 00	210 00	220 00	210 00	280 00	210 00
Salines du Midi, salt.....	France.....	500	25 00	1,095 00	988 00	1,060 00	1,010 00	950 00	720 00	930 00	910 00	1,095 00	720 00
Vielle Montagne, zinc.....	Belgium.....	80	36 00	799 00	774 00	845 00	750 00	765 00	710 00	869 75	650 00	799 00	650 00

quisitioned for the purposes of creating a boom. The occurrence of gold in those districts has been well known for generations, but the undesirable nature of the climate has prevented any substantial development. The boom fell quite flat and the public failed to be roused to enthusiasm about it. In the earlier part of the year great preparations were made for a boom in Chinese properties and the Pekin Syndicate was brought out under influential auspices. The political troubles in China have, however, put all these schemes on one side at present, though it is hoped that eventually something may be done in developing the mineral resources of that country. Russia and Siberia have also attracted attention in some quarters, but political considerations and the fact that concessions to foreigners are not easily obtained have prevented anything very extensive being effected in this direction. During the past few months shares in the Siberian Gold Concessions, Limited, have been sold privately in great quantities. This company is being piloted by the celebrated Mr. Hooley, and by Mr. Perschine and the Marquis of Queensberry. It will be introduced publicly on the market before long.

No new metallurgical process has been introduced to the public this year, though as a novelty may be mentioned the Elmore system of concentration of ores by means of petroleum residue and water, which is attracting considerable attention among mining companies in London. The Smelting Corporation, owning the Fry zinc-lead process, has raised further capital for the purpose of completing their works on a large scale and for the purchase of ores. The Sulphides Reduction New Process, Limited, owning the Ellershausen process, has been reconstructed on a large scale. The object at first was to erect works in England, but subsequently it was decided to acquire the properties of the French company instead. The Swinburne-Ashcroft process for treating sulphides with gaseous chlorine and electrolyzing the chlorides thus obtained is still being experimented with on behalf of some Australian companies, but the value of the process has not yet been determined.

The iron and coal companies owning works and collieries in Great Britain have been uniformly prosperous this year owing to the boom in coal and the demand for iron and steel. Handsome dividends have been paid, and the shares are in considerable demand.

The outlook for the coming year is not at all a cheerful one. The after effects of the South African war cannot yet be gauged and there seems no prospect of any revival in business in any quarter.

The Paris Mining Stock Market in 1900.

(By Our Special Correspondent.)

The mining stock department of the Paris Bourse was less active during 1900 than in several previous years, owing to a variety of causes. During the whole year the absence of returns and the future uncertainties relating to the Transvaal mining stocks, in which our people were heavy investors, were a weight upon the market which affected it most unfavorably. The investment of large sums in the concessions granted at the Exposition took much away from stocks. The Chinese business and the possibility of international complications were a seri-

ous drawback. Again, the coal scarcity affected some classes of stocks unfavorably. Naturally both parties kept these transactions as quiet as possible, not wishing to precipitate a general fall in prices.

The new century is about to begin and we all hope for greater prosperity than we have ever before attained. May 1901 be a better year than its predecessor is our wish. Azote.

MINING DIVIDENDS AND ASSESSMENTS.

Perhaps the most striking incident in the history of the Nineteenth Century was the wonderful development of the mineral resources of the United States—a development so rapid and so great that the country now holds first place among the nations of the earth in the variety and value of its mineral production. It is encouraging to note therefore that mining is becoming as much a field for investment as agriculture or manufacturing. The "Engineering and Mining Journal" records this with satisfaction, and will continue to secure the fullest reports of mineral output and the returns on the capital invested. In 1900 210 companies reported their dividends to the "Engineering and Mining Journal." The total amount distributed by these companies was \$130,941,000, a disbursement that places mining among the most profitable of the country's industries. Failures there have been, failures there will be, but we doubt if any other line of human endeavor can show better profits and fewer losses for the year.

The metal mines of the United States paid dividends to the amount of \$51,502,000, or 39.3 per cent. of the whole value reported. Copper mining, as was to be expected from the market for copper and the United States' position as a copper producer, was the most profitable. The copper mines paid \$33,433,000, or 64.9 per cent. of the total mining dividends. The great Calumet & Hecla Mine, in Michigan, heads the list. It mines native copper, but not high-grade ore, and paid last year a total of \$7,000,000, equal to about 280 per cent. on its capital stock of \$2,500,000. Wonderful as the record of this mine has been there is nothing to show that its activity will not last for many years. The second largest dividend payer is the Boston & Montana, which mines sulphide copper ore, carrying some gold and silver, at Butte, Montana. The company paid last year \$6,450,000, or 172 per cent. on its capital stock of \$3,750,000. The Amalgamated Copper Company, which controls several mines at Butte, paid \$6,000,000, or 8 per cent. on its capital stock. The Anaconda Copper Company, one of the Butte assets of the Amalgamated Company, holds fourth place on the dividend list, with \$4,800,000, or 16 per cent. on its capital stock of \$30,000,000. The next largest dividend payer is the United Verde, of Jerome, Arizona, controlled by W. A. Clark, of Montana. It mines copper ore carrying higher percentages of gold and silver than the Butte ore, and paid last year \$2,325,000, or 77.5 per cent. on its capital stock of \$3,000,000. Another copper company, the Mountain Copper Company, having mines of sulphide ore at Shasta County, California, paid its English stockholders \$1,200,000, or 19.2 per cent. on its capital stock.

Gold and silver mines in this country made a good showing in 1900, disbursing \$13,907,000, or 27 per cent. of the total mining dividends re-

DIVIDENDS.—Continued.

Table with 16 columns: Name of Company, 1898, 1899, 1900, Grand Total, Name of Company, 1898, 1899, 1900, Grand Total, Name of Company, 1898, 1899, 1900, Grand Total. Lists various mining companies and their dividend payments for 1898, 1899, and 1900.

ASSESSMENTS.

Table with 16 columns: Name of Company, 1898, 1899, 1900, Grand Total, Name of Company, 1898, 1899, 1900, Grand Total, Name of Company, 1898, 1899, 1900, Grand Total. Lists various mining companies and their assessment amounts for 1898, 1899, and 1900.

C., copper; g., gold; i., iron; l., lead; q., quicksilver; s., silver; z., zinc.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT WHOLESALE PRICES.

Table with multiple columns listing various chemical and mineral products, their units, and current wholesale prices. Categories include Abrasives, Acids, Alloys, Barytes, Borax, Boric Acid, Calcium, Carbonates, Chlorides, Chromes, Cokes, Copper, Cream of Tartar, Cryolite, Explosives, Feldspar, Fluorspar, Fuller's Earth, Graphite, Gypsum, Hydrazine, Iodine, Iron, Kaolin, Lead, Lime, Magnesite, Magnesium, Manganese, Mercury, Mica, Mineral Wool, Nickel, Nitrate, Oil, Oxides, Potash, Potassium, Pyrites, Quartz, Rosin, Salt, Silica, Silicates, Sulphates, Sulphur, Tar, Zinc, and Zirconium. Prices are listed in various units such as lb., gal., sh. ton, and bbl.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

Table listing prices for rare elements. It includes columns for the element name, unit (e.g., oz., gm., lb., kg.), and price. Elements listed include Barium, Beryllium, Boron, Cadmium, Cerium, Chromium, Cobalt, Didymium, Erbium, Germanium, Glucium, Indium, Iridium, Lanthanum, Lithium, Magnesium, Niobium, Osmium, Palladium, Potassium, Rhodium, Rubidium, Ruthenium, Selenium, Strontium, Tellurium, Thallium, Thorium, Uranium, Vanadium, Yttrium, and Zirconium.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to Nov. 21. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.