DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, Director

MINERAL RESOURCES

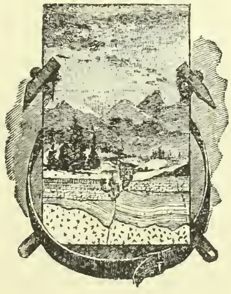
OF THE

UNITED STATES

CALENDAR YEAR

1900

DAVID T. DAY
Chief of Division of Mining and Mineral Resources



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CONTENTS.

COAL, BY EDWARD W. PARKER.

COKE, BY EDWARD W. PARKER.

PETROLEUM, BY F. H. OLIPHANT.

NATURAL GAS, BY F. H. OLIPHANT.

ASPHALTUM AND BITUMINOUS ROCK, BY EDWARD W. PARKER.

STONE.

CLAY PRODUCTS, BY JEFFERSON MIDDLETON.

CEMENT.

PRECIOUS STONES, BY GEORGE F. KUNZ.

TALC AND SOAPSTONE, BY JOSEPH HYDE PRATT.

ABRASIVE MATERIALS, BY JOSEPH HYDE PRATT.

ILLUSTRATION.

LETTER OF TRANSMITTAL.

Department of the Interior,
United States Geological Survey,
Division of Mining and Mineral Resources,
Washington, D. C., September 4, 1901.

Sir: I have the honor to transmit herewith the report, Mineral Resources of the United States, Calendar Year 1900, being the seventeenth annual report on the mineral resources of the country published by this office. In addition to the statistics for the calendar year 1900, the report contains much descriptive matter collected while the statistical canvass was in progress. Nearly all of this material has been given prompt publication as advance extras, in accordance with the law provided for the printing of any chapter as soon as completed.

In accordance with your instructions, the report for the calendar year 1901 is in preparation.

Very respectfully, your obedient servant,

David T. Day,
Geologist in Charge.

Hon. Charles D. Walcott,
Director of United States Geological Survey.

MINERAL RESOURCES OF THE UNITED STATES, 1900.

DAVID T. DAY, *Chief of Division.*

INTRODUCTION.

The arrangement and scope of this volume are practically the same as in the sixteen preceding reports of the series, Mineral Resources of the United States. In accordance with the act of Congress approved March 3, 1901, however, the form has been changed to ordinary octavo, and the whole is confined to one volume. Each report records the development of the mineral industries of the United States since the time covered by the preceding number of the series; the reports should therefore be consulted together. Every chapter in this report is a census of the productive features of the industry, as complete as possible with the means at command. The statistics of the production of gold and silver are the work of the Director of the Mint, Treasury Department, and are accepted as official. The statistics of the imports and exports of minerals, which form an essential part of the volume, are obtained through the courtesy of the Chief of the Bureau of Statistics, Treasury Department.

ACKNOWLEDGMENTS.

Except as noted above, and in a few isolated instances where some other well-established agency already exists by which the statistics are collected accurately, the figures are obtained directly from the producers, and it is impossible to acknowledge here, otherwise than by brief mention, the invaluable assistance which has been freely rendered by them and the voluntary contributions of many local experts. The names of the statistical experts who, acting under the authority of the United States, have collected statistics from the producers are given at the heads of the special chapters. The technical press, besides affording much information concerning new mining enterprises, has been largely drawn upon for prices, market reports, and new technical processes.

As heretofore, the publication of this volume has been anticipated to a great extent by the issuance in advance, in pamphlet form, of the several chapters which compose it. Before the issuance of this volume all of the chapters, except those treating of a few of the minor minerals, will have been so given to the public.

The following summary gives the principal statistical information recorded in this report:

In presenting these statistics all unnecessary duplication has been avoided. The coke product, discussed in the following pages, amounting to 20,533,348 short tons, with a value of $47,443,331, is excluded from the tabulation, as the quantity and value of the coal used in its manufacture is included in the statistics of coal production. Similarly, white lead, red lead, and litharge, whose average aggregate value for the last ten years has exceeded $10,000,000, are not given in the table, the base from which they are made being included in the output of pig lead. Zinc oxide, or zinc white, made directly from the ores and consequently not included in spelter production, is tabulated. The product of pig iron and its value are given in the tabulation as the best means of presenting the statistics of production in the first marketable condition. The value of brick and pottery clays, rather than the value of the manufactured products, is embraced in the tabular statement, although the statistics of brick, tile, and pottery production are presented in detail in the report. Inflation of valuation and all unnecessary duplication are thus avoided.

SUMMARY OF THE MINERAL PRODUCTION OF THE UNITED STATES IN 1900.

GENERAL REMARKS.

The varied character of the units of measurement employed in the mineral industry makes it impossible to compare the outputs of the several minerals except in the value of the products. The figures given in the following summary show a continuation of the remarkable activity in the mineral industries of the United States noted in 1899. The total value of our mineral products during 1900 exceeded for the first time the enormous sum of $1,000,000,000, the exact figures being $1,067,605,587, as compared with $971,900,894 in 1899, a gain of $95,704,693, or 9.85 per cent. While this gain is not so great, either actually or proportionately, as the gain in 1899, when the gain over 1898 was $273,698,547, or 39.20 per cent, it is more than three times the normal growth of the mineral industries from 1880 to 1898 and shows that the mineral industries keep pace with the great prosperity of the nation.

This is the largest actual gain attained, except that of 1899 over 1898, being approached only in 1895, when the gain over 1894 was $94,634,861, or 17.97 per cent. In 1887 the gain over 1886 was $74,927,880, or 16.81 per cent. In other years between 1880 and 1898, the gains were not noteworthy, while in some of the years, notably 1884, the product decreased $40,451,968, or nearly 9 per cent. During the industrial depression of 1892–1895 the product would have been expected to decline, which it did, going from $648,675,081 in 1892 to $574,299,886 in 1893, to $526,624,139 in 1894, and to $621,259,000 in 1895, and not reaching the output of 1892 until 1898.

As heretofore, iron and coal are the most important of our mineral products, the value of the former in 1900 being $259,944,000 and of the latter $306,891,364. Nearly all the important minerals increased in output, though some showed an increase in product and a decline in value, notably copper, which increased 37,450,245 pounds, but decreased $2,728,673, while zinc fell off in both product and value. The fuels increased from $340,756,211 in 1899 to $406,250,518 in 1900, a gain of $65,494,307, or 19.22 per cent. Every variety of fuel increased except anthracite coal, which showed a decline from 53,944,647 long tons in 1899 to 51,221,353 long tons in 1900, owing to the labor disturbances in the fall of 1900. The average value of anthracite coal per ton at the mine was $1.49 in 1900 and $1.46 in 1899, while the average price per ton for bituminous coal at the mine was 87 cents in 1899 and $1.04 in 1900.

Of the total gain of $95,704,693 the metallic products contributed $24,462,127, while the nonmetallic products increased $71,242,566 in value.

METALS.

Iron and steel.—The great record-breaking output of pig iron in 1899, which was 13,620,703 long tons, valued at $245,172,654, was maintained and even exceeded in 1900, notwithstanding the general feeling that the output of 1899 would not be equaled in 1900. The production of pig iron for 1900 was 13,789,242 long tons, valued at $259,944,000. This is an increase of 168,539 tons, or 1.24 per cent, and of $14,771,346, or 6.02 per cent. This gain is insignificant, however, when compared with the gain in 1899 over 1898. In the former year the gain over the latter was 1,846,769 long tons, or 15.69 per cent, while the value increased $128,615,654, or 110.35 per cent. This great increase, especially in the value, was the result of abnormal conditions and of course could not be expected to be maintained. In fact, in the face of the large production of 1899, which appeared to be an overproduction, it is astonishing that the output and value of this commodity should have kept up. The average price per ton of pig iron increased from $18 in 1899 to $18.85 in 1900. This was very close to the maximum price of $19 reached in 1887. The average price per long ton in recent years has been as follows: 1897, $9.85; 1896, $10.47; 1895, $11.14; 1894, $9.76; 1893, $11.90.

The production of Bessemer steel ingots decreased from 7,586,354 long tons in 1899 to 6,684,770 tons in 1900. This is a loss of nearly a million tons and makes the production in 1900 about the same as that of 1898, when it was 6,609,017. The production of open-hearth steel in 1900 was 3,398,135 long tons, which is an increase from 2,947,316 tons in 1899. The production of Bessemer steel rails increased from 2,240,767 long tons in 1899 to 2,383,654 tons in 1900.

Iron ores.—The production of iron ores in the United States during 1900 amounted to 27,553,161 long tons, as compared with 24,683,173 in 1899, a gain of 2,869,988 tons, or 12 per cent. The value of the iron ores mined in 1900 was $66,590,504, as compared with $34,999,077, a gain of $31,591,427, or 90.26 per cent.

The production of 1900, as for 1898 and 1899, was a record breaker, not only for this country, but the outputs of iron ores during these years have never been equaled by any other country, the nearest approach to our output being in 1900 by the German Empire when 18,667,950 long tons were produced.

Copper.—The great activity of 1899 in the copper industry was continued during 1900. The product increased from 568,666,921 pounds in 1899 to 606,117,166 in 1900, a gain of 37,450,245 pounds, or 6.59 per cent, while the value decreased from $101,222,712 in 1899 to $98,494,039 in 1900, a loss of $2,728,673, or 2.7 per cent. While the average price per pound during 1900 was high compared with that obtaining during the last decade, it was nevertheless lower than the price in 1899. The average price per pound in 1900 was 16.25 cents; in 1899 it was 17.8 cents, and in 1898 it was 11.75 cents. While in 1900 some of the leading producers did not mine as much metal as in former years, others largely increased their output. There was great activity in the opening up of old mines and the development of new properties, but few reached the production stage in 1900.

Lead.—The lead smelting and refining industry in 1900 was marked by an unprecedented increase in production over the preceding year. The output increased nearly 30 per cent, from 210,500 short tons in 1899 to 270,824 short tons in 1900. The value increased from $18,945,000 to $23,561,688. The increased production is attributed to the stimulating effect of the high prices which prevailed and which were artificially established and maintained by the consolidated interests of the smelting and refining works. It is believed that the consumption did not increase in proportion to the increase in production.

Zinc.—The production of zinc decreased from 129,051 short tons in 1899 to 123,886 tons in 1900, a decrease of 5,165, or 4 per cent. The value showed a still greater decline, from $14,840,865 in 1899 to $10,654,196, or $4,186,669, or 28.21 per cent. The product in 1900 was considerably more than that of 1898, though the value was about the same, namely, 115,399 short tons, valued at $10,385,910.

Gold.—The gold product continued to increase, rising from 3,437,210 fine ounces in 1899 to 3,829,897 fine ounces in 1900, while the value rose from $71,053,400 in 1899 to $79,171,000. In 1898 the gold product was valued at $64,463,000.

Silver.—The coining value of the silver product in 1900 was $74,-533,495, as compared with $70,806,626 in 1899. The commercial value of the product was $35,741,140, or 47.95 per cent of the coining value.

The production in 1900 was 57,647,000 fine ounces, while in 1899 it was 54,764,500 fine ounces. The average value per ounce commercially in 1900 was 62 cents; in 1899 it was 60 cents, and in 1898 it was 59 cents.

Quicksilver.—The production of quicksilver continued to decrease, notwithstanding the developments in what is known as the Terlingua district of Texas. The output in 1900 was 28,317 flasks, of 76½ pounds net, as compared with 30,454 flasks in 1899 and 31,092 flasks in 1898.

The value declined from $1,452,745 in 1899 to $1,302,586 in 1900. The production in 1900 includes a small amount, 200 flasks, reported from Oregon.

Aluminum.—The Pittsburg Reduction Company, operating under the Hall patents, continues the only producer of metallic aluminum in the United States. The production in 1900 was about 6,000,000 pounds, valued at $1,920,000, as compared with 5,200,000 pounds in 1899, valued at $1,716,000.

Antimony.—The amount of antimony obtained from ores of domestic production in 1900 was 151 short tons, valued at $27,180, as compared with 234 short tons, valued at $43,600, in 1899. This is a decrease of 35.47 per cent in production and 36.79 per cent in value. The domestic product is but a small proportion of the antimony consumed in the United States, the total product obtained from imported ores being estimated at 1,750 short tons, valued at $346,980, in 1900, as compared with 1,275 tons, valued at $251,875, in 1899. The total consumption, however, in 1900 was estimated to have been 3,577 short tons, valued at $634,917. The difference between this total and the domestic product, 1,827 short tons, valued at $287,937, was imported as crude antimony or regulus.

Manganese ores.—The production of manganese ores increased from 9,935 long tons in 1899 to 11,771 long tons in 1900, thus recovering partially from the decline in 1899 from 1898. This was an increase of 1,836 tons, or 18.48 per cent, and of $18,011, or 21.89 per cent. The average price per ton was $8.52 in 1900, as compared with $8.28 in 1899. The bulk of the manganese ores in 1900 used by the steel makers came from foreign countries.

Nickel.—The production of nickel dropped from 22,541 pounds in 1899 to 9,715 pounds in 1900. All of the domestic product was obtained as a by-product in the smelting of lead ores at Mine Lamotte, Mo. The value of the product decreased from $8,566 in 1899 to $3,886 in 1900.

Platinum.—The production of crude platinum continues to increase, although the amount produced remains small. In 1900 the product was 400 ounces, worth $2,500, as compared with 300 ounces, valued at $1,800, in 1899.

FUELS.

Coal.—The aggregate production of anthracite and bituminous coal in 1900 amounted to 240,965,917 long tons, equivalent to 269,881,827 short tons, with a value of $306,891,364, as compared with 226,553,564 long tons, or 253,739,992 short tons, in 1899, valued at $256,077,434. The increase in 1900 over the preceding year was 14,412,353 long tons, or 16,141,835 short tons, in amount and $50,813,930 in value.

The output of anthracite coal in Pennsylvania amounted to 51,221,353 long tons, or 57,367,915 short tons, valued at $85,757,851, against

53,944,647 long tons, or 60,418,005 short tons, in 1899, valued at $88,142,130. The decrease in the production of anthracite amounted to 2,723,294 long tons, or 3,050,090 short tons, in amount and $2,384,279 in value, and was due entirely to the protracted labor troubles, which practically suspended mining operations in the anthracite regions during the summer and early fall of 1900.

The total product of bituminous coal, which includes lignite or brown coal, cannel, splint, semianthracite, and semibituminous, and the small anthracite product of Colorado and New Mexico, amounted to 189,744,564 long tons, or 212,513,912 short tons, valued at $221,133,513, as compared with 172,608,917 long tons, or 193,321,987 short tons, in 1899, valued at $167,935,304, showing an increase in the bituminous product of 17,135,647 long tons, or 19,191,925 short tons, in amount and $53,198,209 in value.

In connection with the coal-mining industry in 1900 an interesting feature was the comparatively large increase in the value of the product, which was principally noticeable in the case of bituminous coal. The total increase in product was 16,141,835 short tons, or 6.4 per cent, while the value increased $50,813,930, or 19.8 per cent. The increase in value in 1900 was nearly $2,800,000 more than the increase in the value from 1898 to 1899, when the product increased 33,765,325 tons, or more than double the increase of 1900 over 1899.

Another interesting feature in connection with the coal-mining industry of the United States is the continued increase in the percentage of bituminous coal mined by mechanical methods. During 1900 there were undercut by the use of machines 52,790,523 short tons, or 24.65 per cent of the total bituminous product. The total product of bituminous coal in 1900 increased a little less than 10 per cent over the preceding year, while the machine-mined product increased over 20 per cent.

The total number of men employed in all the coal mines of the United States in 1900 was 448,706, who made an average of 212 working days, as compared with 410,635 men with an average of 214 days in 1899.

In considering the coal product, these reports include not only the coal marketed, either by shipments to a distance or sold locally, but also that consumed by the mine employees and by the mine owners themselves operating the properties, this being known technically as colliery consumption. There are occasional exceptions where operators use only slack or waste, which would otherwise be thrown on the dump and not regarded. These exceptions are few and the amount is comparatively small. The coal consumed in the manufacture of coke is also included in this report. The coal shipped, sold to local trade and used by employees, and consumed in the manufacture of coke is considered the marketable product. The colliery consumption averages about 9 per cent of the total product in anthracite production, and about 1½ per cent in bituminous mining. The marketable product in 1900 amounted to 260,689,081 short tons, as compared with 244,612,654 short tons in 1899. The increased production of coal in the United States in 1899 placed this country in unquestioned supremacy among the coal-producing countries of the world. In 1898 the production of Great Britain, which has been for several years the only real rival of the United States as a coal producer, exceeded that of the United States by about 6,300,000 tons. In 1899 the production of the United States increased nearly 34,000,000 short tons, while that of Great Britain increased a little over 20,000,000, so that the product of the United States in that year exceeded that of Great Britain for the first time in our history, with a lead of a little over 7,200,000 tons. In 1900 the production of the United States exceeded that of Great Britain by more than 17,500,000 short tons. In this connection it is interesting to note that practically all of the coal produced in the United States is consumed in this country for domestic, transportation, or manufacturing purposes. The exports of coal from the United States in 1900 were less than 9,000,000 short tons, only a little more than 3 per cent of the total product.

Coke.—The unprecedented activity which prevailed in the iron and steel trade in the United States during 1899 continued into the spring of 1900, and although the summer of 1900 developed a weak and unsettled condition in the iron and steel trade, it was not sufficient to overcome the advance made in the earlier months of the year. Sympathizing with the increased iron and steel production, the production of coke increased from 19,668,569 short tons in 1899 to 20,533,348 short tons in 1900, a gain of 864,779 short tons. The value of the product increased much more in proportion—from $34,670,417 in 1899 to $47,443,331 in 1900, a gain of $12,772,914. The increase in production amounted to 4.4 per cent over 1899; the value increased 37 per cent. The value of the coke product in 1900 was more than double that of 1897—three years before—or of any year prior to that date. The year 1900 showed important developments in the introduction of by-product coke ovens. This was exhibited more by the increase in the number of new plants constructed during the year than by any increase in production of by-product coke. The amount of coke made in by-product ovens was 1,075,727 short tons, as compared with 906,534 short tons in 1899. The number of by-product ovens in operation or completed by December 31, 1900, amounted altogether to 1,085. The number of by-product ovens in course of construction at the close of the year was 1,096, or 11 more than all the ovens completed during the eight years since the first by-product oven was constructed in the United States.

Petroleum.—The production of petroleum increased from 57,070,850 barrels in 1899, valued at $64,603,904, to 63,362,704 barrels in 1900, valued at $75,752,691. This was a gain of 6,291,854 barrels, or 11.02 per cent, and of $11,148,787, or 17.26 per cent. This product of 1900 is the largest ever attained by this country, the next largest output having been in 1896, when 60,960,361 barrels were produced. This great output was attained notwithstanding the fact that the greatly increased output of California and the new discoveries in Texas occurred so late in the year as not to enter into the output of 1900 to any extent. The average value per barrel for the entire country during 1900 was $1.19½, while for 1899 it was $1.13⅕, and for 1898 it was 79⅘ cents.

Natural gas.—The value of the natural gas product increased from $20,074,873 in 1899 to $23,606,463 in 1900, a gain of $3,531,590, or 17.59 per cent. Not only did the value increase in 1900, but also the quantity sold, and the introduction of meters and other appliances for the more careful manipulation of gas wells and pipe lines has brought about a large saving in the amount of gas required to produce a given heating effect.

STRUCTURAL MATERIALS.

Stone.—The value of all kinds of building stone produced in the United States in 1900 amounted to $48,008,739, as compared with $44,090,670 in 1899, an increase of $3,918,069. This increase was shared by all classes of building stone, the most conspicuous increase being in the production of limestone, the value of which in 1900 was about $1,600,000 more than that of 1899.

The exports of slate, which were a conspicuous feature of this branch of the building-stone industry in 1898 and 1899, fell off nearly one-third in 1900, the value of the exports decreasing from $1,363,617 to $950,543.

Clays.—The activity in all branches of the clay-working industries in 1899, noted in the last report, was continued during 1900. The value of all clay products in 1900, as reported to this office, was $96,212,345, as compared with $95,797,370 in 1899 and $73,892,884 in 1898. The figures here given for 1899 are those collected by the Twelfth Census. The brick and tile product in 1900 was valued at $76,413,775, as compared with $78,547,120 in 1899, while the pottery products were valued in 1900 at $19,798,570, as compared with $17,250,250 in 1899.

The clay mined and sold by those not manufacturing the product themselves in 1900 amounted to 1,221,660 short tons, valued at $1,840,377, as compared with 843,279 short tons, valued at $1,645,328, in 1899.

Cement.—The total product of cement in the United States in 1900 was 17,231,150 barrels, as compared with 15,520,445 barrels in 1899, a gain of 1,710,705 barrels, or 11.02 per cent. The value increased from $12,889,142 in 1899 to $13,283,581 in 1900, a gain of $394,439, or 3.06 per cent.

The Portland-cement industry in 1900 showed a large increase over that of 1899, the production being 8,482,020 barrels, as compared with 5,652,266 barrels in 1899, a gain of 2,829,754 barrels, or 50.1 per cent. The value of this product increased from $8,074,371 in 1899 to $9,280,525 in 1900. The average price per barrel in 1899 was $1.43, while in 1900 it was but $1.09. The number of producers reporting was 36 in 1899 and 50 in 1900.

The production of natural-rock cement decreased from 9,868,179 barrels in 1899 to 8,383,519 barrels in 1900, a loss of 1,484,660, or 14.9 per cent. The value fell off $1,085,923, or from $4,814,771 in 1899 to $3,728,848 in 1900 or 22.55 per cent. The average price per barrel in 1899 was 48.8 cents, and in 1900 it was 44.5 cents.

In addition to the above there were made 365,611 barrels of slag cement, valued at $274,208, or 75 cents per barrel.

ABRASIVE MATERIALS.

Corundum and emery.—The combined product of corundum and emery in 1900 amounted to 4,305 short tons, valued at $102,715, a decrease from 4,900 short tons, valued at $150,600, produced in 1899.

Garnet.—The amount of abrasive garnet produced in 1900 was 3,185 short tons, valued at $123,475, an increase from 2,765 short tons, valued at $98,325, in 1899.

Grindstones.—The production of grindstones in 1900, based on the value of the product, was the largest on record, exceeding that of 1882, the year of largest previous production, by a little over $1,000. The value of the grindstones made in 1900 was $710,026, as compared with $675,586 in 1899.

Infusorial earth and tripoli.—The production decreased from 4,334 short tons, valued at $37,032, in 1899, to 3,615 short tons, valued at $24,207, in 1900.

Millstones.—The production in 1900 was the largest since 1889, but the industry is still of insignificant importance when considered with what it was twenty years ago. The substitution of the roller process for buhrstones in flour mills has practically eliminated the use of buhrstones for this purpose. The value of the buhrstones, or millstones, produced in 1900 was $32,858, as compared with $28,115 in 1899.

Oilstones.—The value of the oilstones and whetstones made in the United States in 1900 was $174,087, a decrease from $208,283 in 1899. The production in 1899 was the largest in the history of the industry.

CHEMICAL MATERIALS.

Borax.—The production in 1900 consisted of 24,235 tons of crude and 1,602 tons of refined, with a total value of $1,018,251. No separation was made of the refined and crude borax produced in 1899, the total output amounting to 20,357 short tons, valued at $1,139,882.

Bromine.—The production increased from 433,004 pounds, valued at $108,251, in 1899, to 521,444 pounds, valued at $140,790, in 1900. The bromine is obtained from the mother liquor made in the salt works in Michigan, Ohio, and West Virginia.

Fluorspar.—The production in 1900 amounted to 18,450 short tons, valued at $94,500, as against 15,900 short tons, valued at $96,650, in 1899. Most of the production is now obtained from Marion and Crittenden counties, Ky. The decrease in the value in 1900 was due to the larger amount of the material sold in a crude or unmanipulated condition.

Gypsum.—The production of gypsum, particularly for the manufacture of calcined plaster, continues to show remarkable gains. The output of crude gypsum in 1900 amounted to 594,462 short tons, the value of which in its first marketable condition amounted to $1,627,203, as compared with 486,235 short tons in 1899, valued at $1,287,080, and 291,638 short tons, valued at $755,280, in 1898. From this it will be seen that the production, both in amount and in value, in 1900 was more than double that of 1898, two years before. The remarkable increases in the last two years are attributed to the substitution of plaster of paris for ordinary lime mortar in the manufacture of wall plaster in large buildings; also to the manufacture of staff for temporary buildings, such as is used for exposition purposes. In arriving at the value of the gypsum product, that which is sold crude is taken at its value crude, while that which is made into calcined plaster is taken for the calcined plaster produced and sold.

Marls.—The production remains practically stationary at 60,000 short tons, valued at $30,000.

Phosphate rock.—The production of phosphate rock decreased from 1,515,702 long tons in 1899 to 1,491,216 long tons in 1900, while the value increased from $5,084,076 to $5,359,248. The decrease in production is attributed to the scarcity of vessels for the foreign trade and the high ocean freight rates, a direct result of the taking away of many vessels from the carrying trade to be used in the transportation of troops, etc., to South Africa. There was also a disinclination shown among the manufacturers of superphosphates to purchase crude rock in large quantities at the advanced prices prevailing in 1900.

Pyrite.—The production of pyrite, used in the manufacture of sulphuric acid, increased from 174,734 long tons, valued at $543,249, in 1899, to 204,615 long tons, valued at $749,991, in 1900.

Salt.—The salt product includes the salt in brine in the manufacture of soda ash, caustic soda, etc., at chemical works in Michigan, New York, and Pennsylvania. Including this factor, the production in 1900 amounted to 20,869,342 barrels of 280 pounds net, an increase from 19,708,614 barrels in 1899. The value increased from $6,867,467 to $6,944,603. These figures indicate that the combinations effected by many of the larger producers in New York, Michigan, Ohio, Kansas, Utah, and California have not increased the cost to the consumers.

Sulphur.—Compared with the amount of sulphur imported into the United States and the sulphur contents of the pyrites used for acid making the domestic production of sulphur continues insignificant. It amounted in 1900 to 3,525 short tons, valued at $88,100, against 4,830 short tons, valued at $107,500, in 1899. All of the product was from Louisiana and Utah.

PIGMENTS.

Barytes.—The production increased significantly, from 41,894 short tons in 1899 to 67,680 short tons in 1900, with an increase in value from $139,528 to $188,089. The increased production was due practically to the development of properties in Tennessee.

Cobalt oxide.—Sympathizing with the decreased production of nickel in 1900 the output of cobalt oxide also decreased from 10,230 pounds in 1899 to 6,471 pounds in 1900. The value declined proportionately, from $18,512 to $11,648.

Metallic paint.—The production of metallic paint (iron ore ground for pigment), exclusive of mortar color, in 1900 was 23,218 short tons, as against 23,423 short tons in 1899, a decrease of 205 tons. The value increased from $249,945 in 1899 to $261,831 in 1900, a gain of $11,886. The production of mortar colors increased from 5,736 short tons in 1899 to 6,689 short tons in 1900, and the value increased from $65,156 in 1899 to $79,911 in 1900.

Ocher, umber, and sienna.—The production of ocher in 1900 amounted to 17,015 short tons, valued at $186,707, as compared with 14,124 short tons in 1899, valued at $140,168, a gain of 2,891 short tons and $46,539. The production of umber increased from 473 short tons in 1899, valued at $4,151, to 1,452 short tons in 1900, valued at $26,927, which is the greatest value for this product reported in recent years. The production of sienna in 1900 was 957 short tons, valued at $14,771, as compared with 588 short tons in 1899, valued at $8,205. The combined production of ocher, umber, and sienna in 1900 was 19,424 short tons, valued at $228,405, as compared with 15,185 short tons in 1899, valued at $152,524.

Venetian red.—The production of venetian red in 1900 was 14,696 short tons as compared with 11,991 short tons in 1899, a gain of 2,705 short tons. The value of this product in 1900 was $236,574 as compared with $210,361 in 1899. The average production during the last four years has been about 12,600 short tons annually.

White lead, red lead, litharge, and orange mineral.—The returns to the Geological Survey for 1900 indicate that there was a general falling off in the production of lead pigments in that year. The production of white lead in oil decreased from 170,214,565 pounds in 1899 to 151,874,933 pounds in 1900. Dry white lead decreased from 50,178,486 pounds in 1899 to 44,544,971 pounds in 1900. The production of red lead decreased from 22,157,694 pounds to 21,486,825 pounds; litharge, from 21,937,704 pounds to 18,984,145 pounds, and orange mineral, from 2,024,302 pounds to 1,973,016 pounds. In the cases of red lead and orange mineral these decreases were offset by advances in values. The values were: White lead in oil $8,977,268 in 1899 and $8,430,996 in 1900; white lead dry, $2,340,689 in 1899 and $2,226,960 in 1900. The red-lead product was valued at $1,192,927 in 1899, as compared with $1,198,008 in 1900. The litharge product declined both in quantity and value, the latter from $1,159,968 to $990,391 in 1900. The value of the orange mineral product was $146,720 in 1899 and $149,288 in 1900.

Zinc white.—The production of zinc white showed a remarkable increase, from 40,146 short tons to 48,840 short tons, with an increase in value from $3,211,680 to $3,667,210.

MISCELLANEOUS.

Asbestos.—Nearly the entire product continues to come from the Sall Mountain mines in White County, Ga. Small amounts came in 1900 from California and Massachusetts. The total product in 1900 was 1,054 short tons, valued at $16,310, an increase from 681 short tons, valued at $11,740 in 1899.

Asphaltum.—Under this title are included all the numerous varieties of bitumens or hydrocarbons occurring in the United States and not discussed in the chapter on petroleum. The production in 1900 was less than for several years past, amounting to 54,389 short tons, valued at $415,958. The production in 1899 was 75,085 short tons, and in 1898 it was 76,337 short tons. The year of largest production was 1892, when it reached a total of 87,680 short tons.

Bauxite.—The production in 1900 amounted to 23,184 long tons, valued at $89,676, a decrease from 35,280 long tons, valued at $125,598, in 1899.

Chromic iron ore.—A product of 140 long tons of chromic iron ore, valued $1,400, was reported in 1900. No production of this material had been reported since 1896, when an output of 786 long tons, worth $6,667, was obtained.

Feldspar.—The production of feldspar decreased from 27,202 short tons, valued at $238,545, in 1899, to 21,353 short tons, valued at $173,659, in 1900.

Fibrous talc.—This variety of talc, or soapstone, occurs in but one locality in the United States, Gouverneur, St. Lawrence County, N. Y. It is used principally as a makeweight in the manufacture of medium grades of paper. The production has shown an increasing tendency for several years. In 1900 it amounted to 63,500 short tons, valued at $499,500, as compared with 54,655 short tons, valued at $438,150, in 1899. The production in 1900 was the largest on record.

Flint.—Sympathizing with the decreased production of feldspar, the flint product, which is used for pottery manufacture, also decreased from 36,852 short tons, valued at $229,345, in 1899, to 32,495 short tons, valued at $179,351, in 1900.

Fuller's earth.—The production of fuller's earth in the United States has decreased annually since 1897, when it reached its maximum. In 1900 the production amounted to 9,698 short tons, valued at $67,535, as compared with 12,381 short tons, valued at $79,644, in 1899. The maximum production of fuller's earth was obtained in 1897, with an output of 17,113 short tons.

Graphite.—The production of graphite in 1900 amounted to 5,507,855 pounds of crystalline graphite and 611 short tons of amorphous as compared with 2,900,732 pounds of crystalline and 2,324 short tons of amorphous graphite in 1899. The total value of the product in 1900 was $197,579; in 1899 it was $167,106.

Limestone for iron flux.—The amount of limestone used for fluxing in blast furnaces in 1900 was 7,495,435 long tons as compared with 6,707,435 long tons in 1899. The value, however, decreased from $4,695,205 in 1899 to $4,500,000 in 1900.

Magnesite.—This product comes entirely from California. The production in 1900 amounted to 2,252 short tons, valued at $19,333, which was the maximum, both in amount and in value. In 1899 the product amounted to 1,280 short tons, valued at $18,480.

Mica.—The output of sheet mica in 1900 includes a considerable amount of rough or uncut mica shipped from the West and sold in the uncut condition. This makes the amount of the production in 1900 appear much larger than that of any preceding year. There was, however, an important increase in the production of sheet mica, particularly in the small sizes which have been found available for the manufacture of electric insulators. Including the uncut mica marketed, the total sheet mica product in 1900 amounted to 456,283 pounds, valued at $92,758. The scrap mica produced in the same year was 5,453 short tons, valued at $54,302. These figures are compared with 108,570 pounds of sheet mica, valued at $70,587, and 1,505 short tons of scrap, worth $30,878, in 1899.

Mineral waters.—The amount of commercial natural mineral waters sold in 1900 was about 8,000,000 gallons more than in the preceding year, with a loss of a little over $700,000 in value. In 1899 the amount of natural mineral waters sold was 39,562,136 gallons, worth $6,948,030. In 1900 the product sold was 47,558,784 gallons, worth $6,245,172. The decrease in value is attributed to a larger production of low-priced waters and a falling off in the amount of high-priced waters sold.

Monazite.—A production of 908,000 pounds, valued at $48,805, was reported for 1900 as compared with 350,000 pounds, worth $20,000, in 1899.

Precious stones.—The value of the gems and precious stones found in the United States in 1900 was $233,170 as compared with $185,770 in 1899. The principal features connected with this industry in 1900 were the continued mining of fine blue sapphires in Fergus County, Mont., the development of fancy-colored sapphires in Granite County, and the systematic working of beryl deposits in Mitchell County, in the same State; also an increased production of turquoise in Nevada and New Mexico, and the mining of purple-pink garnets in Macon County, N. C. The discovery of a new locality for colored tourmalines in California contributed some interest.

Pumice stone.—The company organized to develop the pumice deposits of Nebraska and Wyoming became involved in litigation in 1899, and produced no pumice in 1900.

Rutile.—The production increased slightly from 230 pounds, valued at $1,030, in 1899, to 300 pounds, valued at $1,300, in 1900.

Soapstone.—Exclusive of the product of fibrous talc from Gouverneur, N. Y., the production of soapstone and talc amounted to 27,943 short tons, valued at $383,541, in 1900. This was the largest output on record, exceeding that of 1899, the year of previous largest production, by 3,178 short tons in amount and $52,736 in value.

Mineral products of the United

	Product.	1899.	
		Quantity.	Value.
	METALLIC.		
1	Pig iron, spot value .... long tons..	13,620,703	$245,172,654
2	Silver, coining value .... troy ounces..	54,764,500	70,806,626
3	Gold, coining value .... do....	3,437,210	71,053,400
4	Copper, value at New York City .... pounds..	568,666,921	101,222,712
5	Lead, value at New York City .... short tons..	210,500	18,945,000
6	Zinc, value at New York City .... do....	129,051	14,840,865
7	Quicksilver, value at San Francisco .... flasks..	30,454	1,452,745
8	Aluminum, value at Pittsburg .... pounds..	5,200,000	1,716,000
9	Antimony, value at San Francisco .... short tons..	1,275	251,875
10	Nickel, value at Philadelphia .... pounds..	22,541	8,566
11	Tin .... do....	None.	....
12	Platinum, value (crude) at San Francisco .... troy ounces..	300	1,800
13	Total value of metallic products	....	525,472,243
	NONMETALLIC (SPOT VALUES).		
14	Bituminous coal .... short tons..	193,321,987	167,935,304
15	Pennsylvania anthracite .... long tons..	53,944,647	88,142,130
16	Natural gas	....	20,074,873
17	Petroleum .... barrels..	57,070,850	64,603,904
18	Brick clay	....	11,250,000
19	Cement .... barrels..	15,520,445	12,889,142
20	Stone	....	44,090,670
21	Corundum and emery .... short tons..	4,900	150,600
22	Garnet for abrasive purposes .... do....	2,765	98,325
23	Grindstones	....	675,586
24	Infusorial earth and tripoli .... short tons..	4,334	37,032
25	Millstones	....	28,115
26	Oilstones, etc .... pounds..	....	208,283
27	Borax .... do....	40,714,000	1,139,882
28	Bromine .... do....	433,004	108,251
29	Fluorspar .... short tons..	15,900	96,650
30	Gypsum .... do....	486,235	1,287,080
31	Marls .... do....	60,000	30,000
32	Phosphate rock .... long tons..	1,515,702	5,084,076
33	Pyrite .... do....	174,734	543,249
34	Salt .... barrels..	19,708,614	6,867,467
35	Sulphur .... short tons..	4,830	107,500
36	Barytes (crude) .... do....	41,894	139,528
37	Cobalt oxide .... pounds..	10,230	18,512
38	Mineral paints .... short tons..	63,111	728,389
39	Zinc white .... do....	40,146	3,211,680
40	Asbestos .... do....	681	11,740
41	Asphaltum .... do....	75,085	553,904
42	Bauxite .... long tons..	35,280	125,598
43	Chromic iron ore .... do....	None.	None.
44	Clay (all other than brick) .... short tons..	....	1,645,328
45	Feldspar .... do....	27,202	238,545
46	Fibrous talc .... do....	54,655	438,150
47	Flint .... do....	36,852	229,345
48	Fuller's earth .... do....	12,381	79,644
49	Graphite (crystalline) .... pounds..	2,900,732	} 167,106
50	Graphite (amorphous) .... short tons..	2,324	
51	Limestone for iron flux .... long tons..	6,707,435	4,695,205
52	Magnesite .... short tons..	1,280	18,480
53	Maganese ore .... long tons..	9,935	82,278
54	Mica (sheets) .... pounds..	108,570	70,587
55	Mica (scrap) .... short tons..	1,505	30,878
56	Mineral waters .... gallons sold..	39,562,136	6,948,030
57	Monazite .... pounds..	350,000	20,000
58	Ozocerite, refined .... do....	None.	None.
59	Precious stones	....	185,770
60	Pumice stone .... short tons..	400	10,000
61	Rutile .... pounds..	230	1,030
62	Soapstone .... short tons..	24,765	330,805
63	Total value of nonmetallic mineral products	....	445,428,651
64	Total value of metallic products	....	525,472,243
65	Estimated value of mineral products unspecified	....	1,000,000
66	Grand total	....	971,900,894

States in 1899 and 1900.

1900.		Increase or decrease in 1900.		Per cent of increase or decrease.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
13,789,242	$259,944,000	+ 168,539	+$14,771,346	1.24	6.02	1
57,647,000	74,533,495	+ 2,882,500	+ 3,726,869	5.26	5.26	2
3,829,897	79,171,000	+ 392,687	+ 8,117,600	11.42	11.42	3
606,117,166	98,494,039	+37,450,245	− 2,728,673	+ 6.59	− 2.70	4
270,824	23,561,688	+ 60,324	+ 4,616,688	28.66	24.37	5
123,886	10,654,196	− 5,165	− 4,186,669	− 4.00	− 28.21	6
28,317	1,302,586	− 2,137	− 150,159	− 7.02	− 10.34	7
6,000,000	1,920,000	+ 800,000	+ 204,000	15.38	11.89	8
1,750	346,980	+ 475	+ 95,105	37.25	37.76	9
9,715	3,886	− 12,826	− 4,680	− 56.90	− 54.63	10
None.						11
400	2,500	+ 100	+ 700	33.33	38.89	12
	549,934,370		+ 24,462,127		4.66	13
212,513,912	221,133,513	+19,191,925	+ 53,198,209	9.93	31.68	14
51,221,353	85,757,851	− 2,723,294	− 2,384,279	− 5.05	− 2.71	15
	23,606,463		+ 3,531,590		17.59	16
63,362,704	75,752,691	+ 6,291,854	+ 11,148,787	11.02	17.26	17
	12,000,000		+ 750,000		6.67	18
17,231,150	13,283,581	+ 1,710,705	+ 394,439	11.02	3.06	19
	48,008,739		+ 3,918,069		8.88	20
4,305	102,715	− 595	− 47,885	− 12.14	− 31.80	21
3,185	123,475	+ 420	+ 25,150	15.19	25.58	22
	710,026		+ 34,440		5.10	23
3,615	24,207	− 719	− 12,825	− 16.59	− 34.63	24
	32,858		+ 4,743		16.87	25
	174,087		− 34,196		− 16.42	26
a 1,602 *b* 24,235	170,036 848,215		− 121,631		− 10.61	27
521,444	140,790	+ 88,440	+ 32,539	20.42	30.06	28
18,450	94,500	+ 2,550	− 2,150	+ 16.04	− 2.22	29
594,462	1,627,203	+ 108,227	+ 340,123	22.26	26.43	30
60,000	30,000					31
1,491,216	5,359,248	− 24,486	+ 275,172	− 1.62	− 5.41	32
204,615	749,991	+ 29,881	+ 206,742	17.10	38.06	33
20,869,342	6,944,603	+ 1,160,728	+ 77,136	5.89	1.12	34
3,525	88,100	− 1,305	− 19,400	− 27.02	− 18.05	35
67,680	188,089	+ 25,786	+ 48,561	61.55	34.80	36
6,471	11,648	− 3,759	− 6,864	− 36.74	− 37.08	37
72,222	881,363	+ 9,111	+ 152,974	14.44	21.00	38
48,840	3,667,210	+ 8,694	+ 455,530	21.66	14.18	39
1,054	16,310	+ 373	+ 4,570	54.77	38.93	40
54,389	415,958	− 20,696	− 137,946	− 27.56	− 24.90	41
23,184	89,676	− 12,096	− 35,922	− 34.29	− 28.60	42
140	1,400	+ 140	+ 1,400			43
	1,840,377		+ 195,049		11.85	44
21,353	173,659	− 5,849	− 64,886	− 21.50	− 27.20	45
63,500	499,500	+ 8,845	+ 61,350	16.18	14.00	46
32,495	179,351	− 4,357	− 49,994	− 11.82	− 21.80	47
9,698	67,535	− 2,683	− 12,109	− 21.67	− 15.20	48
5,507,855 611	197,579	+ 2,607,123 − 1,713	+ 30,473	+ 89.88 − 73.71	+ 18.24	49 50
7,495,435	4,500,000	+ 788,000	− 195,205	+ 11.75	− 4.16	51
2,252	19,333	+ 972	+ 853	75.94	4.62	52
11,771	100,289	+ 1,836	+ 18,011	18.48	21.89	53
456,283	92,758	+ 347,713	+ 22,171	320.27	31.41	54
5,453	54,302	+ 3,948	+ 23,424	262.32	75.86	55
47,558,784	6,245,172	+ 7,996,648	− 702,858	+ 20.21	− 10.12	56
908,000	48,805	+ 558,000	+ 28,805	159.43	144.03	57
None.	None.					58
	233,170		+ 47,400		25.52	59
None.	None.	− 400	− 10,000			60
300	1,300	+ 70	+ 270	30.43	90.00	61
27,943	383,541	+ 3,178	+ 52,736	12.83	15.94	62
	516,671,217		+ 71,242,566		15.99	63
	549,934,370		+ 24,462,127		4.66	64
	1,000,000					65
	1,067,605,587		+ 95,704,693		9.85	66

a Tons, refined. *b* Tons, crude.

Mineral products of the United States

	Product.	1880. Quantity.	Value.
	METALLIC.		
1	Pig iron, value at Philadelphia ....long tons..	3,375,912	$89,315,569
2	Silver, coining value................troy ounces..	30,320,000	39,200,000
3	Gold, coining value ....do....	1,741,500	36,000,000
4	Copper, value at New York City ....pounds..	60,480,000	11,491,200
5	Lead, value at New York City........short tons..	97,825	9,782,500
6	Zinc, value at New York City ....do....	23,239	2,277,432
7	Quicksilver, value at San Francisco ....flasks..	59,926	1,797,780
8	Nickel, value at Philadelphia ....pounds..	329,968	164,984
9	Aluminum, value at Pittsburg...............do....	....	....
10	Antimony, value at San Francisco ....short tons..	50	10,000
11	Platinum (crude), value at San Francisco, troy ounces.	100	400
12	Total value of metallic products	....	190,039,865
	NONMETALLIC (SPOT VALUES).		
13	Bituminous coal.......................long tons..	38,242,641	53,443,718
14	Pennsylvania anthracite ....do....	25,580,189	42,196,678
15	Stone ....do....	....	18,356,055
16	Petroleum ....barrels..	26,286,123	24,183,233
17	Lime ....do....	28,000,000	19,000,000
18	Natural gas..	....	....
19	Cement...................................barrels..	2,072,943	1,852,707
20	Salt ....do....	5,961,060	4,829,566
21	Phosphate rock ....long tons..	211,377	1,123,823
22	Limestone for iron flux ....do....	4,500,000	3,800,000
23	Mineral waters ....gallons sold..	2,000,000	500,000
24	Zinc white.........................short tons..	10,107	763,738
25	Potters' clay ....long tons..	25,783	200,457
26	Mineral paints ....short tons..	3,604	135,840
27	Borax ....pounds..	3,692,443	277,233
28	Gypsum ....short tons..	90,000	400,000
29	Grindstones	....	500,000
30	Fibrous talc........................short tons..	4,210	54,730
31	Pyrites ....long tons..	2,000	5,000
32	Soapstone..........................short tons..	8,441	66,665
33	Manganese ore ....long tons..	5,761	86,415
34	Asphaltum ....short tons..	444	4,440
35	Precious stones	....	100,000
36	Bromine ....pounds..	404,690	114,752
37	Corundum ....short tons..	1,044	29,280
38	Barytes (crude) ....do....	20,000	80,000
39	Graphite ....pounds..	....	49,800
40	Millstones..	....	200,000
41	Oilstones, etc. *a*........................pounds..	420,000	8,000
42	Marls...............................short tons..	1,000,000	500,000
43	Flint ....long tons..	20,000	80,000
44	Fluorspar..........................short tons..	4,000	16,000
45	Chromic iron ore......................long tons..	2,288	27,808
46	Infusorial earth ....short tons..	1,833	45,660
47	Feldspar ....long tons..	12,500	60,000
48	Mica ....pounds..	81,669	127,825
49	Cobalt oxide ....do....	7,251	24,000
50	Slate ground as a pigment...........short tons..	1,000	10,000
51	Sulphur ....do....	600	21,000
52	Asbestos ....do....	150	4,312
53	Rutile...................................pounds..	100	400
54	Lithographic stone ....short tons..	....	....
55	Total value of nonmetallic mineral products.	....	173,279,135
56	Total value of metallic products............	....	190,039,865
57	Estimated value of mineral products unspecified.	....	6,000,000
58	Grand total	....	369,319,000

a Prior to 1889, quantity and value are for rough stone quarried; since 1890 they are for finished product.

for the calendar years 1880 to 1900.

1881.		1882.		1883.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
4,144,254	$87,029,334	4,623,323	$106,336,429	4,595,510	$91,910,200	1
33,077,000	43,000,000	36,197,695	46,800,000	35,733,622	46,200,000	2
1,676,300	34,700,000	1,572,186	32,500,000	1,451,249	30,000,000	3
71,680,000	12,175,600	91,646,232	16,038,091	117,151,795	18,064,807	4
117,085	11,240,160	132,890	12,624,550	143,957	12,322,719	5
26,800	2,680,000	33,765	3,646,620	36,872	3,311,106	6
60,851	1,764,679	52,732	1,487,042	46,725	1,253,632	7
265,668	292,235	281,616	309,777	58,800	52,920	8
....	....	....	....	83	875	9
50	10,000	60	12,000	60	12,000	10
100	400	200	600	200	600	11
....	192,892,408	....	219,755,109	....	203,128,859	12
48,179,475	60,224,344	60,861,190	76,076,487	68,531,500	82,237,800	13
28,500,016	64,125,036	31,358,264	70,556,094	34,336,469	77,257,055	14
....	20,000,000	....	21,000,000	....	20,000,000	15
27,661,238	25,448,339	30,510,830	24,065,988	23,449,633	25,790,252	16
30,000,000	20,000,000	31,000,000	21,700,000	32,000,000	19,200,000	17
....	....	....	215,000	....	475,000	18
2,500,000	2,000,000	3,250,000	3,672,750	4,190,000	4,293,500	19
6,200,000	4,200,000	6,412,373	4,320,140	6,192,231	4,211,042	20
266,734	1,980,259	332,077	1,992,462	378,380	2,270,280	21
6,000,000	4,100,000	3,850,000	2,310,000	3,814,273	1,907,136	22
3,700,000	700,000	5,000,000	800,000	7,529,423	1,119,603	23
10,000	700,000	10,000	700,000	12,000	840,000	24
25,000	200,000	30,000	240,000	32,000	250,000	25
6,000	100,000	7,000	105,000	7,000	84,000	26
4,046,000	304,461	4,236,291	338,903	6,500,000	585,000	27
85,000	350,000	100,000	450,000	90,000	420,000	28
....	500,000	....	700,000	....	600,000	29
5,000	60,000	6,000	75,000	6,000	75,000	30
10,000	60,000	12,000	72,000	25,000	137,500	31
7,000	75,000	6,000	90,000	8,000	150,000	32
4,895	73,425	4,532	67,980	6,155	92,325	33
2,000	8,000	3,000	10,500	3,000	10,500	34
....	110,000	....	150,000	....	207,050	35
300,000	75,000	250,000	75,000	301,100	72,264	36
500	80,000	500	80,000	550	100,000	37
20,000	80,000	20,000	80,000	27,000	108,000	38
400,000	30,000	425,000	34,000	575,000	46,000	39
....	150,000	....	200,000	....	150,000	40
500,000	8,580	600,000	10,000	600,000	10,000	41
1,000,000	500,000	1,080,000	540,000	972,000	486,000	42
25,000	100,000	25,000	100,000	25,000	100,000	43
4,000	16,000	4,000	20,000	4,000	20,000	44
2,000	30,000	2,500	50,000	3,000	60,000	45
1,000	10,000	1,000	8,000	1,000	5,000	46
14,000	70,000	14,000	70,000	14,100	71,112	47
100,000	250,000	100,000	250,000	114,000	285,000	48
8,280	25,000	11,653	32,046	1,096	2,795	49
1,000	10,000	2,000	24,000	2,000	24,000	50
600	21,000	600	21,000	1,000	27,000	51
200	7,000	1,200	36,000	1,000	30,000	52
200	700	500	1,800	550	2,000	53
50	1,000	....	....	....	....	54
....	206,783,144	....	231,340,150	....	243,812,214	55
....	192,892,408	....	219,755,109	....	203,128,859	56
....	6,500,000	....	6,500,000	....	6,500,000	57
....	406,175,552	....	457,595,259	....	453,441,073	58

Mineral products of the United States for

	Product.	1884. Quantity.	1884. Value.
	METALLIC.		
1	Pig iron, value at Philadelphia ....long tons..	4,097,868	$73,761,624
2	Silver, coining value ....troy ounces..	37,744,605	48,800,000
3	Gold, coining value ....do....	1,489,949	30,800,000
4	Copper, value at New York City ....pounds..	145,221,934	17,789,687
5	Lead, value at New York City........short tons..	139,897	10,537,042
6	Zinc, value at New York City ....do....	38,544	3,422,707
7	Quicksilver, value at San Francisco ....flasks..	31,913	936,327
8	Nickel, value at Philadelphia ....pounds..	64,550	48,412
9	Aluminum, value at Pittsburg ....do....	150	1,350
10	Antimony, value at San Francisco ....short tons..	60	12,000
11	Platinum (crude), value at San Francisco, troy ounces.	150	450
12	Total value of metallic products	....	186,109,599
	NONMETALLIC (spot values).		
13	Bituminous coal ....long tons..	73,730,539	77,417,066
14	Pennsylvania anthracite ....do....	33,175,756	66,351,512
15	Stone......................................do....	....	19,000,000
16	Petroleum ....barrels..	24,218,438	20,595,966
17	Lime ....do....	37,000,000	18,500,000
18	Natural gas	....	1,460,000
19	Brick clay	....	....
20	Clay (all other than brick) ....long tons..	35,000	270,000
21	Cement................................barrels..	4,000,000	3,720,000
22	Salt ....do....	6,514,937	4,197,734
23	Phosphate rock ....long tons..	431,779	2,374,784
24	Limestone for iron flux ....do....	3,401,930	1,700,965
25	Mineral waters ....gallons sold..	10,215,328	1,459,143
26	Zinc white.........................short tons..	13,000	910,000
27	Mineral paints ....do....	7,000	84,000
28	Borax ....pounds..	7,000,000	490,000
29	Gypsum ....short tons..	90,000	390,000
30	Grindstones	....	570,000
31	Fibrous talc.......................short tons..	10,000	110,000
32	Pyrites ....long tons..	35,000	175,000
33	Soapstone..........................short tons..	10,000	200,000
34	Manganese ore ....long tons..	10,180	122,160
35	Asphaltum ....short tons..	3,000	10,500
36	Precious stones	....	222,975
37	Bromine ....pounds..	281,100	67,464
38	Corundum ....short tons..	600	108,000
39	Barytes (crude) ....do....	25,000	100,000
40	Graphite ....pounds..	....	....
41	Millstones.....................................	....	150,000
42	Oilstones, etc.*a* ....pounds..	800,000	12,000
43	Marls..............................short tons..	875,000	437,500
44	Flint...............................long tons..	30,000	120,000
45	Fluorspar..........................short tons..	4,000	20,000
46	Chromic iron ore....................long tons..	2,000	35,000
47	Infusorial earth ....short tons..	1,000	5,000
48	Feldspar............................long tons..	10,900	55,112
49	Mica ....pounds..	147,410	368,525
50	Cobalt oxide ....do....	2,000	5,100
51	Slate ground as a pigment..........short tons..	2,000	20,000
52	Sulphur ....do....	500	12,000
53	Asbestos ....do....	1,000	30,000
54	Rutile.................................pounds..	600	2,000
55	Lithographic stone ....short tons..	....	....
56	Total value of nonmetallic mineral products.	....	221,879,506
57	Total value of metallic products..............	....	186,109,599
58	Estimated value of mineral products unspecified ..	....	5,000,000
59	Grand total	....	412,989,105

a Prior to 1889, quantity and value are for rough stone quarried; since 1890 they are for finished product.

the calendar years 1880 to 1900—Continued.

1885.		1886.		1887.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
4,044,425	$64,712,400	5,683,329	$95,195,760	6,417,148	$121,925,800	1
39,910,279	51,600,000	39,445,312	51,000,000	41,269,240	53,350,000	2
1,538,376	31,800,000	1,881,250	35,000,000	1,596 500	33,000,000	3
170,962,607	18,292,999	161,235,381	16,527,651	185,227,331	21,115,916	4
129,412	10,469,431	130,629	12,200,749	145,700	13,113,000	5
40,688	3,539,856	42,641	3,752,408	50,340	4,782,300	6
32,073	979,189	29,981	1,060,000	33,825	1,429,000	7
277,904	179,975	214,992	127,157	205,566	133,200	8
283	2,550	3,000	27,000	18,000	59,000	9
50	10,000	35	7,000	75	15,000	10
250	187	50	100	448	1,838	11
....	181,586,587	....	214,897,825	....	248,925,054	12
64,840,668	82,347,648	73,707,957	78,481,056	87,887,360	98,004,656	13
34,228,548	76,671,948	34,853,077	76,119,120	37,578,747	84,552,181	14
....	19,000,000	....	19,000,000	....	25,000,000	15
21,847,205	19,198,243	28,064,841	19,996,313	28,278,866	18,877,094	16
40,000,000	20,000,000	....	....	....	....	17
....	4,857,200	....	10,012,000	....	15,817,500	18
....	....	....	6,200,000	....	7,000,000	19
36,000	275,000	40,000	325,000	43,000	340,000	20
4,150,000	3,492,500	4,500,000	3,990,000	6,692,744	5,674,377	21
7,038,653	4,825,345	7,707,081	4,736,585	7,831,962	4,093,846	22
437,856	2,846,064	430,549	1,872,936	480,558	1,836,818	23
3,356,956	1,678,478	4,717,163	2,830,297	5,377,000	3,226,200	24
9,148,401	1,312,845	8,950,317	1,284,070	8,259,609	1,261,463	25
15,000	1,050,000	18,000	1,440,000	18,000	1,440,000	26
3,950	43,575	18,800	315,000	22,000	330,000	27
8,000,000	480,000	9,778,290	488,915	11,000,000	550,000	28
90,405	405,000	95,250	428,625	95,000	425,000	29
....	500,000	....	250,000	....	224,400	30
10,000	110,000	12,000	125,000	15,000	160,000	31
49,000	220,500	55,000	220,000	52,000	210,000	32
10,000	200,000	12,000	225,000	12,000	225,000	33
23,258	190,281	30,193	277,636	34,524	333,844	34
3,000	10,500	3,500	14,000	4,000	16,000	35
....	209,900	....	119,056	....	163,600	36
310,000	89,900	428,334	141,350	199,087	61,717	37
600	108,000	645	116,190	600	108,000	38
15,000	75,000	10,000	50,000	15,000	75,000	39
327,883	26,231	415,525	33,242	416,000	34,000	40
....	100,000	....	140,000	....	100,000	41
1,000,000	15,000	1,160,000	15,000	1,200,000	16,000	42
875,000	437,500	800,000	400,000	600,000	300,000	43
30,000	120,000	30,000	120,000	32,000	128,000	44
5,000	22,500	5,000	22,000	5,000	20,000	45
2,700	40,000	2,000	30,000	3,000	40,000	46
1,000	5,000	1,200	6,000	3,000	15,000	47
13,600	68,000	14,900	74,500	10,200	61,200	48
92,000	161,000	40,000	70,000	70,000	142,250	49
68,723	65,373	35,000	36,878	18,340	18,774	50
1,975	24,687	....	....	....	....	51
715	17,875	2,500	75,000	3,000	100,000	52
300	9,000	200	6,000	150	4,500	53
600	2,000	600	2,000	1,000	3,000	54
....	....	....	....	....	....	55
....	241,312,093	....	230,088,769	....	270,989,420	56
....	181,586,587	....	214,897,825	....	248,925,054	57
....	5,000,000	....	800,000	....	800,000	58
....	427,898,680	....	445,786,594	....	520,714,474	59

Mineral products of the United States for

	Product.	1888. Quantity.	Value.
	METALLIC.		
1	Pig iron, value at Philadelphia........long tons..	6, 489, 738	$107, 000, 000
2	Silver, coining value................troy ounces..	45, 783, 632	59, 195, 000
3	Gold, coining value........................do....	1, 604, 927	33, 175, 000
4	Copper, value at New York City ....pounds..	231, 270, 622	33, 833, 954
5	Lead, value at New York City........short tons..	151, 919	13, 399, 256
6	Zinc, value at New York City ....do....	55, 903	5, 500, 855
7	Quicksilver, value at San Francisco ....flasks..	33, 250	4, 113, 125
8	Aluminum, value at Pittsburg............pounds..	19, 000	65, 000
9	Antimony, value at San Francisco ....short tons..	100	20, 000
10	Nickel, value at Philadelphia ....pounds..	204, 328	127, 632
11	Tin..do....	....	....
12	Platinum (crude), value at San Francisco, troy ounces.	500	2, 000
13	Total value of metallic products	....	253, 731, 822
	NONMETALLIC (spot values).		
14	Bituminous coal....................short tons..	102, 039, 838	101, 860, 529
15	Pennsylvania anthracite...............long tons..	41, 624, 611	89, 020, 483
16	Stone..	....	25, 500, 000
17	Petroleum ....barrels..	27, 612, 025	17, 947, 620
18	Natural gas..	....	22, 629, 875
19	Brick clay...	....	7, 500, 000
20	Clay (all other than brick) ....long tons..	36, 750	300, 000
21	Cement.................................barrels..	6, 503, 295	5, 021, 139
22	Mineral waters ....gallons sold..	9, 578, 648	1, 679, 302
23	Phosphate rock ....long tons..	448, 567	2, 018, 552
24	Salt......................................barrels..	8, 055, 881	4, 374, 203
25	Limestone for iron flux ....long tons..	5, 438, 000	2, 719, 000
26	Zinc white ....short tons..	20, 000	1, 600, 000
27	Gypsum ....do....	110, 000	550, 000
28	Borax ....pounds..	7, 589, 000	455, 340
29	Mineral paints......................short tons..	26, 500	405, 000
30	Grindstones	....	281, 800
31	Fibrous talc ....short tons..	20, 000	210, 000
32	Asphaltum ....do....	53, 800	331, 500
33	Soapstone ....do....	15, 000	250, 000
34	Precious stones	....	139, 850
35	Pyrites ....long tons..	54, 331	167, 658
36	Corundum ....short tons..	589	91, 620
37	Oilstones, etc. *a*.......................pounds..	1, 500, 000	18, 000
38	Mica.......................................do....	48, 000	70, 000
39	Barytes (crude) ....short tons..	20, 000	110, 000
40	Bromine..................................pounds..	307, 386	95, 290
41	Fluorspar ....short tons..	6, 000	30, 000
42	Feldspar ....long tons..	8, 700	50, 000
43	Manganese ore..............................do....	29, 198	279, 571
44	Flint.......................................do....	30, 000	127, 500
45	Graphite.................................pounds..	400, 000	33, 000
46	Bauxite..............................long tons..	....	....
47	Sulphur............................short tons..	....	....
48	Marls.......................................do....	300, 000	150, 000
49	Infusorial earth............................do....	1, 500	7, 500
50	Millstones	....	81, 000
51	Chromic iron ore......................long tons..	1, 500	20, 000
52	Cobalt oxide.............................pounds..	8, 491	15, 782
53	Magnesite..........................short tons..	....	....
54	Asbestos ....do....	100	3, 000
55	Rutile ....pounds..	1, 000	3, 000
56	Ozocerite (refined)........................do....	43, 500	3, 000
57	Total value of nonmetallic mineral products.	....	286, 150, 114
58	Total value of metallic products..................	....	253, 731, 822
59	Estimated value of mineral products unspecified...	....	900, 000
60	Grand total...	....	540, 781, 936

a Prior to 1889, quantity and value are for rough stone quarried; since 1890 they are for finished product.

the calendar years 1880 to 1900—Continued.

1889.		1890.		1891.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
7,603,642	$120,000,000	9,202,703	$151,200,410	8,279,870	$128,337,985	1
51,354,851	66,396,988	54,500,000	70,464,645	58,330,000	75,416,565	2
1,590,869	32,886,744	1,588,880	32,845,000	1,604,840	33,175,000	3
231,246,214	26,907,809	265,115,133	30,848,797	295,812,076	38,455,300	4
156,397	13,794,235	143,630	12,668,166	178,554	15,534,198	5
58,860	5,791,824	63,683	6,266,407	80,873	8,033,700	6
26,484	1,190,500	22,926	1,203,615	22,904	1,036,386	7
47,468	97,335	61,281	61,281	150,000	100,000	8
115	28,000	129	40,756	278	47,007	9
252,663	151,598	223,488	134,093	118,498	71,099	10
....	....	....	....	125,289	25,058	11
500	2,000	600	2,500	100	500	12
....	267,247,033	....	305,735,670	....	300,232,798	13
95,685,543	94,504,745	111,320,016	110,420,801	117,901,237	117,188,400	14
40,714,721	65,879,514	41,489,858	66,383,772	45,236,992	73,944,735	15
....	42,809,706	....	47,000,000	....	47,294,746	16
35,163,513	26,963,340	45,822,672	35,365,105	54,291,980	30,526,553	17
....	21,097,099	....	18,742,725	....	15,500,084	18
....	8,000,000	....	8,500,000	....	9,000,000	19
294,344	635,578	350,000	756,000	400,000	900,000	20
7,000,000	5,000,000	8,000,000	6,000,000	8,222,792	6,680,951	21
12,780,471	1,748,458	13,907,418	2,600,750	18,392,732	2,996,259	22
550,245	2,937,776	510,499	3,213,795	587,988	3,651,150	23
8,005,565	4,195,412	8,776,991	4,752,286	9,987,945	4,716,121	24
6,318,000	3,159,000	5,521,622	2,760,811	5,000,000	2,300,000	25
16,970	1,357,600	....	1,600,000	23,700	1,600,000	26
267,769	764,118	182,995	574,523	208,126	628,051	27
8,000,000	500,000	9,500,000	617,500	13,380,000	869,700	28
34,307	483,766	47,732	681,992	49,652	678,478	29
....	439,587	....	450,000	....	476,113	30
23,746	244,170	41,354	389,196	53,054	493,068	31
51,735	171,537	40,841	190,416	45,054	242,264	32
12,715	231,708	13,670	252,309	16,514	243,981	33
....	188,807	....	118,833	....	235,300	34
93,705	202,119	99,854	273,745	106,536	338,880	35
2,245	105,565	1,970	89,395	2,265	90,230	36
5,982,000	32,980	....	69,909	1,375,000	150,000	37
49,500	50,000	60,000	75,000	75,000	100,000	38
19,161	106,313	21,911	86,505	31,069	118,363	39
418,891	125,667	387,847	104,719	343,000	54,880	40
9,500	45,835	8,250	55,328	10,044	78,330	41
6,970	39,370	8,000	45,200	10,000	50,000	42
24,197	240,559	25,684	219,050	23,416	239,129	43
21,113	89,730	13,000	57,400	15,000	60,000	44
....	72,662	....	77,500	....	110,000	45
728	2,366	1,844	6,012	3,593	11,675	46
1,150	7,850	....	....	1,200	39,600	47
139,522	63,956	153,620	69,880	135,000	67,500	48
3,466	23,372	2,532	50,240	....	21,988	49
....	35,155	....	23,720	....	16,587	50
2,000	30,000	3,599	53,985	1,372	20,580	51
13,955	31,092	6,788	16,291	7,200	18,000	52
....	....	....	....	439	4,390	53
30	1,800	71	4,560	66	3,960	54
1,000	3,000	400	1,000	300	800	55
50,000	2,500	350,000	26,250	50,000	7,000	56
....	282,623,812	....	312,776,503	....	321,767,846	57
....	267,247,033	....	305,735,670	....	300,232,798	58
....	1,000,000	....	1,000,000	....	1,000,000	59
....	550,870,845	....	619,512,173	....	623,000,644	60

Mineral products of the United States for

	Product.	1892.	
		Quantity.	Value.
	METALLIC.		
1	Pig iron (spot value)........long tons..	9,157,000	$131,161,039
2	Silver, coining value........troy ounces..	63,500,000	82,099,150
3	Gold, coining value........do....	1,596,375	33,000,000
4	Copper, value at New York City........pounds..	352,971,744	37,977,142
5	Lead, value at New York City........short tons..	173,654	13,892,320
6	Zinc, value at New York City........do....	87,260	8,027,920
7	Quicksilver, value at San Francisco........flasks..	27,993	1,245,689
8	Aluminum, value at Pittsburg........pounds..	259,885	172,824
9	Antimony, value at San Francisco........short tons..		56,466
10	Nickel, value at Philadelphia........pounds..	92,252	50,739
11	Tin........do....	162,000	32,400
12	Platinum, value (crude) at San Francisco........troy ounces..	80	550
13	Total value of metallic products........		307,716,239
	NONMETALLIC (SPOT VALUES).		
14	Bituminous coal........short tons..	126,856,567	125,124,381
15	Pennsylvania anthracite........long tons..	46,850,450	82,442,000
16	Natural gas........		14,800,714
17	Petroleum........barrels..	50,509,136	26,034,196
18	Brick clay........		9,000,000
19	Cement........barrels..	8,758,621	7,152,750
20	Stone........		48,706,625
21	Corundum and emery........short tons..	1,771	181,300
22	Garnet for abrasive purposes........do....		
23	Grindstones........		272,244
24	Infusorial earth and tripoli........short tons..		43,655
25	Millstones........		23,417
26	Oilstones, etc........pounds..		146,730
27	Borax........do....	13,500,000	900,000
28	Bromine........do....	379,480	64,502
29	Fluorspar........short tons..	12,250	89,000
30	Gypsum........do....	256,259	695,492
31	Marls........do....	125,000	65,000
32	Phosphate rock........long tons..	681,571	3,296,227
33	Pyrite........do....	109,788	305,191
34	Salt........barrels..	11,698,890	5,654,915
35	Sulphur........short tons..	2,688	80,640
36	Barytes (crude)........do....	32,108	130,025
37	Cobalt oxide........pounds..	7,869	15,738
38	Mineral paints........short tons..	51,704	767,766
39	Zinc white........do....	27,500	2,200,000
40	Asbestos........do....	104	6,416
41	Asphaltum........do....	87,680	445,375
42	Bauxite........long tons..	10,518	34,183
43	Chromic iron ore........do....	1,500	25,000
44	Clay (all other than brick)........do....	420,000	1,000,000
45	Feldspar........do....	15,000	75,000
46	Fibrous talc........short tons..	41,925	472,485
47	Flint........long tons..	20,000	80,000
48	Fuller's earth........short tons..		
49	Graphite........pounds..		104,000
50	Limestone for iron flux........long tons..	5,172,114	3,620,480
51	Magnesite........short tons..	1,004	10,040
52	Manganese ore........long tons..	13,613	129,586
53	Mica........pounds..	75,000	100,000
54	Mineral waters........gallons sold..	21,876,604	4,905,970
55	Monazite........pounds..		
56	Ozocerite, refined........do....	60,000	8,000
57	Precious stones........		312,050
58	Pumice stone........short tons..		
59	Rutile........pounds..	100	300
60	Soapstone........short tons..	23,908	437,449
61	Total value of nonmetallic mineral products........		339,958,842
62	Total value of metallic products........		307,716,239
63	Estimated value of mineral products unspecified........		1,000,000
64	Grand total........		648,675,081

the calendar years 1880 to 1900—Continued.

1893.		1894.		1895.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
7,124,502	$84,810,426	6,657,388	$65,007,247	9,446,308	$105,198,550	1
60,000,000	77,575,757	49,501,122	64,000,000	55,727,000	72,051,000	2
1,739,081	35,950,000	1,910,816	39,500,000	2,254,760	46,610,000	3
339,785,972	32,054,601	364,866,808	33,141,142	392,639,964	38,682,347	4
163,982	11,839,590	159,331	9,942,254	170,000	11,220,000	5
78,832	6,306,560	75,328	5,288,026	89,686	6,278,020	6
30,164	1,108,527	30,416	934,000	36,104	1,337,131	7
339,629	266,903	550,000	316,250	920,000	464,600	8
250	45,000	200	36,600	450	68,000	9
49,399	22,197	9,616	3,269	10,302	3,091	10
8,938	1,788	None.	....	None.	....	11
75	517	100	600	150	900	12
....	249,981,866	....	218,168,788	....	281,913,639	13
128,385,231	122,751,618	118,820,405	107,653,501	135,118,193	115,749,771	14
48,185,306	85,687,078	46,358,144	78,488,063	51,785,122	82,019,272	15
....	14,346,250	....	13,954,400	....	13,006,650	16
48,412,666	28,932,326	49,344,516	35,522,095	52,892,276	57,632,296	17
....	9,000,000	....	9,000,000	....	9,000,000	18
8,002,467	6,262,841	8,362,245	5,030,081	8,731,401	5,482,254	19
....	33,885,573	....	36,534,788	....	33,319,131	20
1,713	142,325	1,495	95,936	2,102	106,256	21
....	....	....	....	....	....	22
....	338,787	....	223,214	....	205,768	23
....	22,582	2,584	11,718	4,954	20,514	24
....	16,645	....	13,887	....	22,542	25
....	135,173	....	136,873	....	155,881	26
8,699,000	652,425	14,680,130	974,445	11,918,000	595,900	27
348,399	104,520	379,444	102,450	517,421	134,343	28
12,400	84,000	7,500	47,500	4,000	24,000	29
253,615	696,615	239,312	761,719	265,503	807,447	30
75,000	40,000	75,000	40,000	60,000	30,000	31
941,368	4,136,070	996,949	3,479,547	1,038,551	3,606,094	32
75,777	256,552	105,940	363,134	99,549	322,845	33
11,816,772	4,054,668	12,967,417	4,739,285	13,669,649	4,423,084	34
1,200	42,000	500	20,000	1,800	42,000	35
28,970	88,506	23,335	86,983	21,529	68,321	36
8,422	10,346	6,763	10,145	14,458	20,675	37
37,724	530,384	41,926	498,093	50,695	621,552	38
24,059	1,804,420	19,987	1,399,090	20,710	1,449,700	39
50	2,500	325	4,463	795	13,525	40
47,779	372,232	60,570	353,400	68,163	348,281	41
9,079	29,507	11,066	35,818	17,069	44,000	42
1,450	21,750	3,680	53,231	1,740	16,795	43
400,000	900,000	360,000	800,000	360,000	800,000	44
18,391	96,553	17,200	98,900	23,200	133,400	45
35,861	403,436	39,906	435,060	39,240	370,895	46
29,671	103,848	38,000	145,920	36,800	117,760	47
....	....	....	....	6,900	41,400	48
843,103	63,232	918,000	64,010	....	52,582	49
3,958,055	2,374,833	3,698,550	1,849,275	5,247,949	2,623,974	50
704	7,040	1,440	10,240	2,200	17,000	51
7,718	66,614	6,308	53,635	9,547	71,769	52
66,971	88,929	....	52,388	....	55,831	53
23,544,495	4,246,734	21,569,608	3,741,846	21,463,543	4,254,237	54
130,000	7,600	546,855	36,193	1,573,000	137,150	55
....	....	....	....	None.	None.	56
....	264,041	....	132,250	....	113,621	57
....	....	....	....	....	....	58
....	....	150	450	100	350	59
21,071	255,067	23,144	401,325	21,495	266,495	60
....	323,325,620	....	307,455,351	....	338,345,361	61
....	249,981,866	....	218,168,788	....	281,913,639	62
....	1,000,000	....	1,000,000	....	1,000,000	63
....	574,307,486	....	526,624,139	....	621,259,000	64

Mineral products of the United States for

	Product.	1896. Quantity.	Value.
	METALLIC.		
1	Pig iron (spot value) ... long tons..	8,623,127	$90,250,000
2	Silver, coining value ... troy ounces..	58,834,800	76,069,236
3	Gold, coining value ... do....	2,568,132	53,088,000
4	Copper, value at New York City ... pounds..	460,061,430	49,456,603
5	Lead, value at New York City ... short tons..	188,000	10,528,000
6	Zinc, value at New York City ... do....	81,499	6,519,920
7	Quicksilver, value at San Francisco ... flasks..	30,765	1,075,449
8	Aluminum, value at Pittsburg ... pounds..	1,300,000	520,000
9	Antimony, value at San Francisco ... short tons..	601	84,290
10	Nickel, value at Philadelphia ... pounds..	17,170	4,464
11	Tin ... do....	None.	....
12	Platinum, value (crude) at San Francisco ... troy ounces..	163	944
13	Total value of metallic products ...	....	287,596,906
	NONMETALLIC (SPOT VALUES).		
14	Bituminous coal ... short tons..	137,640,276	114,891,515
15	Pennsylvania anthracite ... long tons..	48,523,287	81,748,651
16	Natural gas ...	....	13,002,512
17	Petroleum ... barrels..	60,960,361	58,518,709
18	Brick clay ...	....	9,000,000
19	Cement ... barrels..	9,513,473	6,473,213
20	Stone ...	....	30,142,661
21	Corundum and emery ... short tons..	2,120	113,246
22	Garnet for abrasive purposes ... do....	....	....
23	Grindstones ...	....	326,826
24	Infusorial earth and tripoli ... short tons..	3,846	26,792
25	Millstones ...	....	22,567
26	Oilstones, etc ... pounds..	....	127,098
27	Borax ... do....	13,508,000	675,400
28	Bromine ... do....	546,580	144,501
29	Fluorspar ... short tons..	6,500	52,000
30	Gypsum ... do....	224,139	573,344
31	Marls ... do....	60,000	30,000
32	Phosphate rock ... long tons..	930,779	2,803,372
33	Pyrite ... do....	115,483	320,163
34	Salt ... barrels..	13,850,726	4,040,839
35	Sulphur ... short tons..	5,260	87,200
36	Barytes (crude) ... do....	17,068	46,513
37	Cobalt oxide ... pounds..	10,700	15,301
38	Mineral paints ... short tons..	48,032	530,455
39	Zinc white ... do....	20,000	1,400,000
40	Asbestos ... do....	504	6,100
41	Asphaltum ... do....	80,503	577,563
42	Bauxite ... long tons..	18,364	47,338
43	Chromic iron ore ... do....	786	6,667
44	Clay (all other than brick) ... do....	360,000	800,000
45	Feldspar ... do....	9,114	35,200
46	Fribrous talc ... short tons..	46,089	399,443
47	Flint ... long tons..	11,124	24,226
48	Fuller's earth ... short tons..	9,872	59,860
49	Graphite (crystalline) ... pounds..	535,858	48,460
50	Graphite (amorphous) ... tons..	760	
51	Limestone for iron flux ... long tons..	4,120,102	2,060,000
52	Magnesite ... short tons..	1,500	11,000
53	Manganese ore ... long tons..	10,088	90,727
54	Mica (sheet) ... pounds..	....	65,441
55	Mica (scrap) ... tons..	....	1,750
56	Mineral waters ... gallons sold..	25,795,312	4,136,192
57	Monazite ... pounds..	30,000	1,500
58	Ozocerite, refined ... do....	None.	None.
59	Precious stones ...	....	97,850
60	Pumice stone ... short tons..	....	....
61	Rutile ... pounds..	100	350
62	Soapstone ... short tons..	22,183	354,065
63	Total value of nonmetallic mineral products ...	....	333,936,110
64	Total value of metallic products ...	....	287,596,906
65	Estimated value of mineral products unspecified ...	....	1,000,000
66	Grand total ...	....	622,533,016

the calendar years 1880 to 1900—Continued.

1897.		1898.		1899.		
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
9,652,680	$95,122,299	11,773,934	$116,557,090	13,620,703	$245,172,654	1
53,860,000	69,637,172	54,438,000	70,384,485	54,764,500	70,806,626	2
2,774,935	57,363,000	3,118,398	64,463,000	3,437,210	71,053,400	3
494,078,274	54,080,180	526,512,987	61,865,276	568,666,921	101,222,712	4
212,000	14,885,728	222,000	16,650,000	210,500	18,945,000	5
99,980	8,498,300	115,399	10,385,910	129,051	14,840,865	6
26,648	993,445	31,092	1,188,627	30,454	1,452,745	7
4,000,000	1,500,000	5,200,000	1,716,000	5,200,000	1,716,000	8
756	109,655	1,120	184,050	1,275	251,875	9
23,707	7,823	11,145	3,956	22,541	8,566	10
None.		None.		None.		11
150	900	225	1,913	300	1,800	12
	302,198,502		343,400,217		525,472,243	13
147,609,985	119,567,224	166,592,023	132,586,313	193,321,987	167,935,304	14
46,974,714	79,301,954	47,663,076	75,414,537	53,944,647	88,142,130	15
	13,826,422		15,296,813		20,074,873	16
60,475,516	40,874,072	55,364,233	44,193,359	57,070,850	64,603,904	17
	8,000,000		9,000,000		11,250,000	18
10,989,463	8,178,283	12,111,208	9,859,501	15,520,445	12,889,142	19
	34,667,772		36,607,264		44,090,670	20
2,165	106,574	4,064	275,064	4,900	150,600	21
2,554	80,853	2,967	86,850	2,765	98,325	22
	368,058		489,769		675,586	23
3,833	22,835	2,733	16,691	4,334	37,032	24
	25,932		25,934		28,115	25
	149,970		180,738		208,283	26
16,000,000	1,080,000	16,000,000	1,120,000	40,714,000	1,139,882	27
487,149	129,094	486,979	126,614	433,004	108,251	28
5,062	37,159	7,675	63,050	15,900	96,650	29
288,982	755,864	291,688	755,280	486,235	1,287,080	30
60,000	30,000	60,000	30,000	60,000	30,000	31
1,039,345	2,673,202	1,308,885	3,453,460	1,515,702	5,084,076	32
143,201	391,541	193,364	593,801	174,734	543,249	33
15,973,202	4,920,020	17,612,634	6,212,554	19,708,614	6,867,467	34
2,275	45,590	1,200	32,960	4,830	107,500	35
26,042	58,295	31,306	108,339	41,894	139,528	36
19,520	31,232	6,247	9,371	10,230	18,512	37
60,913	795,793	58,850	694,856	63,111	728,389	38
25,000	1,750,000	33,000	2,310,000	40,146	3,211,680	39
580	6,450	605	10,300	681	11,740	40
75,945	664,632	76,337	675,649	75,085	553,904	41
20,590	57,652	25,149	75,437	35,280	125,598	42
None.	None.	None.	None.	None.	None.	43
	1,000,000		1,384,766		1,645,328	44
11,175	43,100	12,000	32,395	27,202	238,545	45
57,009	396,936	54,356	411,430	54,655	438,150	46
11,952	26,227	19,130	42,670	36,852	229,345	47
17,113	112,272	14,860	106,500	12,381	79,644	48
1,254,402	54,277	2,360,000	75,200	2,900,732	167,106	49
1,108		890		2,324		50
4,247,688	2,124,000	5,275,819	2,638,000	6,707,435	4,695,205	51
1,143	13,671	1,263	19,075	1,280	18,480	52
11,108	95,505	15,957	129,185	9,935	82,278	53
82,676	80,774	129,520	103,534	108,570	70,587	54
740	14,452	3,999	27,564	1,505	30,878	55
23,255,911	4,599,106	28,853,464	8,051,833	39,562,136	6,948,030	56
44,000	1,980	250,776	13,542	350,000	20,000	57
None.	None.	None.	None.	None.	None.	58
	130,675		160,920		185,770	59
158		600	13,200	400	10,000	60
100	350	140	700	230	1,030	61
21,923	365,629	22,231	287,112	24,765	330,805	62
	327,655,427		353,802,130		445,428,651	63
	302,198,502		343,400,217		525,472,243	64
	1,000,000		1,000,000		1,000,000	65
	630,853,929		698,202,347		971,900,894	66

Mineral products of the United States for the calendar years 1880-1900—Continued.

Product.	1900. Quantity.	1900. Value.
METALLIC.		
Pig iron, spot value ... long tons..	13,789,242	$259,944,000
Silver, coining value ... troy ounces..	57,647,000	74,533,495
Gold, coining value ... do ...	3,829,897	79,171,000
Copper, value at New York City ... pounds..	606,117,166	98,494,039
Lead, value at New York City ... short tons..	270,824	23,561,688
Zinc, value at New York City ... do ...	123,886	10,654,196
Quicksilver, value at San Francisco ... flasks..	28,317	1,302,586
Aluminum, value at Pittsburg ... pounds..	6,000,000	1,920,000
Antimony, value at San Francisco ... short tons..	1,750	346,980
Nickel, value at Philadelphia ... pounds..	9,715	3,886
Tin ... do ...	None.	...
Platinum, value (crude) at San Francisco ... troy ounces..	400	2,500
Total value of metallic products ...	...	549,934,370
NONMETALLIC (SPOT VALUES).		
Bituminous coal ... short tons..	212,513,912	221,133,513
Pennsylvania anthracite ... long tons..	51,221,353	85,757,851
Natural gas ...	...	23,606,463
Petroleum ... barrels..	63,362,704	75,752,691
Brick clay ...	...	12,000,000
Cement ... barrels..	17,231,150	13,283,581
Stone ...	...	48,008,739
Corundum and emery ... short tons..	4,305	102,715
Garnet for abrasive purposes ... do ...	3,185	123,475
Grindstones ...	...	710,026
Infusorial earth and tripoli ... short tons..	3,615	24,207
Millstones ...	...	32,858
Oilstones, etc ...	...	174,087
Borax ... short tons..	*a* 1,602	170,036
	b 24,235	848,215
Bromine ... pounds..	521,444	140,790
Fluorspar ... short tons..	18,450	94,500
Gypsum ... do ...	594,462	1,627,203
Marls ... do ...	60,000	30,000
Phosphate rock ... long tons..	1,491,216	5,359,248
Pyrite ... do ...	204,615	749,991
Salt ... barrels..	20,869,342	6,944,603
Sulphur ... short tons..	3,525	88,100
Barytes (crude) ... do ...	67,680	188,089
Cobalt oxide ... pounds..	6,471	11,648
Mineral paints ... short tons..	72,222	881,363
Zinc white ... do ...	48,840	3,667,210
Asbestos ... do ...	1,054	16,310
Asphaltum ... do ...	54,389	415,958
Bauxite ... long tons..	23,184	89,676
Chromic iron ore ... do ...	140	1,400
Clay (all other than brick) ... short tons..	...	1,840,377
Feldspar ... do ...	21,353	173,659
Fibrous talc ... do ...	63,500	499,500
Flint ... do ...	32,495	179,351
Fuller's earth ... do ...	9,698	67,535
Graphite (crystalline) ... pounds..	5,507,855	197,579
Graphite (amorphous) ... short tons..	611	
Limestone for iron flux ... long tons..	7,495,435	4,500,000
Magnesite ... short tons..	2,252	19,333
Manganese ore ... long tons..	11,771	100,289
Mica (sheet) ... pounds..	456,283	92,758
Mica (scrap) ... short tons..	5,453	54,302
Mineral waters ... gallons sold..	47,558,784	6,245,172
Monazite ... pounds..	908,000	48,805
Ozocerite, refined ... do ...	None.	None.
Precious stones ...	...	233,170
Pumice stone ... short tons..	None.	None.
Rutile ... pounds..	300	1,300
Soapstone ... short tons..	27,943	383,541
Total value of nonmetallic mineral products ...	...	516,671,217
Total value of metallic products ...	...	549,934,370
Estimated value of mineral products unspecified ...	...	1,000,000
Grand total ...	...	1,067,605,587

a Refined. *b* Crude.

IRON ORES.

By JOHN BIRKINBINE.

PRODUCTION.

A total output of 27,553,161 long tons causes the calendar year 1900 to repeat the records of the years 1898 and 1899 with a production of iron ore in excess of the amount previously reported in any year for this or any other country.

The following statement illustrates the remarkable increase in the quantities of iron ore won in three years:

Iron ore mined in the United States in 1898, 1899, and 1900.

Year.	Amount.	Year.	Amount.
	Long tons.		*Long tons.*
1898	19,433,716	1900	27,553,161
1899	24,683,173		

A statement of the maximum product of the German Empire in 1900, when the output was 18,964,267 metric tons, or 18,667,950 long tons, and that of Great Britain, 1882, when 18,031,957 long tons were won, is given for comparison.

The increase in the United States iron-ore product for 1899 over 1898 was 5,249,457 long tons, equivalent to an advance of 27 per cent, and the increase of 1900 over 1899 was 2,869,988 tons, or 12 per cent.

The production for the year 1900 was therefore 8,119,445 tons, or 42 per cent greater than that of 1898, a marvelous record for two years.

It is interesting to note the quantities of iron ores which have been credited to the years for which the United States Geological Survey has collected statistics, and to place side by side with these the quantities of pig iron contemporaneously made, for the bulk of the iron ore mined in the United States enters into the production of pig iron by the nation.

Production of iron ores and pig iron in the United States from 1889 to 1900.

Year.	Iron ores.	Pig iron.	Year.	Iron ores.	Pig iron.
	Long tons.	*Long tons.*		*Long tons.*	*Long tons.*
1889	14,518,041	7,603,642	1897	17,518,046	9,652,680
1890	16,036,043	9,202,703	1898	19,433,716	11,773,934
1891	14,591,178	8,279,870	1899	24,683,173	13,620,703
1892	16,296,666	9,157,000	1900	27,553,161	13,789,242
1893	11,587,629	7,124,502	Total	206,060,395	114,931,099
1894	11,879,679	6,657,388	Average	17,171,700	9,577,592
1895	15,957,614	9,446,308			
1896	16,005,449	8,623,127			

The average annual products for the twelve years indicated were 17,171,700 tons of iron ore and 9,577,592 tons of pig iron, suggesting an apparent average yield of domestic ore of 55.78 per cent. This does not take into consideration either the iron ore utilized for other than smelting purposes or the foreign iron ores or other materials which are fed to blast furnaces.

An exact determination of these will show that domestic ores actually used in producing pig iron yielded a lower percentage of iron than above indicated.

Taking the last five years, the returns suggest that about 1.83 long tons of domestic iron ore were produced for each ton of pig iron made in the United States.

To determine the amount of iron ore, or of materials used as such, which are fed to blast furnaces, the quantities of foreign iron ores imported, and of zinc residuum, mill cinder, scrap, etc., used must be added the increase of stocks of ore on hand at the mines, and the iron ore used as flux being deducted.

The following official records prior to the year 1889 will, when taken in connection with the foregoing table, suggest the developement in the iron industry:

Production of iron ore and pig iron in the United States, by census periods.

Census year.	Iron ore.	Pig iron.	Census year.	Iron ore.	Pig iron.
	Long tons.	*Long tons.*		*Long tons.*	*Long tons.*
1850	1,579,309	564,755	1870	*a*3,842,720	1,832,929
1860	3,218,275	987,599	1880	7,120,362	3,375,912

a Used.

In the year 1900, twenty-five States and one Territory contributed to make up the total of 27,553,161 long tons, and each of these States, with the exception of Pennsylvania, Virginia, New York, and Tennessee, showed by authentic figures an increased production over 1899. But the apparently decreased production indicated for the four States is in part explained by the difficulty of obtaining reliable data from a number of localities where ores were mined in moderate quantities by individuals or where changes in ownership or direction interfered with securing exact returns in time for proper tabulation. In augmented output Minnesota leads, closely crowding for preeminence as a producer the State of Michigan, which has heretofore held first place. If the shipments of ore during the calendar year, and not the production, are considered, Minnesota obtained first place.

Considered geographically, the increase in iron-ore production in 1900 over the preceding year was most pronounced as to quantity in Minnesota, but the greatest percentages of gain were in the less important contributors—Maryland, Missouri, and the group of Montana, Nevada, New Mexico, Utah, and Wyoming.

The aggregation of large iron-ore mines and the control of many prominent producers by consolidated interests has attracted attention to the iron-ore reserves of the country, with the effect of awakening some anxiety as to a sufficiency for the future, but an investigation will satisfy an unbiased observer that such anxiety is unfounded.

Most of the easily wrought known mines, or those producing the best or most desirable grades of ore, which are conveniently accessible for consumption in existing blast furnaces have been secured by the larger steel plants. There are, however, important mines owned or operated independently of consolidations.

Material advance in the price of the mineral will encourage the rehabilitation or the development of mines which are inactive or operated upon a restricted scale, and also the opening of deposits heretofore unwrought. Such a condition will also secure the transportation of ores from localities now considered too remote for economical use.

A decided advance in selling prices will also stimulate larger importations of ores from foreign countries, upon which a duty of 40 cents per long ton is levied.

In former reports attention was directed to the known existence of iron ores in all of the States. In some the mineral is lean or impure, or in such thin or distributed bodies as to discourage operation, but there are many iron-ore deposits of excellent composition existing in large quantities which have as yet been undeveloped, and there are other deposits exploited in former years upon a limited scale which under advanced conditions could be revived.

Immense bodies of magnetites in the East can meet a heavy demand for ore, and the reduction, by roasting, of sulphur in such as need it, or of phosphorus and gangue material by concentration, can be carried on profitably if the selling prices of ores are much advanced.

It is not improbable that large deposits of titaniferous magnetites may be brought into demand if the supply of ores free or nearly free from titanium is restricted. Many deposits of brown hematite and red hematite ores, which have been wrought on a small scale can by augmented output be cheapened, and materially swell the country's total.

The basic treatment of iron, which is advancing rapidly, may also be expected to extend the limitations which have been placed upon ores for steel production.

In the central and western portions of the country there are important deposits of excellent iron ore which await the extension of the iron and steel industry or of transportation facilities, and if these ores can not be conveyed to existing plants, then furnaces will be placed nearer to the ores as rapidly as the country's demand makes such course advisable.

PRODUCTION BY VARIETIES OF ORE.

It is considered advisable to continue these reports upon the general classification previously adopted, which is as follows:

1. *Red hematite*, being all anhydrous hematites, although known by various names, such as red hematite, specular, micaceous, fossil, slate iron ore, martite, blue hematite, etc.

2. *Brown hematite*, including the varieties of hydrated sesquioxide of iron, recognized as limonite, gothite, turgite, bog ores, pipe ores, etc.

3. *Magnetite*, those ores in which the iron occurs as magnetic oxide, and including some martite, which is mined with the magnetite.

4. *Carbonate*, those ores which contain a considerable amount of carbonic acid, such as spathic ore, blackband, siderite, clay ironstone, etc.

The red hematite variety, as in former years, contributed the largest amount of ore, 22,708,274 long tons, or 82.4 per cent of the total, as against 81 per cent in 1899. This is an increase of 2,703,875 long tons, or 13.5 per cent of the total iron ore production.

There were won in 1900 3,231,089 long tons of brown hematite, or 11.7 per cent of the iron ore product, as against 2,869,785 long tons, or 11.6 per cent in 1899, an advance, as compared with that year, of 361,304 long tons, or 12.6 per cent.

In 1899 the total magnetite mined was 1,727,430 long tons, or 7 per cent of the amount of iron ore won in the United States that year. This product decreased in 1900 by 189,879 tons, or 11 per cent, the output of magnetite being 1,537,551 tons, or 5.6 per cent of the total.

The balance, 76,247 long tons, or about 0.3 per cent was carbonate ore.

Minnesota, the largest producer of red hematite ore, is closely followed by Michigan, while Alabama ranks third. Virginia and West Virginia lead as brown hematite sources of supply, Alabama being second and Colorado third. The greatest amount of magnetite was mined in Pennsylvania, New York and New Jersey indicating a close contest for second place, but ranking as above.

The larger portion of the carbonate ore mined in the United States came from the State of Ohio, Maryland and New York ranking second and third, respectively.

The following table gives the amounts of the different varieties of iron ore mined in the United States in the year 1900 by States, as per the classification above given:

Production of iron ore in the United States in 1900, by varieties.

[Long tons.]

State or Territory.	Red hematite.	Brown hematite.	Magnetite.	Carbonate.	Total.
Michigan	9,615,904	136,157	174,666		9,926,727
Minnesota	9,834,399				9,834,399
Alabama	1,989,689	769,558			2,759,247
Virginia and West Virginia	3,664	918,157			921,821
Pennsylvania	44,653	232,370	600,066	595	877,684
Wisconsin	733,312	12,793			746,105
Tennessee	283,784	310,387			594,171
New York	44,467	44,891	345,714	6,413	441,485
Colorado	3,511	403,573			407,084
New Jersey			344,247		344,247
Georgia and North Carolina	55,844	259,863	20,479		336,186
Montana, Nevada, New Mexico, Utah, and Wyoming	75,673	4,225	52,379		132,277
Ohio				61,016	61,016
Kentucky		52,920			52,920
Missouri	23,374	17,992			41,366
Connecticut and Massachusetts		31,185			31,185
Maryland		18,000		8,223	26,223
Texas		16,881			16,881
Iowa		2,137			2,137
Total	22,708,274	3,231,089	1,537,551	76,247	27,553,161

Taking the aggregate production of the different classes of iron ore for the twelve years during which the United States Geological Survey has collected statistics, it will be found that the red hematite class has contributed over three-fourths of the total, the brown hematite variety slightly under one-seventh, the magnetite about one-tenth of the total, and the carbonate the balance, slightly under 1 per cent.

Production of iron ores in the United States, by classes, from 1889 to 1900.

[Maxima in italics.]

Year.	Red hematite.	Brown hematite.	Magnetite.	Carbonate.	Total.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
1889	9,056,288	2,523,087	2,506,415	*432,251*	14,518,041
1890	10,527,650	2,559,938	*2,570,838*	377,617	16,036,043
1891	9,327,398	2,757,564	2,317,108	189,108	14,591,178
1892	11,646,619	2,485,101	1,971,965	192,981	16,296,666
1893	8,272,637	1,849,272	1,330,886	134,834	11,587,629
1894	9,347,434	1,472,748	972,219	87,278	11,879,679
1895	12,513,995	2,102,358	1,268,222	73,039	15,957,614
1896	12,576,288	2,126,212	1,211,526	91,423	16,005,449
1897	14,413,318	1,961,954	1,059,479	83,295	17,518,046

Production of iron ores in the United States, by classes, from 1889 to 1900—Continued.

Year.	Red hematite.	Brown hematite.	Magnetite.	Carbonate.	Total.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
1898	16,150,684	1,989,681	1,237,978	55,373	19,433,716
1899	20,004,399	2,869,785	1,727,430	81,559	24,683,173
1900	*22,708,274*	*3,231,089*	1,537,551	76,247	*27,553,161*
Total	156,544,984	27,928,789	19,711,617	1,875,005	206,060,395
Percentages of totals for 12 years	76.0	13.5	9.6	0.9	100
Percentages of total for 1900	82.4	11.7	5.6	0.3	100

From the above it will be noted that in 1900 both the red hematite and brown hematite mines contributed their maximum outputs, the other two classes showing a diminution from previous years.

In addition to the iron ore mined, 88,945 long tons of zinc residuum and briquetted blue billy were used in blast furnaces, the former being manufactured into spiegel.

The amount of concentrated ore produced was more than doubled, rising from 94,217 tons in 1899 to 200,446 long tons in 1900, valued at the concentrating works at $649,027.

The concentration of iron ores by jigs and magnetic separators seems to indicate that the expectations for a liberal development which were so pronounced a decade ago may, at least in part, be verified. Some blast furnaces are using this in a large proportion of their charges. It is not improbable, taking into consideration advances in mechanical appliances for crushing, sizing, and briquetting, and the improvements in magnetic separation, that the amount of concentrated iron ore produced will be rapidly augmented.

Rolling-mill scale, copper residuum, etc., are also used as portions of charges for blast furnaces.

The year 1900 shows a marked increase in the value of the iron ore, as in this year the iron-ore miners had the opportunity to participate in the augmented price of pig iron. As most of the iron ore won is sold in the early part of the year, and as these contracts had been made in 1899, prior to the advanced prices in the metal trade, few ore mines participated in any marked degree in the improved business conditions.

LAKE SUPERIOR REGION.

For the year 1900 the Lake Superior region, embracing iron-ore mines in the States of Michigan, Minnesota, and Wisconsin, produced its maximum output of 20,564,238 long tons, or more ore than was mined in the United States in any one year previously, with the exception of 1899, and more than has been reported as produced in any year by a foreign country.

In order to supply the demand, some old workings were reopened, and much exploration work was done, while most of the larger operations were called on for increased amounts. In fact, it was the year of maximum production on all of the ranges.

It should be borne in mind that the figures given in this report are those of production, and not of the shipments, the latter being smaller, owing to an increase in the stocks of ore on hand at the mines on December 31, 1900.

The production from 1889 to 1900, inclusive, of the different ranges which are recognized as forming the Lake Superior region is given in the following table:

Production of Lake Superior iron ores by ranges.

[Maxima in italics.]

Range.	1889.	1890.	1891.	1892.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Marquette	2,631,026	2,863,848	2,778,482	2,848,552
Menominee	1,876,157	2,274,192	1,856,124	2,402,195
Gogebic	2,147,923	2,914,081	2,041,754	3,058,176
Vermilion	864,508	891,910	945,105	1,226,220
Mesabi				29,245
Total	7,519,614	8,944,031	7,621,465	9,564,388

Range.	1893.	1894.	1895.	1896.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Marquette	2,064,827	1,935,379	1,982,080	2,418,846
Menominee	1,563,049	1,255,255	1,794,970	1,763,235
Gogebic	1,466,815	1,523,451	2,625,475	2,100,398
Vermilion	815,735	1,055,229	1,027,103	1,200,907
Mesabi	684,194	1,913,234	2,839,350	3,082,973
Total	6,594,620	7,682,548	10,268,978	10,566,359

Range.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Marquette	2,673,785	2,987,930	3,634,596	*3,945,068*
Menominee	1,767,220	2,275,664	3,281,422	*3,680,738*
Gogebic	2,163,088	2,552,205	2,725,648	*3,104,033*
Vermilion	1,381,278	1,125,538	1,643,984	*1,675,949*
Mesabi	4,220,151	4,837,971	6,517,305	*8,158,450*
Total	12,205,522	13,779,308	17,802,955	*20,564,238*

In the table the ranges have been placed in the chronological order in which they were exploited.

Considered as producers in 1900, the Mesabi range (the youngest in the region) easily leads the list, being credited with 8,158,450 long tons, or four-tenths of the total, due to its large deposit and easily won ore.

The Marquette range is second, being credited with 3,945,068 tons, and although it has been a constant contributor for nearly half a century, when the demand came in 1900 it reached its maximum output.

The Menominee range, the second to be opened, was third, with a maximum of 3,680,738 long tons.

The Gogebic range, first exploited in 1884, which in late years has not reached its 1892 output of 3,058,176 tons, contributed a total of 3,104,033 long tons in 1900.

The Vermilion range, in Minnesota, also opened in 1884, reached its maximum of 1,675,949 long tons in 1900.

It will be noted that with the exception of the Mesabi range, the ranges in 1900 took rank according to the dates at which they were opened, and the Lake Superior region produced 75 per cent of the total for the United States.

It will be of interest to note that the production of the Lake Superior region in 1900 was double that of 1895.

Data of production of the various ranges comprising the Lake Superior region are not obtainable except for census years and since 1889, but the shipments, which include practically all of the iron ore won, except such as was used in local furnaces, are reported by the Iron Trade Review for each year.

Total shipments of iron ore from the Lake Superior region by ranges.

Range.	Amount.
	Long tons.
Marquette range, 1856–1900 (45 years)	59,592,793
Menominee range, 1877–1900 (24 years)	34,015,979
Gogebic range, 1884–1900 (17 years)	31,216,635
Vermilion range, 1884–1900 (17 years)	15,191,180
Mesabi range, 1892–1900 (9 years)	31,400,077
Miscellaneous mines	2,320
Total	171,418,984

As suggesting the proportions of the total product contributed by the different ranges in 1900, and during the entire terms of their activity, the following table is presented:

Proportion of iron-ore production of the Lake Superior region supplied by each range.

Range.	Production in the year 1900.	Total shipments from first development to close of 1900.	Range.	Production in the year 1900.	Total shipments from first development to close of 1900.
	Per cent.	*Per cent.*		*Per cent.*	*Per cent.*
Marquette	19.2	34.8	Vermilion	8.1	8.9
Menominee	17.9	19.8	Mesabi	39.7	18.3
Gogebic	15.1	18.2	Total	100	100

These iron ores of the Lake Superior region are marketed on guaranteed cargo analyses, which, through the courtesy of the Bessemer Ore Association, are added below:

Cargo analyses of Lake Superior iron ores, 1900.

MARQUETTE RANGE.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Abbotsford	63.100	0.029	7.060	0.122	1.795	0.255	0.133	0.018	0.370	....
	61.775	.0283	6.911	.1194	1.7573	.2496	.1302	.0176	.3622	2.10
Alford *a*	64.43	.042	4.76	....	....	....	....	....	....	....
	57.80	.038	4.27	....	....	....	....	....	....	10.29
Angeline, Hard	66.61	.013	....	....	....	....	....	....	....	....
	63.29	.012	....	....	....	....	....	....	....	4.98
Angeline, Hard	66.60	.020	....	....	....	....	....	....	....	....
No. 2 *b*	63.27	.019	....	....	....	....	....	....	....	5.00
Angeline, Hematite	64.41	.044	....	....	....	....	....	....	....	....
	57.31	.039	....	....	....	....	....	....	....	11.03
Angeline, South	60.83	.081	6.85	.32	1.52	.25	.13	.022	3.67	....
	53.76	.072	6.05	.28	1.34	.22	.11	.019	3.24	11.62
Beaufort *b*	50.15	.23	7.01	.23	.46	2.80	3.70	.083	11.82	....
	46.14	.21	6.45	.21	.42	2.58	3.40	.076	10.87	8.00
Bell	39.46	.036	38.92	....	....	....	....	....	....	....
	38.568	.035	38.04	....	....	....	....	....	....	2.26
Bedford	59.87	.140	8.48	....	....	....	....	....	....	....
	53.51	.093	7.55	....	....	....	....	....	....	10.96
Beresford	63.06	.092	5.49	....	....	....	....	....	....	....
	62.57	.091	5.46	....	....	....	....	....	....	.78
Bigelow	50.49	.046	22.74	.12	2.136	.24	.10	.016	2.33	....
	46.097	.0419	20.76	.109	1.950	.219	.09	.0146	2.127	8.70
Buffalo	61.62	.100	4.86	.28	....	....	....	....	....	....
	54.48	.088	4.30	.25	....	....	....	....	....	11.58
Cambria	60.41	.053	6.64	.98	2.63	.90	.32	.010	2.71	....
	53.698	.047	5,90	.87	2.337	.80	.28	.0088	2.408	11.11
Cambridge	60.51	.604	6.05	.28	1.00	1.34	.56	.005	1.88	....
	52.17	.5207	5.2163	.2414	.8622	1.1553	.4828	.0043	1.6209	13.78
Castleford	57.69	.096	11.63	....	....	....	....	....	....	....
	57.14	.095	11.42	....	....	....	....	....	....	.96
Champion No. 1,	64.00	.060	4.55	.20	2.38	.32	.29	.013	....	....
crushed *b*	63.49	.0595	4.51	.198	2.36	.317	.288	.0129	....	.80
Champion Hema-	52.00	.40	12.00	.08	3.00	2.20	1.80	.040	4.09	....
tite *b*	48.10	.37	11.10	.074	2.78	2.04	1.67	.037	3.78	7.50
Chatford *a*	51.72	.117	20.90	....	....	....	....	....	....	....
	46.95	.106	18.97	....	....	....	....	....	....	9.23
Chester, non-Bes-	51.90	0.084	19.60	0.34	1.87	0.95	0.66	0.010	1.55	....
semer	48.215	.0780	18.208	.3158	1.7373	.8824	.6131	.0092	1.44	7.10
Chester, siliceous	40.80	.028	38.16	.478	1.422	.22	.25	.006	2.12	....
	38.72	.0278	35.68	.4469	1.3296	.2057	.2338	.0056	1.983	6.50
Cliffs Shaft, lump	63.400	.095	3.120	.156	1.050	1.980	.810	.021	.930	....
	63.180	.0946	3.109	.1554	1.0463	1.9730	.8071	.0209	.9267	.35
Cliffs Shaft,	62.400	.096	4.400	.180	2.230	1.320	.910	.024	1.160	....
crushed	61.720	.0949	4.352	.1780	2.2056	1.3056	.9000	.0237	1.1473	1.09
Comrade	55.100	.112	12.360	.106	4.150	.561	1.987	.025	1.290	....
	54.499	.1107	12.225	.1048	4.1047	.5548	1.9653	.0247	1.2759	1.09

a Analysis made at mine of season's shipment. *b* Estimated analysis for 1901.

Cargo analyses of Lake Superior iron ores, 1900—Continued.

MARQUETTE RANGE—Continued.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
East New York	60.33	0.050	9.82	0.188	2.125	0.33	0.12	0.018	2.16	....
	54.45	.045	8.86	.1696	1.918	.297	.108	.016	1.949	9.74
Imperial	51.400	.256	13.490	.198	1.200	1.377	1.399	.011	7.380	....
	46.095	.2295	12.097	.1775	1.0761	1.2348	1.2546	.0098	6.6183	10.32
Jackson Pit 7	54.43	.073	14.55	.31	2.25	.28	.09	.041	4.86	....
	50.84	.068	13.59	.29	2.10	.26	.08	.038	4.54	6.60
Jackson, South	44.13	.058	31.45	3.62	1.38	Trace.	.08	....	....	....
	40.9791	.05386	29.2045	3.3615	1.2815	Trace.	.0743	....	....	7.14
Lake	59.600	.104	6.170	.527	3.110	.357	.378	.013	3.650	....
	51.762	.0903	5.358	.4576	2.7010	.3100	.3282	.0112	3.1700	13.15
Lake Bessemer	63.80	.038	5.470	.271	1.590	.204	.151	.010	1.440	....
	56.641	.0337	4.856	.2405	1.4116	.18111	.1340	.0088	1.2784	11.22
Lillie	61.68	.086	5.51	.38	2.16	.36	.08	.012	2.77	....
	53.67	.0748	4.79	.33	1.879	.31	.069	.010	2.41	12.98
Marquette	38.59	.042	39.66	....	....	....	....	....	....	....
	37.65	.0409	38.696	....	....	....	....	....	....	2.43
Michigamme	60.600	.092	9.820	.152	2.475	.816	.774	.027	*a*.170	....
	59.782	.0907	9.687	.1499	2.4415	.8049	.7635	.0266	*a*.1677	1.35
Norfolk, crushed *b*	55.00	.060	13.00	.17	3.30	.57	.56	.032	....	....
	54.46	.0594	12.87	.168	3.27	.564	.555	.0317	....	.98
Princeton No. 1	62.39	.056	6.50	.30	.98	.77	.81	.003	1.65	....
	51.85	.0465	5.4028	.2493	.8145	.64	.6732	.0024	1.3714	16.88
Princeton No. 2	60.00	.177	9.05	.30	1.04	.82	.75	.005	1.70	....
	51.47	.1518	7.7639	.2573	.8922	.7034	.6434	.0042	1.4584	14.21
Republic Specular	67.02	.037	2.88	Trace.	.59	.06	.082	.039	....	....
	66.296	.0366	2.848	Trace.	.583	.059	.0811	.0385	....	1.08
Republic Kingston	61.72	.048	8.20	.14	1.26	.43	.39	.041	....	....
	60.991	.0474	8.103	.138	1.245	.424	.385	.0405	....	1.18
Republic Magnetic (N. B.) *b*	69.00	.12	3.23	.147	.664	.20	.216	.021	.46	....
	68.31	.118	3.197	.145	.657	.198	.213	.0207	.455	1.00
Rose	60.68	.150	6.17	.31	2.45	.51	.17	.030	2.90	....
	53.07	.131	5.39	.27	2.14	.446	.148	.026	2.536	12.54
Richmond	43.60	.034	36.20	.040	.640	.490	.110	.004	2.740	....
	43.05	.033	35.74	.039	.632	.48	.109	.004	2.70	1.270
Salisbury	60.000	.108	7.250	.263	2.460	.408	.468	.011	2.610	....
	52.170	.0939	6.303	.2286	2.1389	.3547	.4069	.0095	2.2693	13.05
Scotch	57.700	.122	10.690	.105	4.220	.586	.874	.019	.730	....
	56.972	.1204	10.555	.1036	4.1668	.5786	.8629	.0187	.7208	1.26
Sheffield	58.68	.025	....	....	....	....	....	....	....	....
	56.91	.024	....	....	....	....	....	....	....	3.01
Tilden Silica	41.200	.033	37.880	.096	1.520	.260	.320	.014	.640	....
	40.396	.0323	37.141	.0941	1.4903	.2549	.3137	0137	.6275	1.95

a Gain. *b* Estimated analysis for 1901.

Cargo analyses of Lake Superior iron ores, 1900—Continued.

VERMILION RANGE.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Chandler	63.99	0.042	4.25	0.29	2.44	0.21	0.10	None.	1.03	....
	60.7457	.03987	4.0345	.2753	2.3163	.1994	.0949	None.	.9778	5.07
Chandler, lump	66.04	.041	2.85	....	1.83	....	....	....	....	....
	64.1843	.03985	2.7699	....	1.7786	....	....	....	....	2.81
Jurat *a*	61.52	.078	4.09	....	....	....	....	....	....	....
	56.99	.072	3.79	....	....	....	....	....	....	7.36
Long Lake	60.53	.045	7.85	.08	3.39	.44	.15	Trace.	1.50	....
	56.8316	.04225	7.3704	.0751	3.1829	.4131	.1408	Trace.	1.4084	6.11
Pioneer *a*	63.24	.041	5.48	....	....	....	....	....	....	....
	59.07	.038	5.05	....	....	....	....	....	....	6.59
Pilot *a*	66.48	.034	2.79	....	....	....	....	....	....	....
	64.56	.033	2.71	....	....	....	....	....	....	2.88
Red Lake	62.59	.129	5.85	.18	1.81	.47	.47	Trace.	.80	....
	61.3069	.12636	5.7301	.1763	1.7729	.4604	.4604	Trace.	.7836	2.05
Savoy *a*	63.57	.051	3.44	....	....	....	....	....	....	....
	59.30	.048.	3.21	....	....	....	....	....	....	6.71
Soudan	65.62	.087	3.97	.02	.98	.43	.26	Trace.	.43	....
	64.8851	.08603	3.9255	.0198	.9690	.4252	.2571	Trace.	.4252	1.12
Vermilion	65.73	.130	3.77	.07	1.43	.56	.38	Trace.	.57	....
	65.0858	.12873	3.7331	.0693	1.4160	.5545	.3763	Trace.	.5644	.98
Vermilion, lump	67.04	.155	2.04	....	1.22	....	....	....	....	....
	66.6914	.15419	2.0294	....	1.2137	....	....	....	....	.52
Zenith *a*	64.66	.037	5.00	....	....	....	....	....	....	....
	60.69	.035	4.69	....	....	....	....	....	....	6.14

MENOMINEE RANGE.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
Armenia *b*	59.60	0.17	5.80	0.20	1.20	2.10	0.97	0.009	3.20	....
	53.64	.15	5.22	.18	1.08	1.89	.87	.008	2.88	10.000
Ajax	54.00	.061	10.35	.56	2.06	1.53	4.12	.021	3.38	....
	50.338	.0568	9.648	.52	1.92	1.426	3.84	.019	3.15	6.78
Barton *a*	57.58	.49	4.11	....	....	....	....	....	....	....
	53.55	.46	3.82	....	....	....	....	....	....	7.00
Basic *b*	56.40	.34	4.12	5.10	1.40	2.10	.90	.009	3.10	....
	52.23	.31	3.81	4.72	1.30	1.94	.83	.008	2.87	7.40
Brunswick *a*	57.76	.45	4.60	....	....	....	....	....	....	....
	50.64	.39	4.03	....	....	....	....	....	....	12.33
Cedar	53.20	.149	8.20	.38	3.87	1.34	3.55	.165	4.38	....
	48.37	.135	7.46	.35	3.52	1.22	3.23	.150	3.98	9.08
Chapin	57.629	.0629	7.28	.43	1.48	1.24	3.35	.014	3.03	....
	53.80	.0587	6.797	.40	1.38	1.157	3.127	.013	2.829	6.634
Clifford	40.93	.017	38.65	.23	.61	.39	.30	.006	.90	....
	39.85	.0165	37.63	.22	.59	.38	.29	.0058	.88	2.64
Columbia	59.36	.47	7.54	.20	2.12	1.10	.76	.046	1.93	....
	52.54	.416	6.67	.177	1.876	.97	.67	.0407	1.708	11.48
Crystal Falls	58.50	.737	4.57	.38	1.61	2.40	.93	.008	2.140	....
	53.53	.674	4.18	.35	1.47	2.20	.85	.007	1.96	8.50
Davidson	56.96	.114	6.77	.33	3.70	.92	2.45	.223	4.11	....
	51.34	.103	6.10	.30	3.33	.83	2.21	.201	3.70	9.87
Florence	54.63	.312	6.44	.40	3.79	1.51	2.97	.127	5.48	....
	49.20	.281	5.80	.36	3.41	1.36	2.67	.114	4.93	9.93
Granada	60.77	.060	5.28	.14	1.30	.84	2.69	.023	1.83	....
	55.92	.055	4.86	.13	1.20	.77	2.48	.021	1.68	7.98

a Analysis made at mine of season's shipment. *b* Estimated analysis for 1901.

Cargo analyses of Lake Superior iron ores, 1900—Continued.

MENOMINEE RANGE—Continued.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Great Western	59.80	0.375	5.00	0.64	1.65	2.10	0.80	0.006	3.10	....
	54.78	.343	4.58	.59	1.51	1.92	.73	.005	2.84	8.40
Hemlock	56.32	.245	6.27	.25	2.80	1.99	1.74	.011	4.13	....
	54.0278	.23503	6.0148	.2398	2.686	1.909	1.6692	.0105	3.9619	4.07
Hiawatha *a*	56.000	.286	7.400	.290	3.050	.250	.410	.070	8.100	....
	51.520	.263	6.808	.266	2.806	.230	.377	.0644	7.452	8.000
Hilltop *a*	54.93	.816	6.50	.23	2.84	1.60	1.19	.005	7.20	....
	50.54	.751	5.98	.21	2.61	1.47	1.09	.0046	6.62	8.00
Hope *a*	62.10	.191	4.20	.21	1.20	1.61	.64	.006	3.15	....
	57.13	.176	3.86	.19	1.10	1.48	.59	.005	2.90	8.00
Keel Ridge *a*	40.64	.046	37.42	.20	.90	1.35	1.00	.006	....	....
	39.46	.045	36.33	.19	.87	1.31	.97	.0058	....	2.90
Lamont	57.60	.72	4.15	.58	1.24	2.61	1.10	.006	2.10	....
	52.70	.66	3.80	.53	1.13	2.39	1.01	.005	1.92	8.50
Lerida	63.09	.103	4.40	.18	1.45	.70	1.64	.032	2.25	....
	58.14	.095	4.06	.17	1.34	.65	1.51	.029	2.07	7.84
Lincoln	59.10	.380	5.10	.42	1.670	1.420	.720	.010	2.840	....
	54.02	.347	4.66	.38	1.53	1.30	.658	.009	2.60	8.60
Loretto	57.97	.019	12.21	.23	1.89	.35	.67	.027	1.03	....
	52.77	.017	11.11	.209	1.72	.318	.609	.024	.937	8.97
Manganate	48.48	.621	5.10	5.29	3.04	2.60	1.15	.019	9.70	....
	46.17	.591	4.86	5.04	2.89	2.48	1.10	.018	9.24	4.77
Millie	61.00	.023	3.50	.19	.92	1.58	1.75	.009	3.24	....
	57.41	.0216	3.29	.178	.86	1.487	1.647	.008	3.049	5.88
Nimick	62.15	.074	5.55	.28	1.35	.61	1.83	.028	1.47	....
	57.34	.068	5.12	.26	1.25	.56	1.69	.026	1.36	7.74
Paint River *a*	57.40	.66	6.10	.40	1.90	1.96	1.41	.008	3.60	....
	51.09	.59	5.43	.36	1.69	1.74	1.25	.007	3.20	11.00
Pewabic	62.94	.013	6.98	.11	.99	.60	1.28	.002	1.19	....
	58.6034	.01210	6.4991	.1024	.9218	.5587	1.1918	.0018	1.1080	6.89
Pewabic Genoa	43.30	.009	32.60	.08	1.38	.76	1.16	.004	1.24	....
	41.1480	.00855	30.9798	.0760	1.3114	.7222	1.1023	.0038	1.1784	4.97
Quinnesec No. 1 *a*	64.10	.031	2.80	.21	.88	.18	.21	.009	2.10	....
	60.13	.029	2.63	.20	.83	.17	.20	.008	1.97	6.20
Quinnesec non-Bessemer *a*	64.18	.135	2.75	.20	.90	.18	.24	.006	2.18	....
	60.26	.127	2.58	.19	.84	.17	.22	.006	2.05	6.10
Quinnesec siliceous Bessemer	47.20	.030	26.00	.12	1.02	.27	.32	.004	2.80	....
	46.21	.029	25.45	.12	1.00	.26	.31	.004	2.74	2.10
Russell	51.25	.055	12.73	.32	2.43	2.80	3.24	.021	4.76	....
	47.42	.0508	11.779	.296	2.248	2.59	2.997	.019	4.40	7.47
Sanders	56.73	.471	9.51	.36	1.10	1.38	.55	.029	2.48	....
	50.76	.421	8.509	.32	.98	1.23	.49	.0259	2.219	10.52
San Jose	64.34	.016	4.52	.34	1.05	.24	.33	.016	.65	....
	58.60	.014	4.116	.309	1.00	.218	.30	.0145	.59	8.92
Shafer	55.40	.308	14.30	.28	1.56	.87	.46	.021	1.93	....
	49.56	.275	12.79	.25	1.395	.778	.41	.0187	1.726	10.53
Tobin *a*	61.10	.24	5.20	.21	1.60	1.35	.96	.007	3.10	....
	56.21	.22	4.78	.19	1.47	1.24	.88	.006	2.85	8.00
Toledo	52.16	.012	20.35	.11	1.10	1.19	1.15	.002	1.42	....
	49.1347	.01130	19.1697	.1036	1.0362	1.1210	1.0833	.0018	1.3376	5.80
Tyrone	57.77	.077	10.39	.15	1.92	1.40	2.44	.002	2.16	....
	53.1657	.07086	9.5619	.1380	1.767	1.2884	2.2455	.0018	1.9878	7.97
Walpole	56.99	.119	12.05	.15	1.54	1.12	2.00	.003	1.58	....
	53.9524	.11266	11.4077	.1420	1.4579	1.0603	1.8934	.0028	1.4958	5.33

a Estimated analysis for 1901.

Cargo analyses of Lake Superior iron ores, 1900—Continued.

GOGEBIC RANGE.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Ashland	61.41	0.044	......	......	......	......	......	......	......	......
	54.636	.0391	......	......	......	......	......	......	......	11.03
Anvil *a*	62.00	.050	5.05	0.90	0.60	0.18	0.14	0.02	3.80	......
	54.56	.044	4.444	.792	.528	.1584	.1232	.0176	3.344	12.00
Aurora *b*	62.13	.031	5.80	......	......	......	......	......	......	......
	55.59	.028	5.19	......	......	......	......	......	......	10.53
Best	54.81	.061	17.76	1.04	1.59	.39	.36	.019	3.52	......
	47.58	.0529	15.41	.90	1.38	.338	.31	.016	3.05	13.18
Bonnie	51.28	.032	11.44	5.69	1.49	.15	.73	.025	4.81	......
	45.66	.028	10.187	5.066	1.326	.13	.65	.022	4.28	10.95
Brotherton	62.95	.030	7.23	.43	.72	.36	.04	.008	1.20	......
	56.511	.0269	6.49	.3878	.6472	.3304	.0359	.0071	1.079	10.24
Buckeye *a*	59.20	.081	10.50	.43	1.97	.14	.46	.025	......	......
	51.73	.071	9.18	.38	1.72	.12	.40	.022	......	12.61
Cary Empire	58.45	.053	3.65	3.98	.71	.15	.09	.006	5.85	......
	52.5466	.04765	3.2814	3.578	.6383	.1349	.0809	.0053	5.2592	10.10
Colby No. 1	56.70	.066	3.20	6.820	.880	.160	.400	.006	2.200	......
	51.59	.060	2.91	6.205	.801	.145	.364	.005	2.00	9.020
Colby No. 2	60.60	.080	4.00	2.25	1.10	.17	.47	.008	2.15	......
	54.66	.072	3.61	2.03	.99	.15	.42	.007	1.94	9.80
Hennepin	59.23	.045	......	......	......	......	......	......	......	......
	53.308	.040	......	......	......	......	......	......	......	9.998
Iron Belt	60.32	.044	8.45	.22	1.73	.23	.14	.012	2.44	......
	53.54	.039	7.50	.20	1.54	.20	.12	.011	2.17	11.24
Ironton	62.10	.050	5.40	.99	1.20	.34	.11	.008	3.120	......
	55.64	.045	4.84	.89	1.08	.30	.10	.007	2.796	10.40
Jack Pot	52.97	.039	......	......	......	......	......	......	......	......
	46.61	.034	......	......	......	......	......	......	......	12.00
Lawrence	60.22	.059	8.00	.50	1.59	.09	.008	.027	3.97	......
	53.61	.053	7.12	.45	1.42	.08	.007	.024	3.53	10.98
Lyon *a*	58.00	.065	......	......	......	......	......	......	......	......
	52.78	.0591	......	......	......	......	......	......	......	9.00
Melrose	61.37	.032	5.24	1.03	1.07	.19	.13	.013	3.96	......
	54.22	.028	4.629	.91	.94	.167	.11	.011	3.498	11.65
Melrose No. 2	60.73	.048	5.78	1.14	1.08	.11	.13	.017	4.39	......
	53.93	.0426	5.13	1.01	.959	.097	.115	.0149	3.898	11.19
Meteor	62.37	.036	4.10	.540	.890	.620	.090	.004	2.240	......
	56.29	.032	3.70	.49	.80	.56	.08	.004	2.02	9.750
Mikado	58.10	.138	15.05	.35	1.10	.24	.17	.010	2.30	......
	50.1694	.11916	12.9957	.3022	.9499	.2072	.1468	.0086	1.9861	13.65
Montreal	65.73	.038	2.60	.66	.25	.21	.14	.005	2.05	......
	60.64	.035	2.40	.61	.23	.19	.13	.0046	1.89	7.75
New Davis	47.01	.045	11.02	9.54	......	......	......	......	......	......
	43.23	.04138	10.1339	8.7729	......	......	......	......	......	8.04
New Era	58.03	.029	10.17	1.13	1.27	.21	.13	.011	3.49	......
	50.90	.025	8.92	.99	1.11	.18	.11	.0096	3.06	12.28
Newport	56.18	.031	4.19	6.22	.81	.22	.18	.008	5.15	......
	50.23	.0277	3.74	5.56	.72	.19	.16	.007	4.60	10.58
Norrie *b*	62.57	.041	4.75	......	......	......	......	......	......	......
	55.93	.037	4.25	......	......	......	......	......	......	10.61
Norden *b*	63.11	.076	3.26	......	......	......	......	......	......	......
	55.65	.067	2.87	......	......	......	......	......	......	11.82
Ottawa *a*	57.00	.059	8.00	3.16	1.28	.25	.25	.011	3.90	......
	51.73	.054	7.26	2.87	1.16	.23	.23	.010	3.54	9.25

a Estimated analysis for 1901. *b* Analysis made at mine of season's shipment.

Cargo analyses of Lake Superior iron ores, 1900—Continued.

GOGEBIC RANGE—Continued.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Ottawa manganese *a*	55.55	0.054	3.35	7.14	1.25	0.25	0.050	0.009	5.80	....
	50.55	.049	3.05	6.50	1.14	.23	.046	.008	5.28	9.00
Palms	61.18	.055	....	....	....	....	....	....	....	....
	52.18	.0469	....	....	....	....	....	....	....	14.70
Pike *a*	63.00	.080	6.50	....	....	....	....	....	....	....
	57.33	.0728	5.915	....	....	....	....	....	....	9.00
Puritan	57.60	.035	4.80	4.37	1.600	.420	.110	.008	3.220	....
	51.03	.031	4.25	3.87	1.42	.372	.098	.007	2.853	11.40
Rand *b*	61.75	.040	2.96	2.41	....	....	....	....	....	....
	53.88	.035	2.58	2.11	....	....	....	....	....	12.75
Rowe *a*	57.00	.045	12.25	.90	.70	.23	.19	.02	3.15	....
	50.16	.0396	10.78	.7920	.6160	.2024	.1672	.0176	2.772	12.00
Sunday Lake	63.08	.030	7.02	.40	1.09	.24	.05	.008	.97	....
	56.520	.0268	6.290	.3584	.9769	.2151	.0448	.0071	.8692	10.40
Taylor	59.97	.056	....	....	....	....	....	....	....	....
	52.767	.0492	....	....	....	....	....	....	....	12.01
Tilden *b*	63.39	.050	2.89	.72	....	....	....	....	....	....
	54.97	.043	2.51	.62	....	....	....	....	....	13.28
Winona	59.20	.045	4.00	2.280	1.36	.21	.08	.008	2.120	....
	53.01	.04	3.58	2.042	1.22	.19	.07	.007	1.90	10.450

MESABI RANGE.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
Adams	63.49	0.035	3.10	0.52	1.13	0.17	0.16	0.028	3.60	....
	57.05	.031	2.79	.47	1.02	.15	.14	.025	3.23	10.15
Adams non-Bessemer *b*	60.75	.077	3.52	.55	2.21	.075	.033	.036	....	....
	54.52	.069	3.16	.49	1.98	.067	.030	.032	....	10.25
Admiral	64.10	.029	4.50	.320	.590	.220	.142	.004	2.110	....
	59.36	.027	4.17	.296	.547	.204	.131	.004	1.954	7.400
Atlas	60.91	.065	5.32	1.00	1.60	.28	.25	Trace.	4.57	....
	54.7825	.05846	4.7848	.8994	1.4390	.2518	.2249	Trace.	4.1103	10.06
Audrey	62.08	.054	4.08	.72	2.83	.28	.18	Trace.	3.50	....
	54.9346	.04778	3.6104	.6371	2.5043	.2478	.1593	Trace.	3.0971	11.51
Bangor	61.01	.046	6.00	.59	2.00	.20	.17	.006	3.05	....
	53.097	.040	5.22	.51	1.74	.17	.147	.005	2.65	12.97
Beaver	63.52	.070	2.63	.45	1.94	.19	.14	.011	3.45	....
	56.38	.062	2.33	.399	1.72	.168	.12	.0097	3.06	11.24
Biwabik	64.30	.037	2.40	.64	.91	.17	.09	.030	3.78	....
	59.471	.03422	2.2197	.5919	.8416	.1572	.0832	.0277	3.4961	7.51
Commodore	63.10	.039	4.15	.20	1.21	.24	.06	.004	3.40	....
	57.23	.035	3.76	.18	1.10	.22	.05	.004	3.08	9.30
Dailey	61.03	.038	6.11	.71	.92	.21	.18	.043	5.17	....
	51.51	.032	5.157	.599	.776	.177	.15	.036	4.36	15.59
Duluth	59.97	.049	....	....	....	....	....	....	....	....
	52.863	.0431	....	....	....	....	....	....	....	11.85
Elba	63.25	.035	3.73	.56	1.01	.27	.15	Trace.	3.72	....
	57.08	.031	3.37	.51	.91	.24	.14	Trace.	3.36	9.67
Fayal	63.56	.036	3.50	.60	1.11	.28	.12	None.	3.75	....
	57.3629	.03249	3.1588	.5415	1.0018	.2527	.1083	None.	3.3844	9.75
Franklin	62.123	.035	....	....	....	....	....	....	....	....
	57.78	.03255	....	....	....	....	....	....	....	6.98
Genoa	62.95	.033	3.95	.55	.92	.26	.17	Trace.	3.70	....
	56.9068	.02983	3.5708	.4972	.8317	.2350	.1537	Trace.	3.3448	9.60

a Estimated analysis for 1901. *b* Analysis made at mine of season's shipment.

Cargo analyses of Lake Superior iron ores, 1900—Continued.

MESABI RANGE—Continued.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Hale *a*	60.00	0.088	8.00	0.50	1.40	0.80	0.07	0.014	12.20	....
	54.00	.0792	7.20	.45	1.260	.72	.063	.0126	1.980	10.00
Hartley	64.47	.037	2.78	.52	.95	.19	.16	.008	3.00	....
	58.55	.034	2.52	.47	.86	.17	.15	.007	2.72	9.18
Hibbing	64.72	.035	2.62	.50	1.37	.20	.01	.010	2.91	....
	58.53	.032	2.37	.45	1.24	.18	.009	.009	2.63	9.57
Juniata *b*	60.25	.050	6.60	.41	....	....	....	....	....	....
	52.42	.044	5.74	.36	....	....	....	....	....	12.99
Kanawha	60.50	.076	7.12	.45	1.54	1.04	.21	.007	2.45	....
	54.45	.0684	6.408	.405	1.386	.936	.189	.0063	2.205	10.00
Linwood *a*	63.01	.054	3.45	.90	1.94	.14	.06	.023	....	....
	57.06	.049	3.12	.81	1.76	.13	.05	.021	....	9.45
Mahoning	64.35	.047	2.42	.40	1.77	.17	.12	.009	3.21	....
	57.38	.0419	2.157	.356	1.578	.15	.107	.008	2.86	10.83
Malta	63.10	.031	5.14	.26	.96	.26	.20	Trace.	2.90	....
	57.9132	.02845	4.7175	.2386	.8811	.2386	.1836	Trace.	2.6616	8.22
Monroe *a*	63.20	.076	4.90	.24	1.10	.24	.36	.009	2.90	....
	57.01	.069	4.42	.22	.99	.22	.32	.008	2.62	9.80
Mountain *b*	63.62	.043	4.32	.28	....	....	....	....	....	....
	55.55	.038	3.77	.24	....	....	....	....	....	12.68
Oliver *b*	62.47	.053	4.63	.39	....	....	....	....	....	....
	54.99	.047	4.08	.34	....	....	....	....	....	11.97
Penobscot	61.30	.036	6.04	.73	1.51	.20	.12	.012	3.41	....
	54.51	.032	5.37	.648	1.34	.177	.106	.0106	3.03	11.07
Pillsbury	61.07	.029	5.75	.49	1.34	.24	.15	.008	4.28	....
	55.91	.027	5.26	.45	1.23	.22	.14	.007	3.92	8.45
Pillsbury No. 2 *a*	60.00	.054	5.41	.72	1.30	.10	.09	.039	....	....
	54.90	.049	4.95	.66	1.19	.09	.08	.036	....	8.50
Preble *b*	61.46	.063	4.61	1.09	....	....	....	....	....	....
	54.50	.056	4.09	.97	....	....	....	....	....	11.32
Roberts	61.04	.028	7.74	.48	1.12	.72	.17	.008	2.03	....
	55.364	.0254	7.021	.4354	1.016	.6531	.1542	.0072	1.8413	9.30
Sauntry	62.70	.086	3.41	.46	1.96	.15	.08	.035	4.10	....
	56.71	.078	3.08	.42	1.77	.14	.07	.032	3.71	9.56
Sellers	63.39	.041	4.10	.49	1.21	.15	.07	.036	2.85	....
	57.59	.037	3.72	.45	1.10	.14	.06	.033	2.59	9.15
Sparta	62.90	.027	6.06	.22	.92	.18	.11	None.	2.33	....
	57.9246	.02486	5.5807	.2026	.8472	.1658	.1013	None.	2.1457	7.91
Stevenson	65.09	.039	3.01	.21	.70	.21	.19	.008	2.80	....
	60.27	.036	2.79	.19	.65	.19	.18	.007	2.59	7.40
Top Brown	61.53	.062	5.00	.91	1.42	.31	.05	Trace.	3.95	....
	55.7339	.05616	4.5290	.8243	1.2862	.2808	.0453	Trace.	3.5779	9.42
Tubal *a*	61.57	.058	4.50	1.14	1.98	.24	.15	.028	....	....
	55.41	.052	4.05	1.03	1.78	.22	.14	.025	....	10.00
Thompson	63.79	.037	2.71	.50	.89	.20	.17	.052	3.91	....
	55.23	.032	2.358	.43	.77	.17	.148	.045	3.385	13.41
Union	60.54	.041	....	....	....	....	....	....	....	....
	55.63	.0376	....	....	....	....	....	....	....	8.11

MICHIPICOTEN RANGE.

Ore.	Iron.	Phosphorus.	Silica.	Manganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Loss by ignition.	Moisture.
Helen	58.57	0.105	4.47	0.10	0.84	0.15	0.10	0.03	9.09	....
	55.81	.100	4.259	.09	.80	.14	.09	.028	8.66	4.71

a Estimated analysis for 1901.

b Analysis made at mine of season's shipment.

IRON-ORE INDUSTRY OF THE VARIOUS STATES DURING 1900.

MICHIGAN.

Michigan continues to be the largest producer, but in 1900 this rank was maintained by a narrow margin over Minnesota.

In the year 1900 Michigan is credited with 9,926,727 long tons, or 36.03 per cent of the total for the United States, the proportion being less than in 1899, when the record was 9,146,157 long tons, or 37.1 per cent, although the increased production was 780,570 long tons, or 8.5 per cent. Of the amount mined in 1900, 9,615,904 long tons, or 96.9 per cent, was red hematite; 174,666 long tons, or 1.7 per cent, magnetite, and 136,157 long tons, or 1.4 per cent, brown hematite.

In Michigan and other States forming the Lake Superior region a portion of the ore mined is manganiferous.

MINNESOTA.

All of the 9,834,399 long tons of iron ore produced in 1900 in Minnesota was of the red hematite variety, in which class the State ranked first, with 43.3 per cent of the country's total. It was also 35.7 per cent of the aggregate amount of all iron ores mined in the United States. The increase over the record of 8,161,289 tons in 1899 was 1,673,110 long tons, or 20.5 per cent. This accounts for over one-half of the total increase in production in the United States in 1900.

Minnesota prior to 1884 had produced no iron ore, but since 1894 has ranked second, and in seventeen years this State shipped 46,591,257 long tons, of which two-thirds came from the Mesabi range.

ALABAMA.

This State contributed 2,759,247 long tons of iron ore in 1900, giving it third place, with 10 per cent of the total for the United States, an increase over 1899 of 96,304 long tons, or 3.6 per cent. Of the 1900 product 1,989,689 long tons, or 72 per cent, was red hematite (in which class the State ranked third), and 769,558 long tons, or 28 per cent, was brown hematite, placing Alabama second as regards this variety of ore.

The large installation of basic open-hearth furnaces gives promise that the utilization of Alabama's iron-ore resources may be even greater in the future than in the past.

VIRGINIA AND WEST VIRGINIA.

These two States mined in the year 1900 921,821 long tons of iron ore, giving them fourth position. This was an apparent decrease of 64,655 long tons, or 6.6 per cent, from the 1899 total of 986,476 long tons.

Of the 1900 production 918,157 long tons was brown hematite ore, in which class Virginia ranked first, and the small remainder, 3,664 long tons, was red hematite.

Virginia supplied the bulk of the ore, the relatively small output of West Virginia being included to maintain the policy of the United States Geological Survey to respect individual reports.

PENNSYLVANIA.

This State ranked fifth in 1900, producing 877,684 long tons of iron ore, a decline of 131,643 long tons, or 13 per cent, from the 1,009,327 long tons mined in the year 1899.

All four classes of iron ore were produced—600,066 long tons, or 68.3 per cent, was magnetite; 232,370 long tons, or 26.5 per cent, brown hematite; 44,653 long tons, or 5.1 per cent, red hematite, and the balance, 595 tons, or 0.1 per cent, carbonate, the State occupying in these classes of ore, respectively, first, sixth, eighth, and fourth positions.

Owing to the absence of some minor returns for Virginia and Pennsylvania it is probable that the revised totals for these States will exceed somewhat the figures given.

WISCONSIN.

Wisconsin took sixth rank as a producer in the year 1900, with 746,105 long tons, an advance of 166,307 long tons, or 28.7 per cent, over the 579,798 long tons mined in 1899.

The major portion of the total for 1900, viz, 733,312 long tons, was red hematite, giving the State fourth place, and the balance, 12,793 tons, was brown hematite.

TENNESSEE.

Tennessee changed places with Wisconsin in 1890, and ranked seventh, with a total of 594,171 long tons, an apparent decline of 37,875 long tons, or 6 per cent, from the 1899 total of 632,046 long tons.

Of this amount 310,387 long tons was brown hematite, and 283,784 long tons red hematite, giving the State fourth and fifth positions in these classes.

NEW YORK.

New York and Pennsylvania were the only States which produced all four general classes of ore in the year 1900.

New York's product consisted of 345,714 long tons of magnetite, 44,891 tons brown hematite, 44,467 long tons red hematite, and 6,413 long tons carbonate ores, giving the State second, ninth, ninth, and third places, respectively.

The total, 441,485 long tons, is 2,305 long tons, or one-half of 1 per cent, less than the 1899 product of 443,790 long tons. New York occupied eighth place in 1900.

COLORADO.

This State ranked ninth in 1900, with a production of 407,084 long tons, an increase of 99,527 long tons, or 32.4 per cent, over the 1899 total of 307,557 long tons.

The greater portion of the 1900 total, 403,573 tons, was brown hematite, in which class of ore the State took third place.

A considerable amount of this ore was obtained from silver mines, and much of it, carrying manganese in varying percentages, was used in blast furnaces to produce spiegeleisen in Colorado and Illinois.

NEW JERSEY.

New Jersey contributed 344,247 tons of magnetite ore in 1900, giving it tenth place as in 1899, but its product was 88,062 long tons, or 34.4 per cent, more than in 1899, when its record was 256,185 long tons.

As an instance of the continuance of the New Jersey iron mines the record of the Richards mine shows that since its purchase by the Thomas Iron Company in 1857 up to December 31, 1900, the total output has been 1,890,858 long tons, and some ore had been taken from this property prior to 1857.

GEORGIA AND NORTH CAROLINA.

These two States combined contributed 336,186 long tons of iron ore in the year 1900, being 51,822 tons, or 18 per cent, more than the 1899 total of 284,364 tons.

Three kinds of ore were mined, viz, 259,863 tons brown hematite, 55,844 tons red hematite, and 20,479 tons magnetite.

MONTANA, NEVADA, NEW MEXICO, UTAH, AND WYOMING.

These Rocky Mountain States, which have been combined so as not to make public individual reports, show an advance to 132,277 tons in 1900, the 1899 total being but 54,148 tons.

Montana, which mined no iron ore in 1899, is again a contributor.

Of the total for these States in 1900, 75,673 tons were red hematite, 52,379 tons of magnetite, and 4,225 tons brown hematite.

The active exploitation of the red hematite deposits in the vicinity of Hartville, Wyo., encourage the expectation that this section will continue to grow in importance and become a factor in the iron-ore supply of the United States; and the same is also probable of the deposit of magnetite and red hematite near Hanover, N. Mex.

The States in this group possess some deposits which may properly be considered as important iron-ore reserves.

OTHER STATES.

Of the remaining States, Ohio mined 61,016 tons, all of the carbonate variety, in which class it stood first.

Kentucky, Connecticut, Massachusetts, Texas, and Iowa contributed brown hematite ores; Missouri, red and brown hematites, and Maryland, brown hematite and carbonate ores.

The recent development of a deposit in northeast Iowa is expected to keep this State in the list of iron-ore producers. It is reported that this is a brown hematite deposit, lying on a flat limestone, and at places claimed to be 100 feet deep.

The ore is crushed and washed, and is said to be of the following analysis when dried at 212°:

Analysis of Iowa iron ore.

	Per cent.
Metallic iron	50 to 52
Silica	10 to 15
Manganese	1 to 1.25
Phosphorus	0.09 to 0.13
Sulphur	Slight trace.

VALUE.

The total value at the mines of the 27,553,161 long tons of iron ore produced in the calendar year 1900 is reported as $66,590,504, an average of $2.42 per long ton. This indicates an increase of $1 per ton, or 70.4 per cent, over the 1899 value of $1.42 per ton.

The lowest average value reported per ton was 82 cents in the State of Texas, where convict labor is employed in some of the mining operations. The highest value was $3.71 per ton in Colorado.

The production, total value, and average value per ton at the mine, by States, is given in the following table:

Amount and value of iron ores produced in 1900, by States.

State.	Production.	Total value at mines.	Value per ton.
	Long tons.		
Michigan	9,926,727	$28,859,650	$2.91
Minnesota	9,834,399	24,384,393	2.48
Alabama	2,759,247	2,629,068	.95
Virginia and West Virginia	921,821	1,489,318	1.62
Pennsylvania	877,684	1,890,100	2.15
Wisconsin	746,105	2,081,272	2.79
Tennessee	594,171	669,087	1.13
New York	441,485	1,103,817	2.50
Colorado	407,084	1,510,831	3.71
New Jersey	344,247	956,711	2.78
Georgia and North Carolina	336,186	446,354	1.33
Montana, Nevada, New Mexico, Utah, and Wyoming	132,277	202,480	1.53
Ohio	61,016	98,563	1.62
Kentucky and Iowa	55,057	60,886	1.11
Missouri	41,366	62,745	1.52
Connecticut and Massachusetts	31,185	75,702	2.43
Maryland	26,223	55,735	2.13
Texas	16,881	13,792	.82
Total	27,553,161	66,590,504	a2.42

a Average.

STOCKS.

The stocks of ore reported on hand at the mines on December 31, 1900, aggregated 3,709,950 long tons, an increase of 1,389,672 long tons, or 60 per cent over the 1899 total of 2,320,278 long tons.

The greater portion of this increased stock was held in the Lake Superior region (comprising the States of Michigan, Minnesota, and Wisconsin), where the accumulation increased 1,394,770 tons from a total of 1,905,148 tons in 1899 to 3,299,918 tons in 1900, the latter representing 88.9 per cent of the total stock reported.

The large stocks in the Lake Superior region are accounted for by the fact that the iron ore which is usually sent to the lower lake ports by vessels can not be forwarded in this manner after the close of navigation, about December 1, hence the mineral won after this date and a portion of the previous month's product is accumulated, the stocks increasing in size until the opening of navigation, about May 1.

The following table gives the reported stock of ore on hand at the mines on December 31, 1900, by States:

Stocks of iron ore on hand at mines December 31, 1900.

State.	Stocks.	State.	Stocks.
	Long tons.		*Long tons.*
Michigan	1,940,420	Montana, Nevada, New Mexico, Utah, and Wyoming	5,750
Minnesota	1,084,354	Ohio	36,930
Alabama	31,909	Kentucky	2,760
Virginia and West Virginia	6,000	Missouri	104,992
Pennsylvania	46,672	Connecticut and Massachusetts	4,438
Wisconsin	275,144	Maryland	None.
Tennessee	8,956	Texas	11,000
New York	91,208	Vermont	150
Colorado	800	Total	3,709,950
New Jersey	31,172		
Georgia and North Carolina	27,295		

PROMINENT IRON-ORE PRODUCERS.

In the year ending December 31, 1900, 110 mining operations each produced 50,000 long tons or over of iron ore, the total for the 110 being 24,329,567 long tons, or 88.3 per cent of the total for the United States, precisely the same proportion as in 1899. The average per mine, however, showed a decrease from 242,091 tons in 1899 to 221,178 tons in 1900.

Of these mining operations 3 contributed over 1,000,000 long tons; 2 between 900,000 and 1,000,000 tons; 1 between 800,000 and 900,000 tons; 2 between 700,000 and 800,000 tons; 1 between 600,000 and 700,000 tons; 3 between 500,000 and 600,000 tons; 6 between 400,000 and 500,000 tons; 1 between 300,000 and 400,000 tons; 13 between 200,000 and 300,000 tons; 35 between 100,000 and 200,000 tons; and 43 between 50,000 and 100,000 tons.

Of these mines 42 are situated in Michigan; 31 in Minnesota; 10 in Alabama; 6 in Wisconsin; 4 each in New York and Colorado; 3 each in Tennessee, New Jersey, and Virginia; 2 in Pennsylvania, and 1 each in Georgia and Wyoming.

Eighty-five of these important mining operations contributed 21,594,640 long tons of red hematite ore, 15 brown hemitite mines yielded 1,342,974 tons, 9 magnetite operations gave 1,234,183 tons, and 1 mine contributed a mixture of 157,770 tons of red hematite and magnetite.

The following table presents a list of the mining operations in the United States producing more than 50,000 long tons in 1900, the States in which they are located, and the amount produced by each, except where the owners objected to such publication, the latter being grouped and placed at the end of the table.

Prominent iron-ore producers in 1900.

		Long tons.
Fayal, Minnesota		1,300,000
Red Mountain Group, Alabama		1,172,421
Mountain Iron and Rathbun, Minnesota		1,001,324
Biwabik, Minnesota		924,867
Mahoning No. 2, Minnesota		910,870
Adams, Minnesota		834,476
Lake Superior, Michigan		784,072
Chapin, Michigan		783,398
Chandler, Minnesota		644,053
Oliver Iron Mining Company:		
East Norrie, Michigan	228,461	
Norrie, Michigan	207,751	
North Norrie, Michigan	162,268	
		598,480
Cleveland Hard Ore, Michigan	74,974	
Cleveland Lake, Michigan	497,925	
		572,899
Cornwall, Pennsylvania		558,713
Pioneer, Minnesota		492,393
Tilden, Michigan		489,625
Pittsburg and Lake Angeline, Michigan		451,750
Regent Iron Company, Michigan		433,836
Aragon, Michigan		422,811
Pewabic, Michigan		419,604
Minnesota Iron Company, Minnesota		310,000
Auburn, Minnesota		283,502
Commodore, Minnesota		269,989
Ashland (Hayes), Michigan		269,350
Cliff's Shaft, Michigan		263,306
Genoa, Minnesota		262,562
Lone Jack and Missabe Mountain, Minnesota		244,876
Pabst, Michigan		241,493
Ludington, Michigan		234,084
Sloss, Alabama		224,219
Sparta, Minnesota		212,348

	Long tons.
Aurora, Michigan	208,148
Penn Iron Mining Company, Michigan	201,763
Brown Mining Company, Tennessee	192,479
Crystal Falls, Michigan	192,345
Newport, Michigan	177,669
Hull, Minnesota	175,589
Ohio, Minnesota	172,597
Savoy, Minnesota	170,582
Franklin, Minnesota	167,735
Salisbury, Michigan	161,996
Champion, Michigan	159,439
Republic and West Republic, Michigan	157,770
Bartow (Georgia Iron and Coal Co.), Georgia	149,424
Spruce Mining Company, Minnesota	149,062
Cary, West Cary, and Superior, Wisconsin	143,537
Cundy, Michigan	140,967
Greeley Group, Alabama	140,618
Montreal, Wisconsin	139,307
Atlantic, Wisconsin	137,175
Penobscot, Minnesota	135,714
Columbia, Michigan	135,591
Riverton Group (including Dober, Iron River, and Isabella), Michigan	133,035
Elba, Minnesota	132,118
Palms, Michigan	131,396
Negaunee, Michigan	129,534
Russellville, Alabama	129,166
Duluth, Minnesota	126,694
Orient, Colorado	126,406
Lillie, Michigan	125,295
Pillsbury, Minnesota	123,755
Clifford, Michigan	119,940
Great Western, Michigan	116,547
Rust, Minnesota	116,334
Allegheny Mining Company, Virginia	108,471
Mansfield, Michigan	97,944
Commonwealth, Wisconsin	96,600
Richard, New Jersey	94,350
Burt, Minnesota	92,266
Brotherton, Michigan	90,000
Hemlock River, Michigan	88,871
Clark, Minnesota	88,057
Cambria, Michigan	87,069
Sunday Lake, Michigan	81,189
Raimund, Alabama	81,000
Shelby, Alabama	80,850
Rich Patch, Virginia	79,518
Clifton Iron Company, Alabama	79,142
Princeton, Michigan	76,000
Volunteer, Michigan	75,505
Port Henry Iron Ore Company, No. 21, New York	73,791
Sunrise, Wyoming	73,663
Wharton Hibernia, New Jersey	73,268
Lincoln, Michigan	73,220

	Long tons.
Magnetic Iron Ore Company, New York	69, 026
Loretto, Michigan	65, 858
Kanawha, Minnesota	64, 637
Iron Belt, Wisconsin	63, 701
Imperial, Michigan	63, 344
Sellers, Minnesota	60, 527
Stevenson, Minnesota	59, 374
Bristol (Claire), Michigan	58, 000
Lower Wood, New Jersey	55, 977
Zenith, Minnesota	54, 252
Scotia, Pennsylvania	52, 893
Colby, Michigan	52, 850
Richmond (Gribben), Michigan	51, 302
Total	22, 993, 563
Fifteen mines not reported by name	1, 336, 004
Total	24, 329, 567

TRANSPORTATION—LAKE SUPERIOR REGION.

The iron ore of the Lake Superior region, although distant from most of the blast furnaces which use them, reach their destination at relatively low transportation costs by reason of the long water haul upon the Great Lakes, the railroads carrying the ores from the various ranges to their ore docks at the shipping ports of Two Harbors and Duluth, Minn., Superior and Ashland, Wis., Marquette, Escanaba, and Gladstone, Mich., the first five being located on the shore of Lake Superior and the last two on Lake Michigan.

In the year 1900 Two Harbors continued to hold the lead, with a shipment of 4,007,294 long tons, followed by Duluth with 3,888,986 tons; Escanaba, 3,436,734 tons. The ports of Marquette and Ashland were close together, being credited respectively with 2,661,861 tons and 2,633,687 tons. Superior follows with 1,522,899 tons, while Gladstone shipped 418,854 tons.

According to the Cleveland Iron Trade Review the total shipments of iron ore from the Lake Superior region in 1900 amounted to 19,059,393 long tons, of which but 489,078 tons were forwarded by rail. The shipments by ports and all rail from 1895 to 1900, inclusive, will be found in the following table:

Lake shipments of iron ore.

Shipping port.	1900.	1899.	1898.	1897.	1896.	1895.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Escanaba	3,436,734	3,720,218	2,803,513	2,302,121	2,321,931	2,860,172
Two Harbors	4,007,294	3,973,733	2,693,245	2,651,465	1,813,992	2,118,156
Duluth	3,888,986	3,509,965	2,635,262	2,376,064	1,988,932	1,598,783
Ashland	2,633,687	2,703,447	2,391,088	2,067,637	1,566,236	2,350,219
Marquette	2,661,861	2,733,596	2,245,965	1,945,519	1,564,813	1,079,485
Superior	1,522,899	878,942	550,403	531,825	167,245	117,884
Gladstone	418,854	381,457	335,956	341,014	220,887	109,211
Total	18,570,315	17,901,358	13,655,432	12,215,645	9,644,036	10,233,910
All-rail shipments	489,078	350,446	369,241	253,993	290,792	195,127
Grand total	19,059,393	18,251,804	14,024,673	12,469,638	9,934,828	10,429,037

The greater part of this ore is sent to lower lake ports, the amount so received at these in 1900 being 15,797,787 long tons, the maximum record. The difference, 2,772,528 long tons, between this amount and the total lake shipments of 18,570,315 tons represents the quantity going to the furnaces at Chicago, Ill., and those in Michigan and Wisconsin.

It will be seen from the table given below that Ashtabula, Ohio, continues to hold first place as a lower lake receiving port, with Cleveland second, Conneaut third, while Buffalo and Tonawanda, Erie, Lorain, and Fairport are closely bunched, followed by Toledo, Huron, and Sandusky, in the order named.

The receipts by Lake Erie ports from 1895 to 1900, according to the Iron Trade Review, are as follows:

Iron ore receipts at Lake Erie ports.

Port.	1900.	1899.	1898.	1897.	1896.	1895.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Ashtabula, Ohio	3,709,486	3,341,526	2,684,563	3,001,914	2,272,822	2,474,791
Cleveland, Ohio	3,376,644	3,222,582	2,645,318	2,456,704	2,313,170	2,312,370
Conneaut, Ohio	2,556,631	2,320,696	1,404,169	495,327	327,623	244,967
Erie, Pa	1,240,715	1,309,961	1,092,364	1,311,526	847,849	811,989
Buffalo and Tonawanda, N.Y.	1,616,919	1,530,016	1,075,975	797,446	545,101	719,742
Fairport, Ohio	1,085,554	1,241,013	912,879	1,008,340	941,446	914,617
Lorain, Ohio	1,090,235	1,112,946	536,086	355,188	191,445	214,219
Toledo, Ohio	645,147	792,348	414,012	416,438	301,794	260,730
Sandusky, Ohio	154,542	87,499	136,200	79,792	58,667	12,361
Huron, Ohio	321,914	263,600	126,755	198,231	226,515	146,442
Total	15,797,787	15,222,187	11,028,321	10,120,906	8,026,432	8,112,228

At the lower lake ports and also at Chicago large stocks of ore usually accumulate by the close of the shipping season on December 1, which is reduced by shipments to the blast furnaces during the winter and early spring, although the greater portion is at once taken from vessels, loaded on cars, and forwarded direct to the furnaces.

The ore on hand at lower lake ports December 1, 1900, was 5,904,670 long tons, the largest on record with the exception of the year 1897.

Similarly the stock of ore on hand at the opening of navigation on May 1, 1901, was the greatest since 1898, that year and 1897 being larger.

The following table gives the ore on hand at lower lake ports from December 1, 1895, to December 1, 1900, and at the opening of navigation from May 1, 1896, to May 1, 1901, inclusive.

Stocks of iron ore at lower lake ports.

Port.	At close of navigation, December 1—					
	1895.	1896.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Ashtabula, Ohio	1,301,302	1,441,666	1,835,694	1,732,671	1,902,598	1,811,459
Cleveland, Ohio	1,200,792	1,419,311	1,478,355	1,175,970	1,200,806	1,337,445
Fairport, Ohio	605,470	773,905	825,312	719,794	692,147	611,717
Erie, Pa	335,718	355,222	484,871	439,167	361,335	480,734
Lorain, Ohio	224,264	231,288	317,509	324,034	337,822	251,838
Conneaut, Ohio	292,460	275,800	360,895	288,101	468,808	630,514
Toledo, Ohio	113,132	115,959	194,644	146,568	186,422	242,375
Huron, Ohio	101,000	200,075	230,029	139,982	164,480	211,377
Buffalo, N. Y.	207,199	82,267	111,660	121,620	192,681	232,100
Sandusky, Ohio	34,375	59,491	84,786	48,500	23,184	95,111
Total	4,415,712	4,954,984	5,923,755	5,136,407	5,530,283	5,904,670

Port.	At opening of navigation, May 1—					
	1896.	1897.	1898.	1899.	1900.	1901.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Ashtabula, Ohio	636,254	926,865	1,031,441	855,691	678,789	1,046,974
Cleveland, Ohio	506,693	979,705	853,776	472,946	386,291	806,119
Fairport, Ohio	346,847	480,984	501,592	289,417	282,298	306,706
Erie, Pa	137,826	153,261	236,485	95,626	97,894	225,412
Lorain, Ohio	118,820	180,605	158,797	168,646	126,212	140,562
Conneaut, Ohio	112,406	207,034	69,047	6,115	8,649	69,755
Toledo, Ohio	10,593	66,337	71,726	22,915	52,616	138,457
Huron, Ohio	55,173	162,292	143,170	82,055	48,412	135,043
Buffalo, N. Y	16,644	50,477	53,081	72,757	35,195	118,007
Sandusky, Ohio	8,442	48,937	48,800	7,086	4,300	63,148
Total	1,949,698	3,256,497	3,167,915	2,073,254	1,720,656	3,050,183

SHIPMENTS OF CUBAN IRON ORES.

As the development of Cuba is of general interest, and as most of the iron ore obtained in Cuba finds a market in the United States, the following table is presented. It indicates the quantities of ore shipped each year by the companies which have been contributors.

Production of three iron-ore companies in Cuba.

Year.	Juragua Iron Company.	Sigua Iron Company.	Spanish-American Iron Company.	Total.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
1884	21,798			21,798
1885	81,106			81,106
1886	111,710			111,710
1887	97,711			97,711
1888	198,040			198,040
1889	256,278			256,278
1890	362,068			362,068
1891	266,377			266,377
1892	322,527	7,830		330,357
1893	348,863	14,022		362,885
1894	150,440			150,440
1895	311,053		74,991	386,044
1896	298,299		114,101	412,400
1897	*a* 250,749		*b* 206,812	457,561
1898	83,852		80,225	164,077
1899	161,707		207,051	368,758
1900	151,961		293,016	444,977
Total	3,474,539	21,852	976,196	4,472,587

a 5,932 long tons sent to Pictou, Nova Scotia. *b* 51,537 long tons sent to foreign ports.

From this table it will be seen that the Juragua Iron Company, Limited (which made its first shipment of ore in 1884), has furnished the most of the ore to date and also the greatest amount in any one year, but of late the Spanish-American Iron Company (which made its first shipment in 1895) has contributed a larger proportion.

This latter company has been purchased by the Pennsylvania Steel Company, one of the joint owners of the Juragua Iron Company, and also interested in the Cuban Steel Ore Company, a new development which up to the close of 1900 made no shipments, but which will be a producer in 1901, preparatory development work being well advanced.

The Sigua Iron Company was active in the years 1892 and 1893, but since that date the property has been unproductive.

The Juragua Iron Company, Limited, the Spanish-American Iron Company, and the Sigua Iron Company deposits are all located in the southeastern portion of the island of Cuba, bordering on the Caribbean Sea east of the bay of Santiago de Cuba, while the Cuban Steel Ore Company is about 40 miles west of the city of Santiago.

The total amount of iron ore mined and shipped from Cuba amounts to 4,472,587 long tons, all of which, with the exception of some 57,469 tons, mined in 1897, came to the United States.

IMPORTS.

Through the courtesy of the Bureau of Statistics of the United States Treasury Department, the following data are presented in regard to the iron ore imported into and exported from the United States in the calendar year 1900. From these figures it will be seen that the amount brought in amounted to 897,831 long tons, valued at $1,303,196, or $1.45 per ton, being an increase of 223,749 tons, or 33.2 per cent, over the importations in 1899. The importations credited to 1900 exceed those of any year since 1891, the valuations given representing the quotations at the port of shipment, but do not include freight or import duties. The higher valuations placed on the ores from Germany and the United Kingdom is because some of the chemical constituents other than iron increased the valuation.

The table below shows the imports of iron ore in 1900, and the valuations by countries, similar figures for 1896–1899 being given for the purpose of comparison:

Quantity and value of iron ores imported into the United States in 1896 to 1900.

Imported from—	1896.		1897.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
Cuba	380,551	$463,570	383,820	$454,709
Spain	121,132	230,879	66,193	167,878
French Africa	79,661	163,517	3,504	7,785
Italy	29,882	85,661		
Greece	33,750	34,520		
Newfoundland and Labrador	20,800	20,965	29,250	29,431
United Kingdom	8,528	23,155	358	4,091
Colombia	3,150	5,800		
Portugal	1,101	2,327	3,612	5,831
Other countries	4,251	6,523	3,233	9,187
Total	682,806	1,036,917	489,970	678,912

Imported from—	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*	
Cuba	165,623	$187,721	360,813	$449,616	431,265	$537,496
Spain	13,335	34,932	145,206	339,058	253,694	494,668
French Africa			22,233	51,746	20,000	23,536
Italy			43,363	122,786	18,951	50,945
Greece	7,200	26,581	16,765	27,556	23,350	31,685
Newfoundland and Labrador			77,970	77,970	140,535	142,685
United Kingdom	683	5,385	172	994	397	3,274
Colombia					3,000	4,854
Portugal						
Germany					145	1,339
Netherlands					181	854
Quebec, Ontario, etc					5,588	10,139
Venezuela					700	1,621
Sweden and Norway					25	100
Other countries	367	929	7,560	13,121		
Total	187,208	255,548	674,082	1,082,847	897,831	1,303,196

The largest foreign contributor to the iron-ore supply of the United States was the island of Cuba, where the deposits are controlled by United States capitalists. Slightly over a quarter million tons of iron ore came from Spain, and 140,535 from Newfoundland and Labrador.

These countries together furnished 825,494 long tons, or 92 per cent of the total. Greece, Algeria, and Italy were the only other countries sending over 10,000 tons each.

An examination of the imports by customs districts demonstrates that, as in previous years, the greater portion of the iron ore came to Baltimore and Philadelphia, 862,724 tons, or 96 per cent of the total, being entered at these ports.

The statistics by customs districts for the years 1898, 1899, and 1900 are as follows:

Imports of iron ore into the United States.

Port.	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*	
Baltimore, Md	144,213	$178,905	333,258	$516,888	448,660	$629,507
Delaware			5,757	7,375	3,331	5,305
Philadelphia, Pa	42,861	74,226	330,594	549,130	414,064	589,749
New York, N. Y	119	1,815	120	703	25,878	63,540
Boston, Mass			75	175	15	71
Newport News, Va	15	602				
Total Atlantic ports	187,208	255,548	669,804	1,074,271	891,948	1,288,172
Cape Vincent, N. Y			195	489		
Buffalo Creek, N. Y			20	52	1,023	586
Cuyahoga, Ohio					2,456	6,141
Champlain, N. Y			641	1,555	236	520
Detroit, Mich			304	168	52	78
Genesee, N. Y					211	442
Oswegatchie, N. Y			125	260	1,131	2,064
Vermont			1,039	2,045	257	454
Total lake ports			2,324	4,569	5,366	10,285
Saluria, Tex. (total Gulf ports)			2	17		
Puget Sound, Wash. (total Pacific ports)			1,912	3,746	424	3,781
Pittsburg, Pa. (interior port)			40	244	93	958
Total imports	187,208	255,548	674,082	1,082,847	897,831	1,303,196

EXPORTS.

Until late years practically all of the iron ore mined in the United States, as well as that imported, entered into domestic consumption, but since the erection of modern blast furnaces in Canada, some of the iron ore from the Lake Superior region has been exported, amounting in the year 1900 to 51,460 long tons, valued at $154,756. Some ore was also sent to Mexico for use as flux in 1899.

The exports by customs districts in 1899 and 1900, together with the valuation of the ore is as follows:

Customs district.	1900.		1899.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
Niagara	....	....	17,857	$30,000
Superior	11,004	$35,213	11,389	20,012
Duluth	38,485	113,962	10,534	22,465
Paso del Norte	....	....	703	2,930
Saluria	....	....	172	823
Detroit	34	120	7	42
Huron	....	....	3	15
Newport News	8	128	....	....
Buffalo Creek	120	300	....	....
Memphremagog	1,809	5,033	....	....
Total	51,460	154,756	40,665	76,287

IRON AND STEEL AT THE CLOSE OF THE NINETEENTH CENTURY.

By James M. Swank,
General Manager of the American Iron and Steel Association.

GENERAL REVIEW.

The progress of the world's iron and steel industries in the nineteenth century, full details of which have been presented in previous reports, is well illustrated by the statistics which show the measure of their development at the close of the century and which will presently be given. Every reader of these pages is already familiar with the fact that at the beginning of the last century comparatively little iron and steel was made in any country. There was but little demand for these products. In time railroads became, as they still are, the greatest of all the consumers of iron and steel, yet the Stockton and Darlington Railroad in England, the first railroad in the world to be built for general freight traffic and passenger travel, was not opened until 1825. The street railway dates from 1832. The general use of iron and steel bridges and iron and steel steamships came later. Next followed the general use of steel in the construction of large buildings, especially buildings of great height. Last of all we have the steel car for general freight purposes. These are the most prominent uses of iron and steel to-day, but simultaneously with the development of these leading uses there has been a constantly increasing use of agricultural machinery, textile machinery, mining machinery, electrical machinery, machine tools, iron and steel pipe, hardware, stoves, shovels, tin plates, wire, and many other articles which are made wholly or in part of iron or steel.

The railroad era began at the close of the first quarter of the nineteenth century, but it was not until the third quarter of the century was well under way that an extraordinary demand for iron and steel for railroads and for other than railroad purposes began to manifest itself in any progressive country. In our own country we built more miles of railroad in 1887 than in any year before or since. The building of iron and steel vessels received a great deal of attention, particularly in Great Britain, in the third quarter of the century, but it was in the fourth quarter that the greatest progress was made in substituting iron and steel ships for wooden ships. As late as 1868 only five iron steamships were built in one year in this country for ocean service. We have since built over 100 steel merchant vessels in one year, and we have in late years built a magnificent fleet for the American Navy, the frames and hulls and armor being of American steel. Armor plate for war ships was not made in Great Britain until after 1850, but its manufacture was not perfected in any country until within the last ten years, while the first contract for American-made armor was not made until 1887. Iron and steel buildings, already referred to, date from the third quarter, but they did not receive much attention from architects and builders until the fourth quarter, while steel cars were virtually unheard of until the century was nearing its end. The manufacture of tin plates was not introduced into the United States, except experimentally, until 1890.

In a word, while the nineteenth century witnessed the development of the iron age, which was succeeded before its close by the steel age, it would be more exact to say that the last year of the first quarter of the century, when the railroad era began, witnessed only the beginning of this development, and that the last quarter has seen its ripest fruits, even the last few years of the last quarter.

The rapid growth of the world's iron and steel industries in the nineteenth century, particularly in its last quarter, could have been possible only by substituting improved methods of manufacture for the slow and expensive methods that were in use at its beginning. The railroads of to-day could not have been supplied with one-half of the rails they need, indeed the half of these roads would never have been built, if the invention in 1855 and 1856 of the Bessemer process for making steel had not resulted in giving to the world steel rails which would last longer and could be much more cheaply and rapidly made than the rails that were made of puddled iron. Nor could the steel that is used to-day in such large quantities for various structural purposes—bridges, buildings, ships, cars, etc.—have been made at all but for the invention of the Bessemer process and its companion, the Siemens open-hearth process, the latter process dating from 1864. Nor could the pig iron that has been required by the Bessemer and open-hearth processes have been supplied, not even the half of it, if reliance had been placed upon the small furnaces, the lean ores, and the charcoal fuel that were in common use less than a hundred years ago.

The modern blast furnace, with its immense blowing engines, its hot-blast stoves, its rich ores, and its mineral fuel to smelt them, has been a powerful factor in the present marvelous development of the world's iron and steel industries. It could not, however, have become this powerful agent if an abundance of iron ores and mineral fuel had not been readily obtainable. Great Britain early found at home the coke she needed for her blast furnaces; her Durham coke is not excelled anywhere; and when she began to make steel in her Bessemer converters and open-hearth furnaces she drew upon Spain and other Mediterranean countries for a large part of the ores that would make pig iron suitable for these new processes. Germany has found within the last twenty years that she could make pig iron from her phosphoric ores that could be converted into steel by the basic modification of the Bessemer process, and she has well utilized her resources. Other continental countries have built up extensive steel industries by the Bessemer and open-hearth processes, some of them, like Great Britain, largely importing their supplies of iron ore, and some of them also importing coal and coke. But in the United States nature has been lavish in her supply of all the raw materials that are needed in the manufacture of steel, except perhaps the ores of manganese and of nickel. Iron ores and bituminous coal are found in many States, and anthracite coal is found in Pennsylvania, all in most generous quantities. In the second quarter of the nineteenth century we successfully introduced anthracite coal and bituminous coke in the blast furnace, and in the same period the iron ores of Lake Superior were discovered. Our Lake Superior and Cornwall ores were early found to be well adapted to the manufacture of Bessemer steel by the original process, and also of open-hearth steel, and our Connellsville and Pocahontas coke are equaled in physical and chemical properties only by the Durham coke of England.

The first shipment of iron ore from the Lake Superior region was made in 1850, but it was not until 1860 that the shipments of Lake Superior ore annually exceeded 100,000 tons. Neither Connellsville coke nor any other coke exerted an appreciable influence upon the manufacture of pig iron in this country until after 1850. These dates show how late in the last century we began to utilize the raw materials that now have a world-wide reputation. There is apparently no limit to the supply of rich and pure iron ores in the Lake Superior region and elsewhere in this country, and we have boundless deposits of good coking coal that are here and there being drawn upon to supplement the coke from the Connellsville basin and the Pocahontas field, neither of which favorite sources of supply will be exhausted for many years to come. Many of our rolling mills have been greatly favored with an abundant supply of natural gas, the use of this ideal fuel having commenced in 1874, at the close of the third quarter of the century under consideration. No other country possesses in such abundance the raw materials for the manufacture of steel as the United States; and no other country has developed a more skillful or more enterprising class of iron and steel makers than our own. Our blast furnaces, our Bessemer steel works, our open-hearth furnaces, our iron and steel rolling mills, our tin-plate works, and our appliances for mining and shipping iron ore and coal are the best that the world has yet seen, and they are constantly receiving the unstinted praise of our European rivals.

While great progress has been made in the last quarter of the nineteenth century in the development of the world's iron and steel industries, the most notable progress has been made in the United States. This country to-day leads all other countries in the production of iron and steel. This prominence in the manufacture of these articles is only in part due to the bounty of nature in providing liberal supplies of the raw materials needed; it is largely the result of friendly legislation by the General Government, first, in more firmly establishing in 1861 the protective-tariff policy, which has since been effectively maintained with but brief interruptions, and, second, in adopting at about the same time the policy of liberal grants of land to railroad companies. Through the operation of the protective policy the home market has been preserved for the home producers of iron and steel and of all articles made from them, and through the operation of the land-grant system, supplemented by the homestead policy, thousands of miles of railroad have been built in the Western States and Territories that otherwise would not have been constructed. With the building of these railroads the population of these States and Territories has been greatly increased, the consumption of iron and steel and of other manufactured products has been enlarged, our vast mineral resources have been discovered and developed, and the whole country has been enriched. Thousands of new farms have been opened, our agricultural products have been many times multiplied, and both home and foreign markets for the sale of our surplus crops have been easily and cheaply reached.

But many of these railroads could not have been built if our protective-tariff policy had not built up our iron-rail industry in the third quarter of the century and our steel-rail industry in the fourth quarter. Until we began to make our own iron rails, and afterwards our own steel rails, foreign manufacturers charged us excessive prices for such rails as we could afford to import. Both the industries mentioned had at the first to struggle for their very existence against foreign competition, the early duties on foreign iron rails and afterwards on foreign steel rails not being sufficiently protective, but in the end the control of the home market was gained, the production of rails increased enormously, and the prices were steadily reduced. In the meantime, as the direct result of the home competition which the protective policy had encouraged, the production of all other articles of iron and steel greatly increased and their prices were also reduced, mines of iron ore and coal were opened which would otherwise have lain dormant, and a greatly enlarged home market for all the products of the farm was created.

After all that has been said, however, of our wealth of natural resources for the production of iron and steel and of the influence of the protective policy and the land-grant system in promoting their manufacture, the truth of history requires that it be distinctly and positively stated that all the advantages above noted would have failed to give to our country in the last quarter of the nineteenth century steel rails and steel in other forms as cheaply and abundantly as they have been supplied if these advantages had not been supplemented by the constructive and executive abilities and the persistent energy of American manufacturers and the inventive genius and technical skill of American engineers and mechanics. The courage of our iron and steel manufacturers in entering upon new enterprises of the greatest magnitude and the skill displayed by our engineers and mechanics in attaining important and valuable metallurgical results must be a constant marvel to every student of our country's industrial development.

Steel rails afford a good illustration of the marvelous energy and superior skill which have been displayed in the manufacture of iron and steel in our country in the last quarter of the nineteenth century. The first experimental steel rails ever made in the United States were rolled at Chicago in 1865, but our Bessemer steel industry at first made such slow progress, owing to foreign competition and the prejudice in favor of iron rails, that the whole country made only 259,699 tons of steel rails in 1875. Soon afterwards, however, American energy and skill produced most wonderful results. In 1879 we made more Bessemer steel rails than Great Britain. In 1881 we made 1,187,770 tons of steel rails and in 1887 we made 2,101,904 tons, and we have since increased these figures. Great Britain's largest production of Bessemer steel rails was in 1882, when she made 1,235,785 tons. From 1867 to 1900, both years included, we made 33,064,467 tons of Bessemer steel rails, an average of almost 1,000,000 tons a year, of which 15,668,101 tons were made in the last ten years.

CHRONOLOGICAL RECORD.

We now present a chronological record of the leading events in the development of the iron and steel industries of the United States down to the close of the nineteenth century. In this record special prominence is given to the beginning of the iron industry in the original thirteen colonies and in the more important iron-producing States that were admitted into the Union after the Revolution; also to the introduction of improved processes and of the best or of newly discovered raw materials in the manufacture of iron and steel; also to the beginning of railroad building in the United States and to associated railroad events; also to early iron and steel shipbuilding and bridge building in the United States.

THE SEVENTEENTH CENTURY.

1619.—In this year the Virginia Company sent to Virginia a number of persons who were skilled in the manufacture of iron to "set up three iron works" in the colony. The enterprise was undertaken in that year and the works were located on Falling Creek, a tributary of the James River.

1620.—In this year, as stated by Beverley in his History of Virginia "an iron work at Falling Creek in James River" was set up, "where they made proof of good iron oar." In this and the following year the enterprise languished. On March 22, 1622, the works were destroyed by the Indians and all the workmen were massacred. The works were not rebuilt.

1642.—In this year "The Company of Undertakers for the Iron Works" in the province of Massachusetts Bay, consisting of eleven English gentlemen, was organized with a capital of £1,000.

1643.—In his History of Lynn (1844) Alonzo Lewis says that in 1643 "Mr. John Winthrop, jr., came from England with workmen and stock to the amount of one thousand pounds for commencing the work. A foundry was erected on the western bank of Saugus River," at Lynn, in Massachusetts. This foundry was a small blast furnace, completed in 1645. It was the first successful iron enterprise in the thirteen colonies. Bog ore was used. For a hundred years after its settlement in 1620 Massachusetts was the chief seat of the iron industry on this continent.

1645.—A small iron pot, holding about a quart, which is still preserved, was cast at the Lynn foundry in 1645. It was the first iron article made from native ore in America.

1658.—In 1658 Capt. Thomas Clarke, in company with John Winthrop and others, put in operation an "iron worke" at New Haven, Conn. This enterprise embraced a blast furnace and a refinery forge.

1675.—Rhode Island made iron soon after its settlement, in 1636, certainly at Pawtucket and elsewhere as early as 1675, when a forge at Pawtucket, erected by Joseph Jenks, jr., was destroyed by the Indians in the Wampanoag war, as well as other iron works and infant enterprises.

1679.—In the Statistics of Coal, by Richard Cowling Taylor, published in 1848, it is stated that the earliest historic mention of coal in this country is by the French Jesuit missionary, Father Hennepin, who saw traces of bituminous coal on the Illinois River in 1679. In his journal he marks the site of a "cole mine" above Fort Crevecœur, near the present town of Ottawa, Ill.

1682.—In an account of the province of East Jersey, published by the proprietors in 1682, it is stated that "there is already a smelting furnace and forge set up in this colony, where is made good iron, which is of great benefit to the country." This enterprise was located at Tinton Falls, in Monmouth County, N. J.

1692.—In 1692 we find the first mention of iron having been made in Pennsylvania. It is contained in a metrical composition entitled A Short Description of Pennsylvania, by Richard Frame, which was printed and sold by William Bradford in Philadelphia in 1692. Frame says that at "a certain place about some forty pound" of iron had then been made. This was doubtless an experimental enterprise.

THE EIGHTEENTH CENTURY.

1703.—Abraham Lincoln's paternal ancestry was identified with the manufacture of iron in Massachusetts. The head of the American branch of his father's family, Samuel Lincoln, emigrated in 1637 from Norwich, England, to Massachusetts. Mordecai Lincoln, son of Samuel, born at Hingham on June 14, 1657, followed the trade of a blacksmith at Hull, from which place he removed to Scituate, where "he built a spacious house and was a large contributor toward the erection of the iron works at Bound Brook" in 1703. These works made wrought iron directly from the ore. Mordecai Lincoln had two sons, Mordecai, jr., and Abraham, who settled in Berks County, Pa. Mordecai, jr., was the great-great-grandfather of Abraham Lincoln.

1710.—The first slitting mill in the colonies for slitting nail rods is said by tradition to have been erected at Milton, in Norfolk County, Mass., as early as 1710. Nails were made by blacksmiths and others from these nail rods, sometimes in chimney corners.

1716.—After the failure of the enterprise on Falling Creek no successful effort was made to revive the iron industry in Virginia until after the beginning of the succeeding century, when Governor Alexander Spotswood and his associates built a furnace in Spottsylvania County, about 10 miles northwest of Fredericksburg, in 1715 or 1716. It was soon followed by other furnaces.

1716.—The first ironworks in Maryland were probably erected in Cecil County, at the head of Chesapeake Bay. A bloomery at Northeast, on Northeast River, erected previous to 1716, probably formed the pioneer iron enterprise.

1716.—Pool forge, on Manatawney Creek, in Berks County, Pa., was established in 1716 by Thomas Rutter, and was the first iron enterprise in Pennsylvania of which any record has been preserved. Mrs. James, in her Memorial of Thomas Potts, Junior, says that Rutter was an English Quaker who was a resident of Philadelphia in 1685.

1717.—Exportation of bar iron from the American colonies began in this year, when 2 tons were sent to England from the British West India islands of Nevis and St. Christopher, but it had evidently been taken there from one of the Atlantic coast colonies.

1722.—Sir William Keith established on Christiana Creek, in Delaware, a forge for the manufacture of bar iron. It was probably built between 1722 and 1726. It was soon followed by Abbington furnace, built about 1727.

1722.—In 1722 Joseph Farmer, an ironmaster, of England, and his associates, afterwards known as the Principio Company, commenced the erection of a furnace on Talbot's manor, in Cecil County, near the mouth of Principio Creek, in Maryland, which was finished in 1724 and was followed by a forge which was completed in 1725, both works being built and afterwards operated for the company by John England. This company afterwards owned many furnaces in Maryland and Virginia.

1728.—In 1728 James Logan wrote that "there are four furnaces in blast in the colony" of Pennsylvania. Colebrookdale and Durham were two of these furnaces, but the names of the others are in doubt.

1728.—Scrivenor says that in 1728–29 there were imported into England from "Carolina" 1 ton and 1 hundredweight of pig iron, and that in 1734 there were imported 2 quarters and 12 pounds of bar iron. These dates fix the erection of ironworks in North Carolina as early as 1728, soon after which year there were many furnaces and forges in North Carolina. Hoes made in Virginia and "Carolina" were sold in New York long before the Revolution.

1728.—Connecticut was probably the first of the colonies to make steel. In 1728 Samuel Higley, of Simsbury, and Joseph Dewey, of Hebron, in Hartford County, represented to the Legislature that the first-named had, "with great pains and cost, found out and obtained a curious art, by which to convert, change, or transmute common iron into good steel, sufficient for any use, and was the very first that ever performed such an operation in America." The certificates of several smiths who had made a trial of the steel and pronounced it good were produced. It was doubtless cementation steel.

1732.—Augustine Washington, the father of George Washington, was engaged in 1732 in making pig iron at Accokeek furnace, in Stafford County, Va., about 15 miles from Fredericksburg, when his famous son was born. This furnace had been built by the Principio Company, composed of English capitalists, as early as 1726, on land owned by Augustine Washington, aggregating about 1,600 acres and containing iron ore, Mr. Washington becoming the owner of one-sixth of the furnace property in consideration of the transfer of his land to the company.

1734.—As early as 1734 a bloomery forge was erected at Lime Rock, in Litchfield County, Conn., by Thomas Lamb, which produced from 500 to 700 pounds of iron per day. A blast furnace was afterwards added to this forge.

1735.—In this year Samuel Waldo erected a furnace and foundry on the Pawtuxet River, in Rhode Island, which were afterwards known as Hope furnace.

1740.—The first ironworks in New York were "set up" a short time prior to 1740, on Ancram Creek, in Columbia County, about 14 miles east of the Hudson River, by Philip Livingston, the owner of the Livingston manor and the father of Philip, the signer of the Declaration of Independence.

1750.—The iron industry of New Hampshire probably dates from about 1750, when several bog-ore bloomeries were in existence on Lamper Eel River, but were soon discontinued. About the time of the Revolution there were a few other bloomeries in operation in New Hampshire.

1750.—In 1750 it was officially reported that there was then in Massachusetts "one furnace for making steel," but its location is not given. Cementation steel was doubtless made.

1750.—The Virginia coal mines were probably the first that were worked in America. Bituminous mines were opened and operated on the James River, in Chesterfield County, probably about 1750. In July, 1766, in the Virginia Gazette, Samuel Duval advertises coal for sale at Rockett's, a lower landing of Richmond, at 12d. per bushel, "equal to Newcastle coal."

1766.—Anthracite coal was discovered in the Wyoming Valley as early as 1766. James Tilghman, of Philadelphia, addressed a letter to the Proprietaries, Thomas and Richard Penn, on the 14th of August, 1766, in which he stated that Colonel Francis had gone "up the N.E. Branch as far as Wyoming, where he says there is a considerable body of good land and a very great fund of coal in the hills." It is claimed that in 1768 or 1769 two of the settlers in the valley, being two brothers named Gore, from Connecticut, who were blacksmiths, were the first persons in this country to use anthracite coal, using it in a forge fire.

1770.—A rolling and slitting mill was built at Old Boonton, in Morris County, N. J., before the Revolution, probably about 1770, by a member of the Ogden family. A more successful enterprise of the same kind was established at Dover, in the same county, about 1792, by Israel Canfield and Jacob Losey.

1770.—In this year the American colonies exported 6,017 tons of pig iron, valued at $145,628; 2,463 tons of bar iron, valued at $178,891; 2 tons of castings, valued at $158, and 8 tons of wrought iron, valued at $810.

1773.—According to Dr. Ramsay, the first ironworks in South Carolina were erected by Mr. Buffington in 1773, but they were destroyed by the Tories during the Revolution. Other iron enterprises were undertaken in this State after the Revolution. In the census year 1840 there were 4 active furnaces in South Carolina and 9 bloomeries, forges, and rolling mills. In 1856 South Carolina had 8 furnaces—1 in York, 1 in Union, and 6 in Spartanburg County, and in the same year the State had 3 small rolling mills. All these enterprises have long been abandoned.

1775.—About this year a few bloomeries were erected in Maine and Vermont. A few furnaces were afterwards erected in these States and many bloomeries in Vermont. All have disappeared.

1777.—Arnold's History of the State of Rhode Island says: "It is said that the first cold-cut nail in the world was made in 1777 by Jeremiah Wilkinson, of Cumberland, R. I., who died in 1832, at the advanced age of 90 years."

1790.—Jacob Perkins, of Newburyport, Mass., invented, about 1790, his nail-cutting machine, which was patented in 1795 and was speedily followed by other inventions for the same purpose.

1790.—The first settlers of Tennessee erected ironworks soon after the close of the Revolution. A bloomery was built in 1790 at Embreville, in Washington County, and another at Elizabethton, on Doe River, in Carter County, about 1795. Wagner's bloomery, on Roane Creek, in Johnson County, was built in this year, and a bloomery was also erected on Camp Creek, in Greene County, in 1797.

1791.—The first iron enterprise in Kentucky was Bourbon furnace, often called Slate furnace, which was built in 1791 on Slate Creek, a branch of Licking River, in Bath County, then Bourbon, and about 2 miles southeast of Owingsville.

1792.—A small blast furnace was built in this year by George Anshutz, a native of Alsace, on Twomile Run, now Shady Side, in Pittsburg. In 1794 it was abandoned for want of ore.

THE NINETEENTH CENTURY.

1801.—About 1801 the long celebrated Champlain iron district in New York was developed and many Catalan forges as well as furnaces and a few rolling mills were soon afterwards built. The forges were true Catalan forges, which converted the rich ores of the district into blooms and billets, chiefly by water power. They were, however, of an improved type. In later years the blast was heated, which was never done with the old Catalan forge. As late as 1883 there were 27 of these forges, with 171 fires, but in 1890 there were only 14, with 102 fires. In 1900 only one forge was in existence and active—Standish Forge, in Clinton County, equipped with 18 fires and using steam power.

1802.—Catalan forges, or bloomeries, were built in northern New Jersey long before the Revolution. Many of them were blown by the *trompe* or water blast. In 1795 Morse mentions "about thirty forges" in northern New Jersey, and in 1802 a memorial to Congress says that there were then in existence 150 of these forges. There are now no Catalan forges left in New Jersey, and only two in the whole country, referred to elsewhere.

1803.—The beginning of the iron industry of Ohio dates from 1803, in which year its first furnace, Hopewell, was commenced by Daniel Eaton, and in 1804 it was finished. The furnace stood on the west side of Yellow Creek, about 1¼ miles from its junction with the Mahoning River, in the township of Poland, in Mahoning County.

1807.—The first railroads in the United States were built to haul gravel, stone, coal, and other heavy materials, and were all short. Strictly speaking they were tramroads and not railroads. One of these was built on Beacon Hill, in Boston, by Silas Whitney, in 1807; another by Thomas Leiper, in Delaware County, Pa., in 1809; and another at Bear Creek furnace, in Armstrong County, Pa., in 1818. The tracks of these roads were composed of wooden rails. Other short railroads for similar service soon followed, but the wooden rails were strapped with flat iron bars. Steam power was not used on any American railroad until 1829.

1810.—The census statistics for 1810, published in 1814, gave the production of cast iron in the census year as 53,908 long tons.

1810.—The production of steel in the census year 1810 was 917 tons.

1810.—In the census of 1810 Tench Coxe mentions a nailery in Indiana Territory which produced in that year 20,000 pounds of nails, valued at $4,000. He does not locate this enterprise.

1810.—In 1810 there was a bloomery in Warren County, a forge in Elbert County, and a nailery in Chatham County, Ga. Two of these enterprises were near the Atlantic coast, and were doubtless among the first of their kind in the State, dating probably from about 1790.

1810.—On June 27, 1810, Clemens Rentgen, a native of the Palatinate, in Germany, obtained a patent from the United States Government for "rolling iron round, for ship bolts and other uses," which invention was put to practical use at Mr. Rentgen's Pikeland works in Chester County, Pa., in 1812 and 1813, in which years he rolled round iron, some of which was for the Navy Department at Washington. We do not learn that he ever rolled flat bars.

1812.—The first rolling mill at Pittsburg was built in 1811 and 1812 by Christopher Cowan, a Scotch-Irishman, and called the Pittsburg rolling mill. This mill had no puddling furnaces. It stood at the intersection of Penn street and Cecil's alley, where the fourth ward schoolhouse was afterwards built.

1816.—Wire fences were in limited use in the neighborhood of Philadelphia as far back as 1816. The wire used was manufactured by White & Hazard at their wire works at the Falls of Schuylkill.

1816.—The first rolling mill erected in the United States to puddle iron and roll flat iron bars was built by Isaac Meason in 1816 and 1817 at Plumsock, on Redstone Creek, about midway between Connellsville and Brownsville, in Fayette County, Pa.

1816.—The celebrated iron district in Iron and St. Francois counties, Mo., which embraces Iron Mountain and Pilot Knob, appears to have contained the first iron enterprise in this State, which embraced a furnace and forge built on Stouts Creek, in Iron County, in 1815 or 1816.

1816.—About 1810 Isaac Pennock built Brandywine rolling mill at Coatesville, Pa., which was purchased from him about 1816 by Dr. Charles Lukens, who had been employed at the Federal slitting mill, a neighboring enterprise. The first boiler plates made in the United States were rolled at this mill by Dr. Lukens some time prior to his death, which occurred in 1825.

1816.—In his History of Philadelphia (1884) Thompson Westcott says that the first wire suspension bridge in the United States, if not in the world, was thrown across the Schuylkill River, near the Falls of Schuylkill, in Philadelphia, in 1816. Its use was necessarily restricted to foot passengers, and only eight passengers were allowed to be on the footway at one time.

1818.—The oldest furnace in Alabama mentioned by Lesley was built about 1818 a few miles west of Russellville, in Franklin County, and abandoned in 1827. A furnace was built at Polksville, in Calhoun County, in 1843; and Shelby furnace, at Shelby, in Shelby County, was built in 1848.

1820.—The production of pig iron this year is estimated by early statisticians to have amounted to only 20,000 tons, the iron industry being greatly depressed. Official and other authoritative statistics for this year are lacking.

1825.—The first bar iron made in New England was made at the Boston iron works, on the mill-dam in Boston, in 1825.

1827.—On February 28, 1827, the Maryland Legislature granted a charter for the construction of the Baltimore and Ohio Railroad, which was the first railroad in the United States that was opened for the conveyance of passengers. Its construction was commenced on July 4, 1828, the venerable Charles Carroll, of Carrollton, laying the cornerstone. In 1829 the track was finished to Vinegar Hill, a distance of about 7 miles. Horse power was at first used. The road was opened for travel from Baltimore to Ellicotts Mills, a distance of 13 miles, on May 24, 1830, and to Harpers Ferry on December 1, 1834. The Washington Branch was opened from Relay to Bladensburg on July 20, 1834, and to Washington City on August 25, 1834.

1829.—The first locomotive to run upon an American railroad was the Stourbridge Lion. It was first used at Honesdale, in Wayne County, Pa., on Saturday, August 8, 1829, on the coal railroad of the Delaware and Hudson Canal Company. The Stourbridge Lion was built in England and weighed about 6 tons.

1830.—The production of pig iron this year was 165,000 tons.

1830.—The T rail was invented in this year by Robert L. Stevens, the president and engineer of the Camden and South Amboy Railroad and Transportation Company, and T rails were made in Wales in 1830, on Mr. Stevens's order, and laid down on a part of his road in 1831. The rails were rolled at the Dowlais iron works, at Dowlais, Glamorganshire.

1830.—The first locomotive built in the United States and used on a railroad was the Tom Thumb, which was built by Peter Cooper at Baltimore and successfully experimented with on the Baltimore and Ohio Railroad in August, 1830. Mr. Cooper was his own engineer. Strictly speaking the Tom Thumb was only a working model, weighing less than a ton.

1830.—The first American locomotive that was built for actual service was the Best Friend of Charleston, which was built at the West Point foundry, in New York City, for the Charleston and Hamburg Railroad, and was successfully put in use on that road in December, 1830.

1830.—In 1830 only 23 miles of railroad were in operation in the United States; in 1840 there were 2,818 miles; in 1850 there were 9,021 miles; in 1860 there were 30,626 miles; in 1870 there were 52,922 miles; in 1880 there were 93,296 miles; in 1890 there were 166,698 miles; and in 1899 there were 189,295 miles.

1832.—Crucible steel of the best quality was first made in the United States in this year in commercial quantities at Cincinnati by Dr. William Garrard and his brother, John H. Garrard, entirely from American materials. Their works were called the Cincinnati steel works.

1832.—In Brown's History of the First Locomotives in America it is stated that "the first charter for what are termed city passenger or horse railroads was obtained in the city of New York, and known as the New York and Harlem, and this was the first road of the kind ever constructed, and was opened in 1832. No other road of the kind was completed till 1852, when the Sixth avenue was opened to the public."

1834.—The first practical application of the hot blast to the manufacture of pig iron in this country was made at Oxford Furnace, in New Jersey, in 1834, by William Henry, the manager. The waste heat at the tymp passed over the surface of a nest of small cast-iron pipes, through which the blast was conveyed to the furnace. The temperature was raised to 250° F., and the product of the furnace was increased about 10 per cent. In 1835 a hot-blast oven, containing cast-iron arched pipes, was placed on the top of the stack by Mr. Henry and heated by the flame from the tunnel head. By this means the temperature of the blast was raised to 500°. The fuel used was charcoal.

1834.—Bituminous coal in Alabama was first observed in this year by Dr. Alexander Jones, of Mobile.

1835.—The first puddling done in New England was at Boston, on the mill-dam, by Lyman, Ralston & Co., in 1835.

1835.—The first successful use of coke in the blast furnace in the United States was accomplished by William Firmstone, at Mary Ann furnace, in Huntingdon County, Pa., in 1835.

1835.—The machine-made horseshoe was patented by Henry Burden, of Troy, N. Y., in 1835. Other horseshoe patents were issued to him in 1843, 1857, and 1862. Mr. Burden was also the inventor of the hook-headed spike and of the Burden rotary squeezer, the latter in 1840.

1839.—In 1839 a small charcoal furnace was built 4 miles northwest of Elizabethtown, in Hardin County, Ill. This is the first furnace in the State of which there is any record.

1839.—On October 19, 1839, Pioneer furnace, at Pottsville, Pa., built by William Lyman, of Boston, and others, under the auspices of Burd Patterson, of Pottsville, was successfully blown in with anthracite fuel by Benjamin Perry and ran for about three months, making about 28 tons of foundry iron a week. This was the first use of anchracite fuel in the blast furnace in the United States that was attended with a fair degree of success.

1840.—On July 3, 1840, the first furnace of the Lehigh Crane Iron Company, at Catasauqua, Pa., was successfully blown in by David Thomas, who had superintended its construction. Its first cast was made on July 4. From the first this furnace produced 50 tons a week of good foundry iron. Four other furnaces built by Mr. Thomas for the same company at Catasauqua soon followed the first furnace. The first furnace built and blown in by him was the first of all the early anthracite furnaces that was completely successful, both from an engineering and a commercial standpoint. It continued in operation for some time.

1840.—The production of pig iron this year was 286,903 tons.

1840.—Indiana possessed a small charcoal-iron industry before 1840. In that year the census mentions a furnace in Jefferson County, 1 in Parke, 1 in Vigo, 1 in Vermilion, and 3 in Wayne County, the total product being 810 tons of "cast iron." A forge in Fulton County, producing 20 tons of "bar iron," is also mentioned. Bog ores were used.

1840.—In 1840 the census reported that 601 tons of "cast iron" had that year been produced in 15 "furnaces" in Michigan, all in the southern part of the State. Some of these "furnaces" were undoubtedly foundries, which obtained pig iron from Ohio and other neighboring States; others used bog ores.

1840.—The census of 1840 mentions a furnace in "Milwaukee town," Wisconsin, which produced 3 tons of iron in that year. This was probably a small foundry. In 1859 Lesley mentions 3 charcoal furnaces in Wisconsin.

1844.—The first discovery by white men of the iron ore of the Lake Superior region was made on the 16th of September, 1844, near the eastern end of Teal Lake, in northern Michigan, by William A. Burt, a deputy surveyor of the General Government. In June, 1845, the Jackson Mining Company was organized at Jackson, Mich., and in the same year it secured possession of the celebrated Jackson iron mountain. The ore from this mountain was first used in a bloomery at Jackson, Mich., and afterwards, in 1847 and subsequently, in bloomeries in northern Michigan. In 1853 a few tons of Jackson ore were shipped to the World's Fair at New York.

1844.—On the 24th of April, 1844, the Hon. Edward Joy Morris, a member of Congress from Pennsylvania, declared that "not a ton of T rail had yet been made in this country."

1844.—The manufacture of heavy iron rails in this country was commenced early in 1844 at the Mount Savage rolling mill, in Allegany County, Md., which was built in 1843 especially to roll these rails. The first rail rolled at this rolling mill, and in honor of which the Franklin Institute, of Philadelphia, awarded a silver medal in October, 1844 (now in the museum at Ince Blundell, Lancashire, England), was an inverted U rail. U rails were in use in the sidings of the Cumberland and Pennsylvania Railroad as late as 1869.

1844.—In this year iron rails weighing 50 pounds to the yard were rolled at the Mount Savage rolling mill, in Maryland, for the railroad leading from Fall River to Boston. These rails were T rails, and were ordered by Colonel Borden, of Fall River. They were the first T rails rolled in the United States.

1845.—The Montour rolling mill, at Danville, Pa., was built in 1845 expressly to roll rails, and it is claimed that here were rolled, in October of that year, the first T rails made in the United States. The facts above presented give this honor to the Mount Savage rolling mill.

1845.—Splint coal, or block coal, was first used in a blast furnace in the fall of 1845 by Himrod & Vincent, of Mercer County, Pa., who used it successfully in their Clay furnace.

1846.—The first furnace in Ohio to use splint coal, or block coal, in its raw state, was built expressly for this purpose at Lowell, in Mahoning County, by Wilkeson, Wilkes & Co., and successfully blown in by them on the 8th of August, 1846. The name of this furnace was at first Anna and afterwards Mahoning.

1849.—The production of iron rails in 1849 was 21,712 long tons, and in 1872, the year of largest production, it was 808,866 tons. In 1900 the production had dwindled to 695 tons.

1849.—A furnace was built at Georgetown, in the District of Columbia, in 1849. It went out of blast finally about 1855. A second stack was built at the same place, but was never put in blast. Both were small furnaces.

1850.—The production of pig iron this year was 563,755 tons.

1850.—The first shipment of iron ore from the Lake Superior region was made in 1850, and consisted of about 10 tons, "which was taken away by Mr. A. L. Crawford, of Newcastle, Pa." A part of this ore was reduced to blooms and rolled into bar iron. It was hauled around the falls of Sault Ste. Marie on a strap railroad 1¼ miles long.

1852.—On December 10, 1852, the Pennsylvania Railroad was completed from Philadelphia to Pittsburg.

1852.—The first wire nails manufactured in the United States were made in 1851 or 1852 at New York by William Hassall. All the wire nails made by William Hassall were made from iron or brass wire, and all were of small sizes, escutcheon and upholsterers' nails being specialties.

1852.—David Thomas, of Catasauqua, Pa., was the first person in this country to introduce powerful blowing engines in the working of blast furnaces. About 1852 he introduced engines at his furnaces at Catasauqua which increased the pressure to double that which was then customary in England. The results were surprising.

1853.—The first use of Lake Superior ore in a blast furnace occurred in Pennsylvania in 1853, when about 70 tons, brought from Erie by canal at great expense, were used in the Sharpsville and Clay furnaces, in Mercer County. The Sharpsville furnace was the first to use the ore.

1854.—Peter Cooper engaged in the manufacture of iron at Trenton, N. J., in 1845, where, as is stated by the American Cyclopædia, "he was the first to roll wrought-iron beams for fireproof buildings." These beams were rolled in the spring of 1854. They were 7 inches deep, weighed about 81 pounds per yard, and were of the form known as deck beams. They were used in Harper Brothers' and the Cooper Union buildings, New York, and also, it is said, on the Camden and Amboy Railroad as rails.

1855.—In this year pig iron made with anthracite coal passed that made with charcoal.

1855.—The world's production of pig iron in 1855 was estimated by Abram S. Hewitt in the following year to have amounted to 7,000,000 long tons.

1855.—On March 6 the American Iron Association, now the American Iron and Steel Association, was organized at Philadelphia. In 1864 the present name was adopted.

1855.—The first 30-foot rails rolled in this country are claimed to have been rolled at the Cambria iron works, at Johnstown, in 1855.

There being no demand for them they were used in the tracks of the Cambria Iron Company. The first 30-foot rails rolled in this country on order were rolled at the Montour rolling mill, at Danville, in January, 1859, for the Sunbury and Erie Railroad Company.

1857.—The iron industry at Chicago dates from 1857, when Capt. E. B. Ward, of Detroit, built the Chicago rolling mill, "just outside of the city." This mill was built to reroll iron rails.

1858.—The first pig iron produced in the Lake Superior region was made in 1858 by Stephen R. Gay, in a small experimental furnace on Dead River, about 3 miles northwest of Marquette.

1859.—Clinton furnace, built in 1859 by Graff, Bennett & Co., at Pittsburg, and blown in on the last Monday of October, was the first furnace built in Allegheny County, Pa., after the abandonment of George Anshutz's furnace at Shady Side.

1860.—The production of pig iron this year was 821,223 tons; in 1870 it was 1,665,179 tons; in 1880 it was 3,835,191 tons; in 1890 it was 9,202,703 tons; and in 1900 it was 13,789,242 tons.

1860.—The production of steel in 1860 was 11,838 tons.

1860.—As late as 1860 there were about 200 Catalan forges, or bloomeries, south of the Ohio and the Potomac rivers, which made bar iron under the hammer directly from the ore. Many of these bloomeries, some of which dated from the preceding century, were blown with the trompe, or water blast, and the remainder with wooden "tubs," operated by water power. At the close of the century only one of these bloomeries still survived, the Helton forge of W. J. Pasley, at Crumpler, Ashe County, N. C., and it was not running in 1897, 1898, 1899, or 1900. The trompe has entirely disappeared.

1862.—The Phœnix wrought-iron column, or wrought-steel column, which is now in general use in this country and in Europe in the construction of bridges, viaducts, depots, warehouses, and other structures, is the invention of the late Samuel J. Reeves, of Philadelphia, of the Phœnix Iron Company. The invention was patented on June 17, 1862.

1864.—In September, 1864, William F. Durfee, acting for the Kelly Pneumatic Process Company, succeeded in making Bessemer steel at its experimental works at Wyandotte, Mich. This was the first Bessemer steel made in the United States.

1865.—The control in this country of Mr. Bessemer's steel patents was obtained in 1864 by John F. Winslow, John A. Griswold, and Alexander L. Holley, all of Troy, N. Y. In February, 1865, Mr. Holley was successful at Troy in producing Bessemer steel at experimental works which he had constructed for his company at that place in 1864.

1865.—The first Bessemer steel rails made in the United States were rolled in May of this year at the Chicago rolling mill, in Chicago, from blooms made by William F. Durfee, at Wyandotte.

1866.—The first elevated city passenger railroad ever built was the Greenwich street railroad in New York, which was commenced in 1866 and has been in successful operation since 1872. It is now known as the Ninth Avenue Elevated Railway. The next project of this character was the Gilbert elevated railroad, in New York, for the construction of which a charter was granted in 1872.

1867.—The first Siemens gas furnace that was regularly introduced into this country for any purpose was built by John A. Griswold & Co., at Troy, N. Y., and used as a heating furnace in their rolling mill, the license having been granted on the 18th of September, 1867.

1868.—The first open-hearth furnace introduced into this country for the manufacture of steel by the Siemens-Martin process was built in 1868 by Frederick J. Slade for Cooper, Hewitt & Co., owners of the works of the New Jersey Steel and Iron Company, at Trenton, N. J.

1868.—In 1867 or 1868 John Player, of England, introduced his iron hot-blast stove into the United States. Mr. Player personally superintended the erection of the first of his stoves in this country at the anthracite furnace of J. B. Moorhead & Co., at West Conshohocken, Pa.

1869.—Pig iron made with raw bituminous coal and with coke passed charcoal pig iron.

1869.—On May 10, 1869, the Union and Central Pacific railroads were joined at Promontory Point, Utah Territory, making the first railroad line across the American Continent.

1869.—The first successful application in this country of the Siemens regenerative gas furnace to the puddling of iron was made under the direction of William F. Durfee, at the rolling mill of the American Silver Steel Company, at Bridgeport, Conn., in 1869.

1873.—The first trans-Atlantic iron steamships to attract attention which were built in this country were the four vessels of the American Steamship Company's line, the *Pennsylvania*, *Ohio*, *Indiana*, and *Illinois*, built of Pennsylvania iron at Philadelphia in 1871, 1872, and 1873 by W. Cramp & Sons. They were each 355 feet long and their capacity was 3,100 tons each.

1873.—The first considerable importation of iron ore into this country was in 1873, when about 46,000 tons were imported, the most of which came from Canada. More than one-half of our imports came from Canada in 1873, 1874, and 1875. In 1879 we commenced to import iron ore largely from the Mediterranean countries, virtually all from Spain, Algeria, and Elba. Before that year the imports from Canada had declined. In 1900 we imported 897,831 tons of iron ore, of which 419,632 tons came from Cuba.

1874.—At the Siberian rolling mill of Rogers & Burchfield, at Leechburg, in Armstrong County, Pa., natural gas, taken from a well 1,200 feet deep, was first used in 1874 as a fuel in the manufacture of iron. For six months in this year natural gas furnished all the fuel required by this mill for puddling, heating, and making steam, not one bushel of coal having been used.

1874.—The two-story bridge across the Mississippi at St. Louis was formally opened on the 4th of July of this year. It was built by the Keystone Bridge Company, of Pittsburg, active operations having been commenced on March 19, 1868. Its center arch is 520 feet long, and there are two other arches each 502 feet long. These arches are composed of steel tubes.

1874.—The Girard avenue bridge over the Schuylkill at Philadelphia was also opened on the 4th of July, 1874. It was built in fourteen months by Clarke, Reeves & Co., of Phœnixville, Pa., entirely of iron. This bridge is 1,000 feet long, 100 feet wide, and is composed of five spans. When built it was the widest bridge in the world.

1874.—In 1874 John Roach & Son launched for the Pacific Mail Steamship Company, at their shipyard at Chester, Pa., two iron steamships, the *City of Peking* and the *City of Tokio*, twin vessels in all respects. These vessels were the largest and most complete iron vessels that had been built in this country down to that year. They were each 423 feet long and had a carrying capacity of 5,000 tons each.

1875.—Pig iron made with bituminous fuel passed that made with anthracite.

1875.—The first 60-foot rails rolled in this country were rolled by the Edgar Thomson Steel Company, at its works near Pittsburg, in the fall of 1875, and were of steel.

1875.—The Whitwell fire-brick hot-blast stove, the invention of Thomas Whitwell, of England, was first used in this country at Rising Fawn furnace, in Dade County, Ga., on June 18, 1875. Its next application was at Cedar Point furnace, at Port Henry, in Essex County, N. Y., on August 12, 1875. The stoves at Cedar Point furnace were, however, built before those at Rising Fawn furnace.

1875.—The first wire nails that were made of steel wire in this country were made at Covington, Ky., in 1875, by Father Goebel, pastor in charge of St. Augustine's Catholic Church in that city, who imported a wire-nail machine from Germany. Father Goebel in the same year formed the Kentucky Wire Nail Works and ordered two more machines, he being president of the company. Thus originated the present extensive wire-nail industry of the United States.

1875.—At the Centennial Exhibition at Philadelphia, in 1876, the Edgar Thomson Steel Company exhibited a steel rail which at that time was the longest steel rail that had ever been rolled. It was 120 feet long and weighed 62 pounds to the yard.

1877.—The first set of Siemens-Cowper-Cochrane fire-brick hot-blast stoves erected in this country was erected at one of the Crown Point furnaces, in Essex County, N. Y., in 1877, but the first set of these stoves in any part of America was erected at Londonderry, in Nova

Scotia, by the Steel Company of Canada, Limited, in 1876. The Siemens-Cowper-Cochrane stove is an English invention.

1878.—The world's production of pig iron in 1878 was estimated in 1879 by the compiler of this chronological record to have amounted to 14,262,174 tons, and the world's production of steel in the same year was estimated by the same authority to have amounted to 2,941,775 tons.

1880.—The first elevated railroad constructed in this country in connection with a regular freight and passenger railroad was undertaken by the Pennsylvania Railroad Company in 1880 and finished in 1881. It constitutes an extension of the main line of the Pennsylvania Railroad to the heart of the city of Philadelphia and is about a mile long.

1883.—The celebrated steel suspension bridge over the East River, connecting New York with Brooklyn, was projected in 1865, but its construction was not actually undertaken until 1869. Its engineer was John A. Roebling, who died in that year, being succeeded by his son, Washington A. Roebling. The bridge was completed and formally opened on May 24, 1883. The total length of the bridge and approaches is 5,989 feet. The length of the main span is 1,595 feet. The wire cables for the Brooklyn bridge were made of American steel.

1884.—In 1884 we commenced to import iron ore from Cuba.

1884.—The first basic steel made in the United States was produced experimentally at Steelton, Pa., by the Pennsylvania Steel Company, on May 24, 1884, in a Bessemer converter.

1884.—In 1884 there were still in existence in this country several slitting mills, which were used spasmodically in the conversion of iron into nail rods. There was a slitting mill at the Cambridge rolling mills near Boston; another at the Norway steel and iron works at South Boston; another at the Eagle iron works at Roland, Center County, Pa., and another at the Oxford iron and steel works at Frankford, Pa.

1887.—The first contract for American-made armor was made by the Navy Department with the Bethlehem Iron Company on June 1, 1887, and was for two battle ships and four monitors, and called for 6,700 tons of plain steel armor, oil-tempered and annealed, at an average price of $536 per ton. But the first armor actually made in this country was made by this company in 1890.

1888.—The beginning of the manufacture of basic steel in this country as a commercial product dates from 1888, on the 28th of March of which year the first basic open-hearth steel was produced at the Homestead steel works of Carnegie, Phipps & Co., Limited, at Homestead.

1890.—In this year the United States for the first time made more pig iron than Great Britain. This leadership was steadily maintained until 1894, when it was lost, but in 1895 it was regained. In 1896 it was again lost, but it was again regained in 1897, and has since been maintained.

1890.—The world's production of pig iron in this year is given in Iron in All Ages as 26,968,468 tons, and the world's production of steel in this year as 12,151,255 tons. The percentage of pig iron produced by the United States was 34.1, and its percentage of steel was 35.2.

1897.—Two miles below Niagara Falls the Pennsylvania Steel Company, of Steelton, Pa., erected in 1897 a double-deck steel arch bridge over the Niagara River, the central arch of which is 550 feet long. The upper deck is for the use of trains of the Grand Trunk Railroad and the lower deck is for the use of carriages and foot passengers. This bridge and the one mentioned below are among the world's great bridges.

1897.—In 1897 the A. & P. Roberts Company, of Philadelphia, erected a steel arch bridge over the Niagara River, just below the Falls. The length of the main-arch span is 840 feet, and there are two approach spans of 210 and 190 feet, respectively. The height of the roadway above the water line is 185 feet. The bridge is 46 feet wide.

1899.—Mr. Poor reports that in 1899 there were 250,362 miles of railroad track in the United States, including second track and sidings, of which 229,645 miles were laid with steel rails and 20,717 miles were laid with iron rails.

1900.—The production of crucible steel in 1874 was 32,436 tons; in 1880 it was 64,664 tons; in 1890 it was 71,175 tons; in 1899 it was 101,213 tons; and in 1900 it was 100,562 tons.

1900.—The production of open-hearth steel in 1869 was 893 tons; in 1870 it was 1,339 tons; in 1880 it was 100,851 tons; in 1890 it was 513,232 tons; and in 1900 it was 3,398,135 tons.

1900.—The production of Bessemer steel in the United States in 1867 was 2,679 tons; in 1870 it was 37,500 tons; in 1880 it was 1,074,262 tons; in 1890 it was 3,688,871 tons; and in 1899 it was 7,586,354 tons. The production in 1900 was 6,684,770 tons.

1900.—The production of all kinds of steel in the United States in 1867 was 19,643 tons, Bessemer steel included; in 1870 it was 68,750 tons; in 1880 it was 1,247,335 tons; in 1890 it was 4,277,071 tons; in 1899 it was 10,639,857 tons; and in 1900 it was 10,188,329 tons.

1900.—The production of Bessemer steel rails in 1867 was 2,277 tons; in 1870 it was 30,357 tons; in 1880 it was 852,196 tons; in 1890 it was 1,867,837 tons; and in 1900 it was 2,383,654 tons.

1900.—In this year the United States for the first time made more open-hearth steel than Great Britain.

1900.—In 1871 the United States imported 82,969 tons of tin plates; in 1880 it imported 158,049 tons; in 1890 it imported 329,435 tons; and in 1900 it imported 60,386 tons.

1900.—In the last six months of 1891 our production of tin plates and terne plates was 999 tons; in 1895 it was 113,666 tons; in 1899 it was 360,875 tons; and in 1900 it was 302,665 tons.

1900.—In 1872 the production of spiegeleisen and ferro-manganese was 4,072 tons; in 1880 it was 17,503 tons; in 1890 it was 133,180 tons; and in 1900 it was 255,977 tons. These figures are included in the statistics of pig iron already given.

1900.—The world's production of pig iron in 1900 we estimate to have amounted to about 40,400,000 tons.

END OF THE CENTURY STATISTICS OF IRON AND STEEL.

We now present a series of tables which give the most complete statistics that are now available of the production of iron and steel and iron ore and coal in all countries at the close of the nineteenth century. For the United States, Great Britain, Germany, France, and all other leading countries the statistics are nearly complete for 1900, but for other countries which produce comparatively little iron and steel and iron ore and coal we have in the main been able to present only statistics for 1899. It will be fully a year before authentic statistics for all countries for 1900 can be obtained. The tables that are now given present, however, a comprehensive and substantially accurate showing of the progress that had been made in all countries at the end of the century in the manufacture of iron and steel and in the mining of the raw materials of their manufacture, iron ore and coal. We add a table which shows the world's railroad mileage at the end of 1899, railroads being, as already stated, the principal consumers of iron and steel.

Credit is due to the American Iron and Steel Association for the statistics of iron and steel production in the United States and Canada and to the United States Geological Survey for the iron ore and coal and coke statistics for the United States. Statistics for Great Britain and her colonies have been compiled from the publications of the British Iron Trade Association and the Home Office of His Majesty's Government. Statistics for continental European countries have been obtained from the statistical bureaus or other authoritative sources of these countries. Other iron and steel statistics and coal and coke statistics have been obtained from official sources or from the best sources of information that were available. The railroad table has been compiled from data obtained by the Railroad Gazette, of New York, from exhaustive tables recently published in the Archiv für Eisenbahnwesen, an official publication of the Prussian ministry of public works.

Summary of iron and steel statistics for the United States for 1899 and 1900.

Products—United States.	1899.	1900.
Shipments of Lake Superior iron ore ......long tons..	18,251,804	19,059,393
Total production of iron ore ......do....	24,683,173	27,553,161
Total production of coal ......do....	226,553,564	240,965,917
Exports of anthracite coal ......do....	1,707,796	1,662,286
Exports of bituminous coal ......do....	4,044,354	6,255,033
Shipments of Connellsville coke ......short tons..	10,129,764	10,166,234
Total production of coke ......do....	19,668,569	20,533,348
Production of pig iron ......long tons..	13,620,703	13,789,242
Production of spiegeleisen and ferro manganese, included above, long tons	219,768	255,977
Approximate consumption of pig iron ......long tons..	13,779,442	13,177,281
Production of Bessemer steel ingots and castings ......do....	7,586,354	6,684,770
Production of Bessemer steel rails ......do....	2,240,767	2,383,654
Production of open-hearth steel ingots and castings ......do....	2,947,316	3,398,135
Production of crucible and miscellaneous steel ......do....	106,187	105,424
Total production of steel ......do....	10,639,857	10,188,329
Production of tin plates and terne plates ......do....	360,875	302,665
Production of iron and steel wire rods ......do....	1,036,398	846,291
Production of wire nails ......kegs of 100 pounds..	7,618,130	7,233,979
Imports of iron and steel ......long tons..	172,774	209,955
Exports of iron and steel ......do....	942,659	1,154,270
Imports of iron and steel ......values..	$15,800,579	$20,443,908
Exports of iron and steel ......do....	$105,690,047	$129,633,480
Imports of iron ore ......long tons..	674,082	897,831
Imports of iron ore from Cuba, included above ......do....	368,759	419,632
Imports of manganese ore ......do....	188,349	256,252
Locomotives built by independent shops ......number..	2,473	3,153
Locomotives built by Baldwin Locomotive Works, included above.do....	901	1,217
Passenger and freight cars built by independent shops ......do....	123,893	124,106
Steel cars built by Pressed Steel Car Company, included above ....do....	9,624	16,671

Summary of iron and steel statistics for Great Britain for 1899 and 1900.

Products—Great Britain.	1899.	1900.
Production of coal in Great Britain ......long tons..	220,094,781	225,181,300
Exports of coal from Great Britain ......do....	41,180,332	44,089,197
Production of iron ore in Great Britain ......do....	14,461,330	14,028,208
Imports of iron ore by Great Britain ......do....	7,054,578	6,297,963
Production of—		
Pig iron in Great Britain ......do....	9,421,435	*a* 8,908,570
Bessemer steel ingots in Great Britain ......do....	1,825,074	1,745,004
Bessemer steel rails in Great Britain ......do....	838,148	759,844
Open-hearth steel ingots in Great Britain ......do....	3,030,251	3,156,050
All kinds of steel in Great Britain ......do....	5,000,000	5,050,000

a British Iron Trade Association.

Summary of iron and steel statistics for European continental countries for 1899 and 1900.

Products—European continental countries.	1899.	1900.
Production of—	*Metric tons.*	*Metric tons.*
Coal and lignite in France	32,863,702	33,270,385
Iron ore in France	4,985,702	....
Pig iron in France	2,578,401	2,699,494
Bessemer steel ingots in France	879,181	954,261
Open-hearth steel ingots in France	619,845	669,787
Miscellaneous steel in France	31,806	36,070
All kinds of steel in France	1,530,832	1,660,118
Coal and brown coal in Germany	135,844,419	149,551,058
Iron ore in Germany and Luxemburg	17,989,635	18,964,367
Pig iron in Germany and Luxemburg	8,143,132	8,520,390
Finished steel in Germany	6,328,666	6,365,259
Coal in Belgium	22,072,068	23,352,000
Iron ore in Belgium	201,445	....
Pig iron in Belgium	1,024,576	1,018,507
Steel ingots in Belgium	731,249	654,827
Coal in Spain	2,565,437	2,773,000
Iron ore in Spain	9,397,733	8,480,246
Pig iron in Spain	295,840	294,118
Bessemer and open-hearth steel ingots in Spain	122,954	....
Coal in Sweden	239,344	252,320
Iron ore in Sweden	2,435,200	2,609,500
Pig iron in Sweden	497,727	526,868
All kinds of steel in Sweden	273,454	300,536
Coal and lignite in Italy	388,534	....
Iron ore in Italy	236,549	....
Pig iron in Italy	19,218	....
Steel in Italy	108,501	....
Coal and lignite in Austria-Hungary	38,738,372	....
Iron ore in Austria-Hungary	3,293,003	....
Pig iron in Austria-Hungary	1,475,000	....
Steel in Austria-Hungary (1896)	880,696	....
Coal in Russia	13,558,000	15,890,000
Pig iron in Russia	2,675,000	2,895,636
Steel ingots in Russia	....	1,830,260
Finished steel in Russia	1,321,351	1,462,809
Exports of coal from Germany	13,943,174	15,275,805

Summary of iron and steel statistics for various foreign countries for 1899 and 1900.

Products—other countries.		1899.	1900.
Production of—			
Coal in Canada	short tons	4,925,051	5,597,832
Coke in Canada	do	100,820	157,134
Iron ore in Canada	do	74,617	122,000
Pig iron in Canada	long tons	94,077	86,090
Steel in Canada	do	22,000	23,577
Coal in India	do	4,937,160	6,095,438
Iron ore in India	do	60,725	....
Pig iron in India	do	19,631	....
Coal in New South Wales	do	4,597,028	5,507,497
Coal in other Australasia	do	1,830,100	....
Coal in Japan in 1898	metric tons	6,761,301	....
Pig iron in Japan in 1898	do	23,652	....
Iron ore in Algeria	do	550,941	....

Railroad statistics for the United States and for all other countries for 1899.

Railroad statistics.	Miles.
New railroad built in the United States	4,528
Completed railroad in the United States on Dec. 31, 1899	189,295
Completed railroad in Europe at the end of 1899	172,621
Completed railroad in Asia	35,938
Completed railroad in Africa	12,501
Completed railroad in Australasia	14,675
Completed railroad in North America	216,290
Completed railroad in South America	27,874
The world's railroad mileage at the end of 1899	479,899

COMMENTS ON THE TABLES.

Assuming that the countries that made pig iron in 1899 and which do not appear in the columns for 1900 made as much pig iron in the last year of the century as in the preceding year, and making due allowance for the production of such minor pig iron producing countries as are not named in the tables, we have a total world's production of pig iron in 1900 of about 40,400,000 long tons, of which the United States made 13,789,242 tons, or fully 34 per cent. Ascertaining the world's production of steel in the same way, we have a total production in 1900 of about 27,200,000 tons, of which the United States made 10,188,329 tons, or over 37 per cent.

DETAILED IRON AND STEEL STATISTICS.

In the accompanying tables we present detailed statistics of the production of leading articles of iron and steel in the United States in 1900, the last year of the nineteenth century. We also present detailed statistics of the shipments of Lake Superior iron ore and Connellsville coke in 1900; also the average monthly prices of leading articles of iron and steel in 1899 and 1900; also statistics of the imports of iron and steel and of iron ore by the United States in 1899 and 1900; also a table showing the production and prices of Bessemer steel rails in the United States from 1867 to 1900 and the rates of duty imposed on foreign steel rails during that period; also a synopsis of Canadian bounties on the production of iron and steel. The statistics of the production and prices of iron and steel have been compiled by the American Iron and Steel Association, and the statistics of imports and exports have been obtained from the Bureau of Statistics of the Treasury Department.

SHIPMENTS OF LAKE SUPERIOR IRON ORE IN 1900.

The Iron Trade Review publishes complete statistics of the shipments of Lake Superior iron ore from 1897 to 1900, which we give below:

Shipments of Lake Superior iron ore from 1897 to 1900.

[Long tons of 2,240 pounds.]

Port.	1897.	1898.	1899.	1900.
Escanaba	2,302,121	2,803,513	3,720,218	3,436,734
Marquette	1,945,519	2,245,965	2,733,596	2,661,861
Ashland	2,067,637	2,391,088	2,703,447	2,633,687
Two Harbors	2,651,465	2,693,245	3,973,733	4,007,294
Gladstone	341,014	335,956	381,457	418,854
Superior	531,825	550,403	878,942	1,522,899
Duluth	2,376,064	2,635,262	3,509,965	3,888,986
Total by lake	12,215,645	13,655,432	17,901,358	18,570,315
Total all-rail	253,993	369,241	350,446	489,078
Total shipments	12,469,638	14,024,673	18,251,804	19,059,393

SHIPMENTS OF CONNELLSVILLE COKE IN 1900.

For the following information we are indebted to the Connellsville Courier: During the year 1900 the Connellsville coke region shipped 10,166,234 short tons of coke, for which the operators received an estimated average price of $2.70, making the value of the product at the ovens reach the enormous aggregate of $27,448,832. This is one-third more than the amount estimated to have been received for the product of 1899, though in volume it was practically the same, the output that year being 10,129,764 tons. The value of the coke output of 1900 was double the value of that of 1898 or of any earlier year in the history of the Connellsville region. The price of furnace coke ranged all the way from $2.50 to $4, and foundry coke from $2.50 to $4.25.

A glance at the record of the past twenty years shows how wonderfully the coke trade of the Connellsville region has grown in spite of the very many and very extensive coking fields opened in other sections. In 1880 the output was only 2,205,000 tons. It rose gradually in the next decade, until in 1890, a boom year in iron, it reached the then enormous total of 6,464,000 tons. Two years of depression followed, in which the annual output ranged from 4,000,000 to 5,000,000 tons. In 1895 came another boom that sent production up to the previously undreamed-of figure of 8,244,000 tons. The very next year, however, it dropped to 5,411,000 tons, but quickly recovered, and in 1898 showed a total of 8,460,000 tons, a greater output than that of 1895. The output of 1899 and that of 1900, as noted above, exceeded 10,000,000 tons each year.

The total number of ovens in the Connellsville region increased during the year 1900 from 19,689 to 20,954. New ovens to the number of 1,343 were built, while 78 ovens were abandoned, making a net gain of 1,265 ovens. There has been a further increase in 1901.

PRODUCTION OF PIG IRON IN 1900.

The total production of pig iron in the United States in 1900 was 13,789,242 long tons, against 13,620,703 tons in 1899, 11,773,934 tons in 1898, and 9,652,680 tons in 1897. The production in 1900 was 168,539 tons greater than in 1899. The following table gives the half-yearly production of pig iron in the last four years:

Production of pig iron in half-yearly periods.

Period.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
First half	4,403,476	5,869,703	6,289,167	7,642,569
Second half	5,249,204	5,904,231	7,331,536	6,146,673
Total	9,652,680	11,773,934	13,620,703	13,789,242

The production of pig iron in the second half of 1899 and the first half of 1900 aggregated 14,974,105 tons, or almost 15,000,000 tons. It will be observed that there was a decline in production in the second half of 1900, as compared with the first half, of 1,495,896 tons.

The production of Bessemer pig iron in 1900 was 7,943,452 tons, against 8,202,778 tons in 1899. The production of basic pig iron in 1900, all made with coke or mixed anthracite and coke, was 1,072,376 tons, against 985,033 tons in 1899. The production of spiegeleisen and ferro-manganese in 1900 was 255,977 tons, against 219,768 tons in 1899. The production of charcoal pig iron in 1900 was 339,874 tons, against 284,766 tons in 1899.

The whole number of furnaces in blast on December 31, 1900, was 232, against 289 on December 31, 1899, and 283 on June 30, 1900.

PRODUCTION OF PIG IRON BY STATES IN 1897, 1898, 1899, AND 1900.

The following table gives the production of pig iron by States from 1897 to 1900, in long tons:

Production of pig iron in the United States from 1897 to 1900.

State.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Massachusetts	3,284	3,661	2,476	3,310
Connecticut	8,336	6,336	10,129	10,233
New York	243,304	228,011	264,346	292,827
New Jersey	95,696	100,681	127,598	170,262
Pennsylvania	4,631,634	5,537,832	6,558,878	6,365,935
Maryland	193,702	190,974	234,477	290,073
Virginia	307,610	283,274	365,491	490,617
North Carolina Georgia	17,092	13,762	17,835	28,984
Alabama	947,831	1,033,676	1,083,905	1,184,337
Texas	6,175	5,178	5,803	10,150
West Virginia	132,907	192,699	187,858	166,758
Kentucky	35,899	100,724	119,019	71,562
Tennessee	272,130	263,439	346,166	362,190
Ohio	1,372,889	1,986,358	2,378,212	2,470,911
Illinois	1,117,239	1,365,898	1,442,012	1,363,383
Michigan	132,578	147,640	134,443	163,712
Wisconsin Minnesota	103,909	172,781	203,175	184,794
Missouri	23,883	141,010	138,880	159,204
Colorado	6,582			
Total	9,652,680	11,773,934	13,620,703	13,789,242

PRODUCTION OF BESSEMER STEEL INGOTS IN 1900.

The total production of Bessemer steel ingots in 1900 was 6,684,770 long tons, against 7,586,354 tons in 1899, showing a decrease in 1900 of 901,584 tons, or almost 12 per cent. The production of 1899 was the largest in our history, but it may be equaled in a year or two, although open-hearth steel is proving to be a most formidable rival of Bessemer steel. Of the production in 1900, 6,467 tons were steel castings, against a similar production in 1899 of 3,939 tons. The following table gives our production of Bessemer steel ingots, including steel castings, in the last six years.

Production of Bessemer steel ingots in the United States from 1895 to 1900.

Year.	Long tons.	Year.	Long tons.
1895	4,909,128	1898	6,609,017
1896	3,919,906	1899	7,586,354
1897	5,475,315	1900	6,684,770

The following table gives the production of Bessemer steel ingots in the last four years by States:

Production of Bessemer steel ingots from 1897 to 1900, by States.

State.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Pennsylvania	3,060,049	3,402,254	3,968,779	3,488,731
Ohio	1,041,541	1,489,115	1,679,237	1,388,124
Illinois	943,774	1,105,040	1,211,246	1,115,571
Other States	429,951	612,608	727,092	692,344
Total	5,475,315	6,609,017	7,586,354	6,684,770

There were no Clapp-Griffiths works in operation in 1900 and only one Robert-Bessemer plant was active. Seven Tropenas plants were at work, and all were employed in the production of steel castings.

PRODUCTION OF BESSEMER STEEL RAILS IN 1900.

The production of all kinds of Bessemer steel rails by the producers of Bessemer steel ingots in 1900 was 2,361,921 long tons, against a similar production in 1899 of 2,240,767 tons and 1,955,427 tons in 1898. The maximum production of Bessemer steel rails by the producers of Bessemer steel ingots was reached in 1900. The year of next largest production was 1899. In 1887, thirteen years ago, 2,044,819 tons were made. This was the third year of largest production. The following table shows the production, by States, of Bessemer steel rails by the producers of Bessemer steel ingots in the last four years.

Production of Bessemer steel rails in the United States from 1897 to 1900 by the producers of Bessemer steel ingots.

State.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Pennsylvania	1,024,386	1,052,771	1,224,807	1,195,255
Other States	590,013	902,656	1,015,960	1,166,666
Total	1,614,399	1,955,427	2,240,767	2,361,921

To the above total for 1900 must be added 21,733 tons of Bessemer rails made in the same year from purchased blooms and from rerolled and renewed Bessemer rails, making a grand total for the year of 2,383,654 tons of Bessemer steel rails.

PRODUCTION OF ALL KINDS OF RAILS IN THE UNITED STATES IN 1900.

In the year 1900 the United States made the largest quantity of open-hearth rails in recent years, 1,333 tons, and the smallest quantity of iron rails ever recorded, 695 tons, which, added to the Bessemer steel rails above given, make the total production of rails in 1900 amount to 2,385,682 tons, the largest production ever attained in one year.

The following table gives the production of all kinds of rails in 1900 according to the weight of the rails per yard. Included in the total production are 101,312 tons which have been definitely reported to us as street rails.

Kind.	Under 45 pounds.	45 pounds and less than 85.	85 pounds and over.	Total.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Bessemer steel rails	155,950	1,625,646	602,058	2,383,654
Open-hearth steel rails	886	447	....	1,333
Iron rails	695	....	....	695
Total	157,531	1,626,093	602,058	2,385,682

The total production of all kinds of rails in 1899 was 2,272,700 tons, of which 133,836 tons weighed less than 45 pounds to the yard, 1,559,340 tons weighed 45 pounds and less than 85 pounds, and 579,524 tons weighed 85 pounds and over 85 pounds. The street rails made in 1899 amounted to 154,246 tons.

PRODUCTION OF OPEN-HEARTH STEEL IN 1900.

The production of open-hearth steel in the United States in 1900 was 3,398,135 long tons, against 2,947,316 tons in 1899, an increase of 450,819 tons, or over 15 per cent. The following table shows the production of open-hearth steel ingots and direct castings, by States, during the past four years:

Production of open-hearth steel ingots and castings, by States, from 1897 to 1900.

State.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
New England	51,402	47,381	57,124	74,522
New York and New Jersey	39,521	47,957	61,461	67,361
Pennsylvania	1,271,751	1,817,521	2,393,811	2,699,502
Ohio	78,357	79,886	117,458	130,191
Illinois	120,609	183,103	246,183	285,551
Other States	47,031	54,444	71,279	141,008
Total	1,608,671	2,230,292	2,947,316	3,398,135

The open-hearth steel made in 1900 was produced by 94 works in 17 States—Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Kentucky, Tennessee, Alabama, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, and Missouri. Only 76 works and 14 States made open-hearth steel in 1899, the new States to enter the list in 1900 being Delaware, Kentucky, and Tennessee.

In 1899 the production of open-hearth steel by the basic process amounted to 2,080,426 tons and by the acid process to 866,890 tons. Of the total production in 1900, 2,545,091 tons were made by the basic process and 853,044 tons were made by the acid process, as follows:

Production of open-hearth steel by basic and acid processes, by States, in 1900.

State.	Basic open-hearth steel.	Acid open-hearth steel.	Total.
	Long tons.	*Long tons.*	*Long tons.*
New England	28,550	45,972	74,522
New York and New Jersey	33,679	33,682	67,361
Pennsylvania	2,059,595	639,907	2,699,502
Ohio	76,615	53,576	130,191
Illinois	244,935	40,616	285,551
Other States	101,717	39,291	141,008
Total	2,545,091	853,044	3,398,135

The total production of open-hearth steel castings in 1900, included above, amounted to 177,491 long tons, of which 42,644 tons were made by the basic process and 134,847 tons were made by the acid process. In 1899 the production amounted to 169,729 tons, of which 39,689 tons were made by the basic process and 130,040 tons by the acid process. The following table gives the production of open-hearth steel castings by the acid and basic processes in 1900, by States:

Production of open-hearth steel castings by acid and basic processes in 1900.

State.	Acid castings.	Basic castings.	Total.
	Long tons.	*Long tons.*	*Long tons.*
Massachusetts, Connecticut, New York, and New Jersey	20,333	1,550	21,883
Pennsylvania	74,832	3,752	78,584
Other States	39,682	37,342	77,024
Total	134,847	42,644	177,491

In 1900 our open-hearth steel production for the first time exceeded that of Great Britain, which amounted to 3,156,050 tons in that year. Great Britain's production in 1900 was the largest in her history.

PRODUCTION OF WIRE RODS AND WIRE NAILS IN 1900.

The production of iron and steel wire rods in the United States in 1900 amounted to 846,291 long tons, against 1,036,398 tons in 1899 and 1,071,683 tons in 1898, showing a decrease of 190,107 tons, or over 18 per cent, in 1900 as compared with 1899. Of the total production in 1900, 1,929 tons were iron rods and 844,362 tons were steel rods.

Pennsylvania made the largest quantity of wire rods in 1900, with Illinois second, Ohio third, and Massachusetts fourth. Six other States, Connecticut, New York, New Jersey, Kentucky, Alabama, and Indiana, also rolled wire rods in 1900.

The production of steel wire nails in the United States in 1900 amounted to 7,233,979 kegs of 100 pounds, as compared with 7,618,130 in 1899, a decrease of 384,151 kegs, or over 5 per cent. In 1898 the production amounted to 7,418,475 kegs, in 1897 to 8,997,245 kegs, in 1896 to 4,719,860 kegs, and in 1895 to 5,841,403 kegs. The nails produced in 1900 were manufactured by 56 works, three less than in 1899.

The following table gives the production of steel wire nails in 1899 and 1900, by States:

Production of wire nails in 1899 and 1900, by States.

[Kegs of 100 pounds each.]

State.	1899.	1900.
Massachusetts, Rhode Island, and Connecticut	176,877	212,584
New York and New Jersey	49,603	63,466
Pennsylvania	2,905,211	2,158,399
Maryland, West Virginia, Alabama, and Ohio	2,154,823	2,516,391
Indiana and Illinois	2,184,662	2,195,672
Michigan, Wisconsin, Kansas, Washington, and California	146,954	87,467
Total	7,618,130	7,233,979

IMPORTS AND EXPORTS OF IRON AND STEEL IN 1899 AND 1900.

The following table, which we have compiled from the Monthly Summary of the Bureau of Statistics of the Treasury Department, gives the quantities of various leading articles of iron and steel and of iron ore and manganese ore imported into the United States in 1899 and 1900:

Imports of iron and steel in 1899 and 1900.

Imports.	1899.	1900.
	Long tons.	*Long tons.*
Pig iron, spiegeleisen, and ferro-manganese	40,393	52,565
Scrap iron and scrap steel	10,925	34,431
Bar iron	19,345	19,685
Iron and steel rails	2,134	1,448
Hoop, band, or scroll	663	165
Steel ingots, billets, blooms, etc	12,601	12,709
Sheet, plate, and taggers' iron and steel	7,043	5,143
Tin plates	58,915	60,386
Wire rods, iron or steel	17,964	21,092
Wire and wire rope	2,363	1,848
Anvils	240	223
Chains	188	260
Total	172,774	209,955
Iron ore	674,082	897,831
Manganese ore	188,349	256,252

Our total imports of iron and steel, including machinery, cutlery, firearms, etc., for which weights are not obtainable, amounted in foreign value to $20,443,908 in 1900, against $15,800,579 in 1899.

The following table gives the quantities of our exports of leading articles of iron and steel and of iron ore in 1899 and 1900, compiled from the same Summary of the Bureau of Statistics:

Exports of iron and steel in 1899 and 1900.

Exports.	1899.	1900.
	Long tons.	*Long tons.*
Ferro-manganese	13	32
All other pig iron	228,665	286,655
Scrap and old, for remanufacture	76,633	49,328
Bar iron	10,898	13,285
Band, hoop, or scroll iron	2,869	2,976
Bars or rods of steel not wire rods	30,429	81,366
Steel wire rods	16,992	10,652
Billets, ingots, and blooms	25,487	107,385
Cut nails and spikes	9,974	11,163
Wire nails	33,517	27,404
All other nails, including tacks	2,076	1,812
Iron plates and sheets	6,196	9,331
Steel plates and sheets	50,635	45,534
Iron rails	6,442	5,374
Steel rails	271,272	356,245
Wire	116,317	78,014
Structural iron and steel	54,244	67,714
Total	942,659	1,154,270
Iron ore	40,665	51,460
Locomotives ....number..	484	436

Our total exports of iron and steel, which include locomotives, car wheels, machinery, castings, hardware, saws and tools, sewing machines, stoves, printing presses, boilers, etc., amounted in 1900 to $129,633,480, against $105,690,047 in 1899, $82,771,550 in 1898, and $62,737,250 in 1897. Our exports of iron and steel have more than doubled in value in the last four years.

Our exports of agricultural implements, which are not included above, amounted in 1900 to $15,979,909, against $13,594,524 in 1899, $9,073,384 in 1898, and $5,302,807 in 1897. These exports have increased in value more than threefold in the last four years.

AVERAGE MONTHLY PRICES OF IRON AND STEEL IN THE UNITED STATES IN 1899 AND 1900.

The following table gives the average monthly quotations of nine leading articles of iron and steel in the leading markets of Pennsylvania in 1899 and 1900 per long ton of 2,240 pounds, except for bar iron, which is quoted by the hundred pounds. The monthly averages are obtained from weekly quotations. Quotations for best bar iron (base price) at Pittsburg are taken from the American Manufacturer. For best refined bar iron from store at Philadelphia (base price) they have been furnished by a leading iron and steel commission house.

Average monthly prices of iron and steel in the United States in 1899 and 1900.

Month.	Old iron T-rails at Philadelphia.	No. 1 foundry pig iron at Philadelphia.	Gray forge pig iron at Philadelphia.	Gray forge pig iron, lake ore, at Pittsburg.	Bessemer pig iron at Pittsburg.	Steel rails at mills in Pennsylvania.	Steel billets at mills at Pittsburg.	Best refined bar iron from store at Philadelphia.	Best refined bar iron at Pittsburg.
1899.									
January	$13.30	$12.12	$10.75	$9.89	$11.00	$18.50	$17.06	$1.30	$1.12
February	14.16	13.25	11.69	10.87	11.69	20.25	18.87	1.45	1.22
March	16.87	16.00	14.37	13.29	14.77	24.80	24.25	1.70	1.38
April	17.87	16.50	15.00	14.50	15.06	25.75	25.25	1.75	1.65
May	18.00	16.60	15.30	15.07	16.32	25.20	27.56	1.90	1.75
June	18.75	18.62	16.50	15.94	18.70	27.25	31.87	2.00	1.88
July	20.00	20.37	17.81	17.50	20.45	28.25	33.80	2.30	2.00
August	21.30	21.70	18.10	18.37	22.37	31.00	36.37	2.40	2.28
September	23.12	23.50	19.50	20.90	23.85	32.50	41.50	2.50	2.50
October	26.20	23.70	19.65	21.19	24.50	34.00	41.50	2.50	2.60
November	27.50	25.00	20.19	21.56	24.69	35.00	39.00	2.50	2.56
December	27.25	25.00	20.31	21.52	25.00	35.00	36.37	2.50	2.50
1900.									
January	26.20	25.00	20.35	21.00	24.97	35.00	34.50	2.50	2.50
February	26.00	24.50	20.19	21.25	25.00	34.20	33.10	2.35	2.50
March	25.25	23.62	19.19	20.90	24.90	35.00	33.00	2.35	2.50
April	24.00	23.19	18.50	20.50	24.90	35.00	32.00	2.25	2.45
May	21.40	22.60	17.80	19.12	24.90	35.00	28.90	2.12	2.34
June	17.00	20.00	16.50	17.80	21.16	35.00	27.25	1.90	2.20
July	15.25	17.75	14.56	15.50	17.00	35.00	21.00	1.80	2.00
August	13.80	17.20	14.45	14.00	16.07	35.00	18.20	1.60	2.00
September	14.87	17.00	14.12	13.37	14.19	30.25	17.06	1.60	2.00
October	15.75	16.00	13.55	13.00	13.37	26.00	16.80	1.60	1.81
November	17.00	16.40	14.12	13.03	13.70	26.00	19.19	1.75	1.73
December	17.62	16.50	14.50	13.32	13.75	26.00	19.75	1.75	1.75

This table shows violent fluctuations in both years. From January to December, 1899, there was an average advance slightly exceeding 100 per cent. From January to October, 1900, there was an average decline of about 38 per cent. With such violent fluctuations in two years it is nothing less than marvelous that the iron trade should have closed the year 1900, as it did, in a healthy and even prosperous condition. The year itself, taken as a whole, was one of marked prosperity for our iron and steel manufacturers.

The spring months of 1900 witnessed a sharp and general decline in iron and steel prices, following the boom of 1899, and most prices continued to decline until October, when the decline was checked and slight advances were established, which have been maintained in 1901. The certainty that political conditions would not be disturbed had a stimulating effect in that month. Steel rails, however, formed an exception to the general decline in prices in 1900. The price, $35 per ton, that had been established by agreement in October, 1899, was maintained until September, 1900, when it was reduced to $26. In the spring of 1901 it was increased to $28, which is the present price.

Notwithstanding the great decline in prices in 1900 and the blowing out of many furnaces and the closing of many mills in the summer months of that year, due to a shrinkage in demand, the production in some branches was greater than that of the preceding year. In the closing months of 1900 production, except in pig iron, was virtually as active as at any time in 1899, while in 1901 production in many lines has still further increased.

PRODUCTION AND PRICES OF BESSEMER STEEL RAILS FROM 1867 TO 1900.

The following table gives the annual production in long tons of Bessemer steel rails in the United States since 1867, together with their average annual price at works in Pennsylvania and the rates of duty imposed on foreign rails.

Production, prices, and rates of duty on Bessemer steel rails from 1867 to 1900.

Calendar year.	Production.	Price in currency.	Duty.
	Long tons.		
1867	2,277	$166.00	45 per cent ad valorem to January 1, 1871.
1868	6,451	158.50	
1869	8,616	132.25	
1870	30,357	106.75	
1871	34,152	102.50	$28 per ton from January 1, 1871, to August 1, 1872; $25.20 from August 1, 1872, to March 3, 1875; $28 from March 3, 1875, to July 1, 1883.
1872	83,991	112.00	
1873	115,192	120.50	
1874	129,414	94.25	
1875	259,699	68.75	
1876	368,269	59.25	
1877	385,865	45.50	
1878	491,427	42.25	
1879	610,682	48.25	
1880	852,196	67.50	
1881	1,187,770	61.13	
1882	1,284,067	48.50	
1883	1,148,709	37.75	$17 per ton from July 1, 1883, to October 6, 1890.
1884	996,983	30.75	
1885	959,471	28.50	
1886	1,574,703	34.50	
1887	2,101,904	37.08	
1888	1,386,277	29.83	
1889	1,510,057	29.25	
1890	1,867,837	31.75	$13.44 from October 6, 1890, to August 28, 1894.
1891	1,293,053	29.92	
1892	1,537,588	30.00	
1893	1,129,400	28.12	
1894	1,016,013	24.00	$7.84 from August 28, 1894.
1895	1,299,628	24.33	
1896	1,116,958	28.00	
1897	1,644,520	18.75	
1898	1,976,702	17.62	
1899	2,270,585	28.12	
1900	2,383,654	32.29	

The lowest average annual price at which Bessemer steel rails have been sold in this country was reached in 1898, namely, $17.62, but sales were made at Pittsburg in February, 1897, at $17, and all through 1898 at the same figures, and perhaps at even lower figures.

CANADIAN IRON AND STEEL BOUNTIES.

The progress of the Canadian iron and steel industries in recent years has been greatly promoted by the action of the Dominion parliament in enacting the bounty act of June 29, 1897, which provides for the payment of liberal bounties by the Dominion government to the manufacturers of "steel ingots, puddled iron bars, and pig iron," $3 per ton to be paid "on steel ingots manufactured from ingredients of which not less than 50 per cent of the weight thereof consists of pig iron made in Canada;" $3 per ton "on puddled iron bars manufactured from pig iron made in Canada;" $3 per ton "on pig iron on the proportion produced from Canadian ore;" and $2 per ton "on pig iron on the proportion produced from foreign ore." By the terms of the act referred to these bounties were to terminate on April 23, 1902, but an act of the Dominion parliament, dated August 11, 1899, extended the bounty provisions to June 30, 1907, provided, however, that they should be annually reduced after April 23, 1902, as follows: From that date to June 30, 1903, 90 per cent shall be paid; from July 1, 1903, to June 30, 1904, 75 per cent; from July 1, 1904, to June 30, 1905, 55 per cent; from July 1, 1905, to June 30, 1906, 35 per cent; from July 1, 1906, to June 30, 1907, 20 per cent. The act of August 11, 1899, also provided that "notwithstanding anything in the statutes of 1897, or in this act, no bounty shall be paid under this act on steel ingots made from puddled iron bars manufactured in Canada." The bounty provisions of the act of June 29, 1897, were held to have come into force on April 23, 1897. We have quoted from an official copy of the acts of the Dominion parliament. The above information is given here because of the recent rapid progress in the development of the iron and steel industries of Canada.

PHILADELPHIA, *June 30, 1901.*

GOLD AND SILVER.

By George E. Roberts,
Director of the Mint.

PRODUCTION.

The year 1900 recorded a further increase in the production of gold in the United States, and not only the highest total ever reached, but the largest gain over any previous year that has been made in the present period of increasing output. The yield for the year was 3,829,897 fine ounces, of the value of $79,171,000, a gain over the year 1899 of 392,687 fine ounces, and in value of $8,117,600.

The most important gains were in the Seward Peninsula of Alaska, the Cripple Creek district of Colorado, and the Territory of Arizona. Gold was discovered in the beach sands of Cape Nome in 1898, and the yield from beach and tundra in that locality was $2,400,000 for that season. The beach diggings claimed the most attention during 1898. A shovel, pick, and rocker were all that was required to equip an able-bodied man for profitable operations, and the handsome results won by hundreds caused a tremendous influx of gold hunters in the spring of 1899. By the time the outsiders arrived, however, the beach was practically worked out, and those who did not abandon the Territory scattered over the interior and up and down the peninsula searching the creek beds and tundra. Valuable claims were developed in a number of localities, and the total yield credited to this territory, about 350 miles long by 100 miles wide, for the year 1900 is $5,100,000. It would have been considerably more but for the legal complications which tied up many of the claims.

The beach claims were found where streams empty, or in times past have emptied, into the ocean, bringing gold from the placers above. The gold, black sand, and garnets were concentrated in layers, or pay streaks, as the miners call them, from one-fourth of an inch to 2 inches in thickness. In spots they were very rich, as at the mouth of Daniels Creek, where the action of the waves had concentrated values to such an extent that miners in the early spring of 1900 took out from $10,000 to $15,000 with a single rocker. It has been a common opinion that the black sand which is associated with the gold is itself gold bearing, but careful investigation determines that this is not the case. By reason of its high specific gravity the action of the water has deposited this sand with the gold.

The tundra claims are of value only where they are located upon the bed of an old stream. These claims might properly be called beach claims, as they are commonly above the present water level of adjacent streams. The most productive claims of the year were located on Anvil Creek, Glacier and Snow gulches, Dexter Creek, Dry Creek, Nikola Gulch, Topkak and Daniels creeks, Gold Run, Crooked Creek, Ophir Creek, and Sweetcake Creek.

While pay dirt is widely distributed, and, in many places, exceedingly rich, yet the depth, when compared with the gravel banks of California and other fields in the United States, is small. The average depth of pay dirt in the Cape Nome district is about 2 feet. This gravel thaws out on exposure to the sun, and can be very easily handled with the shovel. The country is flat, and there is practically no dump, which would be a serious drawback to hydraulic mining, even if there were sufficient dirt to handle.

There was no gain, but a small loss, in the amount of gold obtained in Alaska from quartz. The quartz mines are in southeastern Alaska. On Baranof Island the quartz mining and milling operations are on as extensive a scale as in any place in the world, though the grade of the ore is low. With water power and stamp mills of large capacity ore worth less than $2 is made to pay. The three large mines on the island, which are under one management, though in separate companies, employ 805 men, and in 1900 crushed and treated at their mills 912,447 tons of ore, or over 76,000 tons monthly throughout the year.

Colorado in 1900 made a gain in its production of gold amounting to 137.702 fine ounces and in value to $2,846,600. Of this increase the Cripple Creek district supplied $2,415,285. The record of this district from the year of its discovery to the present, as shown by the reports of the Bureau of the Mint, is as follows:

Production of gold in Cripple Creek, Colo., district.

1891	$2,000
1892	583,010
1893	2,010,367
1894	2,908,702
1895	6,879,137
1896	7,512,911
1897	10,139,708
1898	13,507,244
1899	15,658,254
1900	18,073,539
Total	77,274,872

Development work in this district was very heavy during the year, but the area of good gold-bearing territory was not materially widened. Nearly all old producers kept development work ahead of production, and reserves in sight are enormous. Twelve shafts, on as many properties, are down over 1,200 feet, and the ore bodies at this depth are very promising. Perhaps the most significant feature of the year's progress was the tendency to consolidate small properties by the organization of large companies and by the outright purchase of single claims by heavy investors. A large amount of valuable territory has by this means passed into strong hands and extensive development operations are certain to result. The new mills and reduction works constructed during the year, with the additions made to old works, give an increased capacity for about 1,200 tons of ore per day.

The Leadville district shows a gain of $504,280 in gold over the year 1899. The tendency to consolidation noted in the Cripple Creek district is also apparent here. The notable feature of this district is the enormous outlay for pumping water. It is done under an agreement by which the several companies divide the cost on the basis of the value of their output. They raise 15,000,000 gallons per day, or 28.6 tons of water for each ton of ore. The cost last year was $1.14 for each ton of ore raised.

There is activity in all the gold-producing counties of Colorado, with many large tunnel and other enterprises which involve heavy investments under way.

The increased production of Arizona is largely by the development work and enlarged equipment of a few great mines, but the number of discoveries reported and small plants in operation promises well for a growing output in the future.

The yield of silver in the United States shows an increase of about 3,000,000 ounces, and has been exceeded in but three years—1891, 1892, and 1893. It is worthy of note that production should be thus maintained notwithstanding the fact that few mines are now worked for silver alone. Colorado produced over 20,000,000 ounces, of which over 16,000,000 ounces were from lead and copper ores. Montana produced over 14,000,000 ounces, of which over 11,000,000 were from copper and lead ores. Two-thirds of the output of silver in the United States is obtained as a by-product from mines which would be operated no matter what the price of silver might be.

The production by States is given in the tables below:

Product of gold and silver in the United States from 1792.

[The estimates for 1792 to 1873 are by Dr. R. W. Raymond, United States mining commissioner, and since by the Director of the Mint.]

Year.	Total.	Gold.	Silver.
April 2, 1792, to July 31, 1834	$14,000,000	$14,000,000	Small.
July 31, 1834, to Dec. 31, 1844	7,750,000	7,500,000	$250,000
1845	1,058,327	1,008,327	50,000
1846	1,189,357	1,139,357	50,000
1847	939,085	889,085	50,000
1848	10,050,000	10,000,000	50,000

Product of gold and silver in the United States from 1792—Continued.

Year.	Total.	Gold.	Silver.
1849	$40,050,000	$40,000,000	$50,000
1850	50,050,000	50,000,000	50,000
1851	55,050,000	55,000,000	50,000
1852	60,050,000	60,000,000	50,000
1853	65,050,000	65,000,000	50,000
1854	60,050,000	60,000,000	50,000
1855	55,050,000	55,000,000	50,000
1856	55,050,000	55,000,000	50,000
1857	55,050,000	55,000,000	50,000
1858	50,500,000	50,000,000	500,000
1859	50,100,000	50,000,000	100,000
1860	46,150,000	46,000,000	150,000
1861	45,000,000	43,000,000	2,000,000
1862	43,700,000	39,200,000	4,500,000
1863	48,500,000	40,000,000	8,500,000
1864	57,100,000	46,100,000	11,000,000
1865	64,475,000	53,225,000	11,250,000
1866	63,500,000	53,500,000	10,000,000
1867	65,225,000	51,725,000	13,500,000
1868	60,000,000	48,000,000	12,000,000
1869	61,500,000	49,500,000	12,000,000
1870	66,000,000	50,000,000	16,000,000
1871	66,500,000	43,500,000	23,000,000
1872	64,750,000	36,000,000	28,750,000
1873	71,750,000	36,000,000	35,750,000
1874	70,800,000	33,500 000	37,300,000
1875	65,100,000	33,400,000	31,700,000
1876	78,700,000	39,900,000	38,800,000
1877	86,700,000	46,900,000	39,800,000
1878	96,400,000	51,200,000	45,200,000
1879	79,700,000	38,900,000	40,800,000
1880	75,200,000	36,000,000	39,200,000
1881	77,700,000	34,700,000	43,000,000
1882	79,300,000	32,500,000	46,800,000
1883	76,200,000	30,000,000	46,200,000
1884	79,600,000	30,800,000	48,800,000
1885	83,400,000	31,800,000	51,600,000
1886	86,000,000	35,000,000	51,000,000
1887	86,350,000	33,000,000	53,350,000
1888	92,370,000	33,175,000	59,195,000
1889:			
Mint	97,446,000	32,800,000	64,646,000
Census	99,282,866	32,886,180	66,396,686
1890	103,309,645	32,845,000	70,464,645
1891	108,591,565	33,175,000	75,416,565
1892	115,009,150	33,000,000	82,099,150
1893	113,525,757	35,950,000	77,575,757
1894	103,500,000	39,500,000	64,000,000
1895	118,661,000	46,610,000	72,051,000
1896	129,157,236	53,088,000	76,069,236
1897	127,000,172	57,363,000	69,637,172
1898	134,847,485	64,463,000	70,384,485
1899	141,860,026	71,053,400	70,806,626
1900	153,704,495	79,171,000	74,533,495

Production of gold in the United States in 1898 and 1899, and the increase or decrease in 1899, by States and Territories.

[Fine ounces.]

State or Territory.	1898.	1899.	Increase.	Decrease.
Alaska	122,137	264,104	141,967	....
Arizona	119,249	124,133	4,884	....
California	756,483	735,194	....	21,289
Colorado	1,122,073	1,256,920	134,847	....
Georgia	6,221	5,466	....	755
Idaho	83,055	91,380	8,325	....
Maine	....	174	174	....
Michigan	5	5	....	....
Montana	248,014	230,270	....	17,744
Nevada	144,859	107,344	....	37,515
New Mexico	26,074	28,256	2,182	....
North Carolina	4,064	1,669	....	2,395
Oregon	56,966	69,152	12,186	....
South Carolina	5,041	7,745	2,704	....
South Dakota	275,723	312,962	37,239	....
Texas	14	334	320	....
Utah	110,556	166,933	56,377	....
Washington	37,065	33,156	....	3,909
Wyoming	257	1,413	1,156	....
Other States	542	600	58	....
Total	3,118,398	3,437,210	318,812	....

Production of silver in the United States in 1898 and 1899, and the increase or decrease in 1899, by States and Territories.

[Fine ounces.]

State or Territory.	1898.	1899.	Increase.	Decrease.
Alaska	92,400	140,100	47,700	....
Arizona	2,246,800	1,578,300	....	668,500
California	642,300	824,300	182,000	....
Colorado	22,815,600	22,662,900	....	152,700
Georgia	500	400	....	100
Idaho	5,073,800	3,851,800	....	1,222,000
Maine	....	500	500	....
Michigan	32,400	112,800	80,400	....
Montana	14,807,200	16,096,000	1,288,800	....
Nevada	805,000	843,400	38,400	....
New Mexico	425,300	503,300	78,000	....
North Carolina	700	300	....	400
Oregon	130,000	134,300	4,300	....
South Carolina	300	400	100	....
South Dakota	152,300	145,600	....	6,700
Texas	472,900	520,000	47,100	....
Utah	6,485,900	7,093,300	607,400	....
Washington	254,400	256,000	1,600	....
Other States	200	800	600	....
Total	54,438,000	54,764,500	326,500	....

Approximate distribution, by producing States and Territories, of the product of gold and silver in the United States for the calendar year 1898.

[As estimated by the Director of the Mint.]

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama	242	$5,000	100	$129	$5,129
Alaska	122,137	2,524,800	92,400	119,467	2,644,267
Arizona	119,249	2,465,100	2,246,800	2,904,954	5,370,054
California	756,483	15,637,900	642,300	830,448	16,468,348
Colorado	1,122,073	23,195,300	22,815,600	29,498,958	52,694,258
Georgia	6,221	128,600	500	646	129,246
Idaho	83,055	1,716,900	5,073,800	6,560,065	8,276,965
Iowa	5	100			100
Maryland	29	600			600
Michigan	5	100	32,400	41,891	41,991
Minnesota	5	100			100
Montana	248,014	5,126,900	14,807,200	19,144,663	24,271,563
Nevada	144,859	2,994,500	805,000	1,040,808	4,035,308
New Mexico	26,074	539,000	425,300	549,883	1,088,883
North Carolina	4,064	84,000	700	905	84,905
Oregon	56,966	1,177,600	130,000	168,081	1,345,681
South Carolina	5,041	104,200	300	388	104,582
South Dakota	275,723	5,699,700	152,300	196,913	5,896,613
Tennessee	43	900			900
Texas	14	300	472,900	611,426	611,726
Utah	110,556	2,285,400	6,485,900	8,385,810	10,671,210
Virginia	218	4,500			4,500
Washington	37,065	766,200	254,400	328,921	1,095,121
Wyoming	257	5,300	100	129	5,429
Total	3,118,398	64,463,000	54,438,000	70,384,485	134,847,485

Production of gold in the United States in 1899 and 1900 and the increase or decrease in 1900 by States and Territories.

State or Territory.	Value.			
	1899.	1900.	Increase.	Decrease.
Alaska	$5,459,500	$8,171,000	$2,711,500	
Arizona	2,566,100	4,193,400	1,627,300	
California	15,197,800	15,816,200	618,400	
Colorado	25,982,800	28,829,400	2,846,600	
Georgia	113,000	116,700	3,700	
Idaho	1,889,000	1,724,700		$164,300
Michigan	100	29,000	28,900	
Montana	4,760,100	4,698,000		62,100
Nevada	2,219,000	2,006,200		212,800
New Mexico	584,100	832,900	248,800	
North Carolina	34,500	28,500		6,000
Oregon	1,429,500	1,694,700	265,200	
South Carolina	160,100	121,000		39,100
South Dakota	6,469,500	6,177,600		291,900
Texas	6,900	1,100		5,800

Production of gold in the United States in 1899 and 1900 and the increase or decrease in 1900 by States and Territories—Continued.

State or Territory.	Value.			
	1899.	1900.	Increase.	Decrease.
Utah	$3,450,800	$3,972,200	$521,400	
Washington	685,400	718,200	32,800	
Alabama, Maryland, Minnesota, Tennessee, Vermont, Virginia, Wyoming, Maine, Missouri	45,200	40,200		$5,000
Total	71,053,400	*a*79,171,000	8,904,600	787,000
Net increase			8,117,600	

a 3,829,897 fine ounces.

Production of silver in the United States in 1899 and 1900 and the increase or decrease in 1900, by States and Territories

State or Territory.	Weight.			
	1899.	1900.	Increase.	Decrease.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Alabama	100	100		
Alaska	140,100	73,300		66,800
Arizona	1,578,300	2,995,500	1,417,200	
California	824,300	941,400	117,100	
Colorado	22,662,900	20,483,900		2,179,000
Georgia	400	400		
Idaho	3,851,800	6,429,100	2,577,300	
Michigan	112,800	102,000		10,800
Montana	16,096,000	14,195,400		1,900,600
Nevada	843,400	1,358,700	515,300	
New Mexico	503,300	434,300		69,000
North Carolina	300	11,200	10,900	
Oregon	134,300	115,400		18,900
South Carolina	400	400		
South Dakota	145,600	536,200	390,600	
Texas	520,000	477,400		42,600
Utah	7,093,300	9,267,600	2,174,300	
Washington	256,000	224,500		31,500
Wyoming	400	200		200
Maryland	100			100
Virginia	100			100
Maine	500			500
Missouri	100			100
Total	54,764,500	*a* 57,647,000	7,202,700	4,320,200
Net increase			2,882,500	

a Commercial value, $35,741,100.

Approximate distribution, by producing States and Territories, of the product of gold and silver in the United States for the calendar year 1899.

[As estimated by the Director of the Mint.]

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama	208	$4,300	100	$129	$4,429
Alaska	264,104	5,459,500	140,100	181,140	5,640,640
Arizona	124,133	2,566,100	1,578,300	2,040,630	4,606,730
California	735,194	15,197,800	824,300	1,065,762	16,263,562
Colorado	1,256,920	25,982,800	22,662,900	29,301,527	55,284,327
Georgia	5,466	113,000	400	517	113,517
Idaho	91,380	1,889,000	3,851,800	4,980,105	6,869,105
Maine	174	3,600	500	646	4,246
Maryland	39	800	100	129	929
Michigan	5	100	112,800	145,843	145,943
Missouri	5	100	100	129	229
Montana	230,270	4,760,100	16,096,000	20,810,990	25,571,090
Nevada	107,344	2,219,000	843,400	1,090,457	3,309,457
New Mexico	28,256	584,100	503,300	650,731	1,234,831
North Carolina	1,669	34,500	300	388	34,888
Oregon	69,152	1,429,500	134,300	173,641	1,603,141
South Carolina	7,745	160,100	400	517	160,617
South Dakota	312,962	6,469,500	145,600	188,251	6,657,751
Texas	334	6,900	520,000	672,323	679,223
Utah	166,933	3,450,800	7,093,300	9,171,135	12,621,935
Vermont	5	100	....	....	100
Virginia	343	7,100	100	129	7,229
Washington	33,156	685,400	256,000	330,990	1,016,390
Wyoming	1,413	29,200	400	517	29,717
Total	3,437,210	71,053,400	54,764,500	70,806,626	141,860,026

Approximate distribution, by producing States and Territories, of the gold and silver product of the United States for the calendar year 1900 as to sources of production.

[As reported by officers and agents of the mint.]

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores.	Copper ores.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Alabama	62	65	50	....	....
Alaska	101,095	293,944	74,818	....	....
Arizona	196,494	9,100	2,571,977	225,732	1,452,291
California	607,485	159,905	614,412	54,713	499,032
Colorado	1,361,643	34,914	4,802,856	*a* 16,079,127	....
Georgia	4,535	1,489	489	....	....
Idaho	56,804	43,721	1,021,153	5,528,965	....
Maryland	10	9	2	....	....
Michigan	1,401	....	....	....	102,042
Montana	202,406	26,709	2,835,948	2,134,802	9,324,085
Nevada	96,911	990	1,125,000	368,566	....
New Mexico	39,140	3,628	139,619	90,000	300,000
North Carolina	888	1,272	12,364	....	....
Oregon	68,319	15,268	79,668	52,374	....
South Carolina	5,628	306	391	....	....

a Lead and copper ores.

Approximate distribution, by producing States and Territories, of the gold and silver product of the United States for the calendar year 1900, etc.—Continued.

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores.	Copper ores.
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
South Dakota	300,955		558,903		
Tennessee		15	1		
Texas	53		477,400		
Utah	195,223		2,027,038	5,912,184	1,442,462
Virginia	78	94	96		
Washington	30,664	4,768	154,270	146,300	2,000
Wyoming		1,653	256		
Total	3,269,794	597,850	16,496,711	30,592,763	13,121,912

Approximate distribution, by producing States and Territories, of the product of gold and silver in the United States for the calendar year 1900.

[As estimated by the Director of the Mint.]

State or Territory.	Gold.		Silver.			Total value (silver at commercial value).
	Fine ounces.	Value.	Fine ounces.	Coining value.	Commercial value.	
Alabama	92	$1,900	100	$129	$62	$1,962
Alaska	395,271	8,171,000	73,300	94,772	45,446	8,216,446
Arizona	202,856	4,193,400	2,995,500	3,872,970	1,857,210	6,050,610
California	765,109	15,816,200	941,400	1,217,165	583,668	16,399,868
Colorado	1,394,622	28,829,400	20,483,900	26,484,234	12,700,018	41,529,418
Georgia	5,644	116,700	400	517	248	116,948
Idaho	83,433	1,724,700	6,429,100	8,312,372	3,986,042	5,710,742
Maryland	5	100				100
Michigan	1,403	29,000	102,000	131,879	63,240	92,240
Missouri	33	700				700
Montana	227,266	4,698,000	14,195,400	18,353,648	8,801,148	13,499,148
Nevada	97,050	2,006,200	1,358,700	1,756,703	842,394	2,848,594
New Mexico	40,292	832,900	434,300	561,519	269,266	1,102,166
North Carolina	1,379	28,500	11,200	14,481	6,944	35,444
Oregon	81,980	1,694,700	115,400	149,204	71,548	1,766,248
South Carolina	5,854	121,000	400	517	248	121,248
South Dakota	298,842	6,177,600	536,200	693,269	332,444	6,510,044
Tennessee	5	100				100
Texas	53	1,100	477,400	617,244	295,988	297,088
Utah	192,155	3,972,200	9,267,600	11,982,351	5,745,912	9,718,112
Virginia	155	3,200				3,200
Washington	34,743	718,200	224,500	290,263	139,190	857,390
Wyoming	1,655	34,200	200	258	124	34,324
Total	3,829,897	79,171,000	57,647,000	74,533,495	35,741,140	114,912,140

MANGANESE ORES.

By John Birkinbine.

PRODUCTION.

SUMMARY OF PRODUCTION AND VALUE.

In the year ending December 31, 1900, the production of manganese ores in the United States amounted to 11,771 long tons, valued at $100,289, or $8.52 per ton. This was an increase of 1,836 long tons, or 18.48 per cent over the 1899 total of 9,935 long tons, and the total value was augmented $18,011 in 1900.

The bulk of the manganese ore in 1900 used by the steel companies came from foreign countries—Russia, Brazil, Cuba, India, Chile, Turkey, United States of Colombia, etc.

Only six States produced manganese ore in the year 1900. Virginia heads this list with 7,881 long tons, or 67 per cent of the total for the United States; Georgia stands second on the list. Arkansas, formerly an important contributor of good manganese ore, is third, with but 145 tons to its credit in 1900.

The following table indicates the amount, value, and average value per ton of the manganese ores produced in the United States, by States, from 1896 to 1900:

Amount and value of manganese ores produced in the United States from 1896 to 1900.

State.	1896.			1897.			1898.		
	Product.	Total value.	Average value per ton.	Product.	Total value.	Average value per ton.	Product.	Total value.	Average value per ton.
	Long tons.			*Long tons.*			*Long tons.*		
Alabama	....	....	....	....	....	....	22	*a* $143	*a* $6.50
Arkansas	3,421	$36,686	$10.72	3,240	$33,708	$10.40	2,662	26,035	9.78
California	284	3,415	12.02	484	2,788	5.76	541	3,222	5.96
Georgia	4,085	27,032	6.62	3,332	22,084	6.63	6,689	41,571	6.21
Michigan	....	....	....	37	370	10.00	....	....	....
Missouri	....	....	....	....	....	....	....	....	....
Montana	....	....	....	....	....	....	....	....	....
North Carolina	2	17	8.50	....	....	....	....	....	....
Pennsylvania	265	1,988	7.50	354	2,832	8.00	....	....	....
Tennessee	....	....	....	11	93	8.45	381	2,276	5.97
Virginia	2,018	21,485	10.65	3,650	33,630	9.21	5,662	55,938	9.88
West Virginia	13	104	8.00	....	....	....	....	....	....
Total	10,088	90,727	8.99	11,108	95,505	8.60	15,957	129,185	8.10

a Estimated.

Amount and value of manganese ores produced in the United States, etc.—Continued.

State.	1899.			1900.		
	Product.	Total value.	Average value per ton.	Product.	Total value.	Average value per ton.
	Long tons.			*Long tons.*		
Alabama	....	....	....	....	....	....
Arkansas	356	$3,781	$10.62	145	$1,530	$10.55
California	115	855	7.43	131	1,310	10.00
Georgia	3,089	23,377	7.57	3,447	26,816	7.78
Michigan	....	....	....	....	....	....
Missouri	16	160	10.00	....	....	....
Montana	....	....	....	137	514	3.75
North Carolina	90	765	8.50	....	....	....
Pennsylvania	12	58	4.83	....	....	....
Tennessee	19	133	7.00	30	195	6.50
Virginia	6,228	53,069	8.52	7,881	69,924	8.87
West Virginia	10	80	8.00	....	....	....
Total	9,935	82,278	8.28	11,771	100,289	8.52

This table shows an increase in all of the States having active mines, except Arkansas, and in the States of Missouri, North Carolina, Pennsylvania, and West Virginia, which did not mine manganese ores in 1900.

Outside of Virginia and Georgia comparatively little ore was mined. These two States contributed 11,328 long tons, or 96 per cent of the United States total of 11,771 long tons. The States named and Arkansas have been the principal producers of manganese ores, and the amount mined by each, as well as that of the other States, which have been grouped together, are given in the following table for the years 1880 to 1900, inclusive:

Production of manganese ores in the United States from 1880 to 1900.

[Maxima are given in italics.]

Year.	Virginia.	Arkansas.	Georgia.	Other States.	Total.	Total value.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	
1880	3,661	....	1,800	300	5,761	$86,415
1881	3,295	100	1,200	300	4,895	73,425
1882	2,982	175	1,000	375	4,532	67,980
1883	5,355	400	....	400	6,155	92,325
1884	8,980	800	....	400	10,180	122,160
1885	18,745	1,483	2,580	450	23,258	190,281
1886	*20,567*	3,316	6,041	269	30,193	277,636
1887	19,835	5,651	*9,024*	14	*34,524*	*333,844*
1888	17,646	4,312	5,568	1,672	29,198	279,571
1889	14,616	2,528	5,208	1,845	24,197	240,559
1890	12,699	5,339	749	*6,897*	25,684	219,050
1891	16,248	1,650	3,575	1,943	23,416	239,129
1892	6,079	*6,708*	826	....	13,613	129,586
1893	4,092	2,020	724	882	7,718	66,614
1894	1,797	1,934	1,277	1,300	6,308	53,635

Production of manganese ores in the United States from 1880 to 1900—Continued.

Year.	Virginia.	Arkansas.	Georgia.	Other States.	Total.	Total value.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	
1895	1,715	2,991	3,856	985	9,547	$71,769
1896	2,018	3,421	4,C85	564	10,088	90,727
1897	3,650	3,240	3,332	886	11,108	95,505
1898	5,662	2,662	6,689	944	15,957	129,185
1899	6,228	356	3,089	262	9,935	82,278
1900	7,881	145	3,447	298	11,771	100,289
Total for 21 years	183,751	49,231	64,070	20,986	318,038	3,041,963

PRODUCTION OF MANGANIFEROUS IRON ORES.

As in previous reports, the amount of manganiferous iron ores produced has been included in the report on iron ores, but is also given here as a matter of record.

The output of some of the mines of Colorado is used in the manufacture of spiegeleisen, some of the ores carrying as high as 45 per cent of manganese, but the greater portion of the manganiferous ores is used as a flux by the silver smelters.

Several of the Lake Superior mines produce iron ores carrying small percentages of manganese.

The quantity and value of manganiferous iron ores mined and the percentage of manganese which they contain are given by States in the following table:

Production of manganiferous iron ores in 1900.

Locality.	Quantity.	Manganese.	Average value per ton at mine.	Total value.
	Long tons.	*Per cent.*		
Colorado	43,303	18 to 45	$4.74	$205,256
Lake Superior region	334,274	1 to 9.54	2.49	832,058
Total	377,577	1 to 45	2.75	1,037,314

The production, total, and average value of the manganiferous iron ores produced in the United States from 1889 to 1900, inclusive, are as follows:

Total production of manganiferous iron ores in the United States from 1889 to 1900.

[Maxima in italics.]

Year.	Total product.	Total value.	Average value per ton.
	Long tons.		
1889	83,434	$271,680	$3.26
1890	61,863	231,655	*3.74*
1891	132,511	314,099	2.37
1892	153,373	354,664	.31
1893	117,782	283,228	2.40
1894	205,488	408,597	1.99
1895	125,729	233,998	1.86
1896	338,712	726,413	2.14
1897	202,304	343,784	1.70
1898	287,810	429,302	1.49
1899	*761,845*	*1,147,047*	1.51
1900	377,577	1,037,314	2.75

MANGANIFEROUS SILVER ORES.

In mining the precious metals, ores containing iron, manganese, and silver are obtained (the proportion of the latter not being large enough to make it valuable per se), which are used as a flux by the smelters. This ore is classed as an iron ore, but the amounts and values of this character of ore won during the years 1889 to 1900, inclusive, are given in the following table:

Production of manganiferous silver ores in the United States from 1889 to 1900.

[Maxima in italics.]

Year.	Quantity.	Value.	Average value per ton.
	Long tons.		
1889	64,987	$227,455	$3.50
1890	51,840	181,440	3.50
1891	79,511	397,555	5.00
1892	62,309	323,794	*5.20*
1893	*a* 55,962	258,695	4.75
1894	*b* 31,687	148,292	4.84
1895	54,163	229,651	4.24
1896	138,079	416,020	3.01
1897	149,502	424,151	2.84
1898	99,651	295,412	2.96
1899	79,855	266,343	3.34
1900	*188,509*	*897,068*	4.76

a Including 1,500 tons from Montana, for which no value is given.
b Including 1,049 tons from Montana, for which no value is given.

MANGANIFEROUS ZINC ORES.

The franklinite ores of New Jersey, after being treated to obtain the zinc contents, leave a residuum containing iron and manganese, which is utilized in the production of spiegel. In the year 1900 87,110 tons were produced. The amounts and values for the years since 1889 are given below:

Production of manganiferous zinc ore residuum in the United States from 1889 to 1900.

[Maxima in italics.]

Year.	Quantity.	Value.	Average value per ton.
	Long tons.		
1889	43,648	$54,560	$1.25
1890	48,560	*60,700*	1.25
1891	38,228	57,432	*1.50*
1892	31,859	25,937	.81
1893	37,512	30,535	.81
1894	26,981	20,464	.76
1895	43,249	24,451	.57
1896	44,953	20,455	.46
1897	33,924	18,713	.55
1898	48,502	*a* 26,676	.55
1899	65,010	32,505	.50
1900	*87,110*	34,844	.40

a Estimated.

PRODUCTION OF MANGANESE AND MANGANIFEROUS ORES.

In the next table is given a résumé of the production in 1900 of all the ores containing manganese in varying percentages, together with the values of the same.

Production of manganese and manganiferous ores in the United States in 1900.

Kind of ore.	Quantity.	Total value.	Average value per ton.
	Long tons.		
Manganese	11,771	$100,289	$8.52
Manganiferous iron ores	377,577	1,037,314	2.75
Manganiferous silver ores	188,509	897,068	4.76
Manganiferous zinc ore	87,110	34,844	.40
Total	664,967	2,069,515	3.11

PRODUCTION OF MANGANESE ORES, BY STATES.

ARKANSAS.

The Batesville district had but two active mines in 1900, which were restricted in their output, the total being but 145 long tons. There are some deposits containing ore high in manganese, but much of it carried considerable phosphorus, reducing its value.

The production in the Batesville district from 1850 to 1900, inclusive, was 49,801 long tons, as will be seen below:

Production of manganese in the Batesville district of Arkansas to December 31, 1900.

[Maximum in italics.]

Year.	Authority.	Quantity.
		Long tons.
1850 to 1867	Estimated	400
1868	.....do	10
1881	Railroad reports of shipments	100
1882	.....do	175
1883	.....do	400
1884	.....do	800
1885	Mineral Resources of the United States	1,483
1886	.....do	3,316
1887	.....do	5,651
1888	.....do	4,312
1889	Eleventh Census	2,528
1890	Mineral Resources of the United States	5,339
1891	.....do	1,650
1892	.....do	*6,708*
1893	.....do	2,180
1894	.....do	1,934
1895	.....do	2,991
1896	.....do	3,421
1897	.....do	3,240
1898	.....do	2,662
1899	.....do	356
1900	.....do	145
Total		49,801

CALIFORNIA.

All of the manganese ore mined in California in 1900 came from Alameda County, with the exception of 1 ton from Plumas County.

A demand formerly existed for black oxide of manganese in the chlorination process, but most of the gold mines now send the sulphuret ores to the smelters, and the railroad freights are too high to encourage the shipment of manganese ores, although some of them are of good grade.

The total production of California from 1874 to the end of 1900 was 9,902 long tons, of which 131 tons are credited to 1900. The yearly output has been as follows:

Total production of manganese ores in California to December 31, 1900.

Year.	Quantity.	Year.	Quantity.
	Long tons.		*Long tons.*
1874 to 1888	6,000	1895	525
1889	53	1896	284
1890	386	1897	484
1891	705	1898	541
1892	......	1899	115
1893	400	1900	131
1894	278	Total	9,902

COLORADO.

A large proportion of the iron ore mined in this State, particularly in the vicinity of Leadville, Lake County, contains manganese in varying quantities, some of which is used in the manufacture of spiegeleisen and the remainder as a flux in the silver smelters.

The rapid extension of the steel industry in Colorado gives promise of a large local consumption of manganiferous ores in the near future.

The production of these two classes of ore, as reported to this office, from 1889 to 1900 was as follows:

Production of manganiferous ores in Colorado from 1889 to 1900.

Ore.	1889.	1890.	1891.	1892.	1893.	1894.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Manganiferous iron ores used for producing spiegeleisen.	2,075	....	964	3,100	5,766	7,022
Manganiferous silver ores ...	64,987	51,840	79,511	62,309	54,462	30,187
Total....................	67,062	51,840	80,475	65,409	60,228	37,209

Ore.	1895.	1896.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Manganiferous iron ores used for producing spiegeleisen.	13,464	9,072	16,519	18,848	29,355	43,303
Manganiferous silver ores ...	53,506	137,597	149,502	99,651	79,855	188,509
Total....................	66,970	146,669	166,021	118,499	109,210	231,812

GEORGIA.

During the year 1900 this State mined 3,447 tons of manganese, an increase of 358 long tons from the 1899 product of 3,089 long tons. Mr. Robert H. Couper states that the manganese-producing belt at Cartersville is coextensive with the Potsdam sandstone, commencing about 4 miles south of that town and continuing northward to Beasleys Gap, its length being about 20 miles. Its breadth varies, but averages 2 to 3 miles. The nature of the formation is generally a substratum of white clay, a stratum of sandstone distinguished by its bore holes (*Scolithus*), a stratum of more or less ochery clay somewhat laminated, and above all a bed of drift or placer clay. In the stratum of laminated clay are the mines of yellow ocher, specular iron ore, and manganese, varying in richness in different localities.

The manganese occurs in lenticular masses, extending down to the bottom of the stratum of clay. This depth depends on the depth of the fold of the formation, for the stratum of clay is an integral part of the formation and is separate from the bed of placer clay. The mining of manganese has been precarious, but Mr. Couper states that there is a large amount of ore in reserve in these mines.

In 1900 all of the manganese ore came from the Cartersville district, but in 1901 there will be a report of ore mining in the Cave Spring district, where, from the present exploitations, the ore is claimed to be of more uniform quality and lower in phosphorus than that from the Cartersville district.

The total production of manganese ore in Georgia from 1866 to 1900 was 84,020 long tons. The annual amount mined is given in the table below.

Production of manganese ores in Georgia from 1866 to 1900, inclusive.

Year.	Quantity.	Year.	Quantity.
	Long tons.		*Long tons.*
From 1866 to 1873 (estimated)	5,550	1888	5,568
1874	2,400	1889	5,208
1875	2,400	1890	749
1876	2,400	1891	3,575
1877	2,400	1892	826
1878	2,400	1893	724
1879	2,400	1894	1,277
1880	1,800	1895	3,856
1881	1,200	1896	4,085
1882	1,000	1897	3,332
1883 and 1884	(*a*)	1898	6,689
1885	2,580	1899	3,089
1886	6,041	1900	3,447
1887	9,024	Total	84,020

a None reported.

LAKE SUPERIOR REGION.

Occasionally small amounts of ores are obtained in this district which would be classed as manganese, but there is considerable iron ore mined containing usually from 3 to 6 per cent of manganese, which is reported in the paper on iron ores.

In the following table will be found the amounts and percentages of manganese carried by these Lake Superior ores in the years 1886 to 1900, inclusive:

Production of manganiferous iron ores in the Lake Superior region from 1886 to 1900.

Year.	Product.	Average per cent of manganese.	Year.	Product.	Average per cent of manganese.
	Tons.			*Tons.*	
1886	100,000	2	1888	189,574	4
	157,000	4		11,562	11
Total	257,000		Total	201,136	
1887	200,000	4	1889	50,018	6.74
	10,000	10		31,341	9+
Total	210,000		Total	81,359	

Production of manganiferous iron ores in the Lake Superior region from 1886 to 1900—Continued.

Year.	Product.	Average per cent of manganese.
	Tons.	
1890	61,863	
1891	13,711	4.68 to 17.96
	11,015	10
	9,213	9.68
	98,572	5.38
Total	132,511	
1892	6,710	4.893
	102,695	5
	7,500	8
	8,272	9.998
	22,254	12.028
Total	147,431	
1893	27,353	4.67
	55,009	7.61
	15,102	7.77
	5,051	10.40
	7,833	14
	300	22
Total	110,648	
1894	50,763	3.07
	57,872	3.55
	6,264	6.50
	61,817	7.26
	14,610	7.75
	7,140	18
Total	198,466	
1895	13,752	8
	10,228	7.608
	10,000	7.5
	26,500	7.26
	51,785	3.536
Total	112,265	
1896	69,139	7.44
	47,000	5.75
	18,900	5
	104,156	4.3
	38,590	3.22
	51,855	3.1
Total	329,640	
1897	18,000	4
	38,489	5.85
	92,872	6.99
	30,500	7.57
	35	14.5
	4,689	(*a*)
Total	184,585	
1898	80,363	5 to 7
	35,000	6.8
	153,499	6
Total	268,862	
1899	484,784	.68 to 3.6
	39,325	4.02
	94,708	5 to 6
	113,673	6 to 8
Total	732,490	
1900	33,887	1 to 4.37
	52,850	2.25 to 6.82
	143,537	3.98
	86,000	6 to 7
	18,000	9.54
Total	334,274	

a Not given.

MONTANA.

A small amount of manganese ore (137 tons) was obtained in this State, but as the market is at a considerable distance and transportation is expensive, the price per ton obtained at the mines was low.

TENNESSEE.

Manganese ores have been intermittently mined in this State, and as railroad connections are completed to promising beds of manganese of moderate extent, shipments may be increased in the future.

Mr. William McGovern gives an analysis of ore shipped from the Heberlin mine, as follows:

Analysis of Heberlin manganese ores.

Constituent.	Per cent.
Manganese (metallic)	53.735
Iron (metallic)	2.085
Silica	1.30
Phosphorus	.008

The production of manganese ores in Tennessee from 1897 to 1900 was as follows:

Production of manganese ores in Tennessee from 1897 to 1900.

Year.	Production.
	Long tons.
1897	11
1898	381
1899	19
1900	30

VIRGINIA.

Virginia was formerly a large contributor of manganese ore, 20,567 tons being mined in 1886. After this there was a decline each year, with but one exception, until 1895, when 1,715 tons were produced. Since that date each year has shown an advance, the 1900 total being 7,881 long tons, making the output for the State from 1880 to 1900 183,751 long tons, as will be seen from the following table:

Production of manganese ores and manganiferous iron ores in Virginia from 1880 to 1900.

[Maximum in italics.]

Year.	Manganese ores.	Year.	Manganese ores.
	Long tons.		*Long tons.*
1880	3,661	1892	6,079
1881	3,295	1893	4,092
1882	2,982	1894	1,797
1883	5,355	1895	1,715
1884	8,980	1896	2,018
1885	18,745	1897	3,650
1886	*20,567*	1898	5,662
1887	19,835	1899	6,228
1888	17,646	1900	7,881
1889	14,616	Total	183,751
1890	12,699		
1891	16,248		

IMPORTS.

As manganese ore is largely used in the manufacture of steel, of which the United States is the largest producer, and as this country mines but a limited amount of manganese ores, it is to be expected that the imports of this mineral would be large, and nearly all the manganese-producing countries of the world have contributed their quota. Russia is credited with over one-half the total, followed by Brazil, Cuba, etc.

The amount imported in the calendar year 1900 was 256,252 long tons, valued at $2,042,361, or $7.97 per ton, an increase of 67,903 long tons, or 36.1 per cent, over the 1899 figures of 188,349 long tons. The average value per ton, however, declined from $8.41 to $7.97, due in a measure to the ore coming from the principal contributor, Russia, being not so well prepared as formerly, owing to the numerous small operations and also to annoying transportation regulations, thus diminishing the percentage of manganese in the ore, and also its value.

The imports by countries in 1899 and 1900 were as follows:

Imports of manganese ores into the United States during the calendar years 1899 and 1900, by countries.

Country.	1900.		1899.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
Russia, Black Sea	132,121	$812,592	73,397	$598,644
Brazil	54,451	590,825	28,115	299,877
British East Indies	10,650	30,787	17,950	54,471
Cuba	20,582	259,348	16,359	221,785
Chile	9,925	69,670	17,575	111,726
Colombia	7,902	86,678	8,900	82,489
Turkey in Asia	7,062	49,482	5,782	46,822
Turkey in Europe	6,186	43,593	8,310	61,241
Japan	5,338	44,707	4,492	31,657
France			2,953	21,080
Germany	1,696	43,025	1,274	34,927
United Kingdom	156	7,466	134	6,697
French West Indies	65	650		
Greece	50	897	3,030	10,526
Quebec, Ontario, etc	39	1,100		
Nova Scotia, New Brunswick, etc	19	1,114	78	2,586
Austria-Hungary	10	427		
Total	256,252	2,042,361	188,349	1,584,528

The importations by customs districts show that over one-half of the total was received at Baltimore, slightly under one-third at Philadelphia, about 5 per cent at New York, and the small balance scattered among a number of ports, as indicated in the annexed table.

Manganese ore imported into the United States during the calendar years 1899 and 1900, by customs districts.

Customs district.	1900.		1899.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
Philadelphia, Pa	80,333	$726,545	90,583	$655,061
Baltimore, Md	161,932	1,134,823	80,006	739,547
New York, N. Y	13,883	176,944	14,762	152,959
Norfolk, Va			2,901	32,248
Pittsburg, Pa	25	1,578	44	2,473
Newport News, Va	15	568	26	1,351
Chicago, Ill			16	595
Boston, Mass	1	24	5	116
Passamaquoddy, Me	2	30	4	82
All others	61	1,849	2	96
Total	256,252	2,042,361	188,349	1,584,528

The growth of the importations of magnanese ores into the United States, as compared with the domestic production, is indicated by the following table, which shows the amount and value of imported manganese ore for the last twelve years, and also similar data in regard to the domestic ores. The average of imports and production for the twelve years and the average value are also given.

Relative quantities and values of domestic and imported manganese ores from 1889 to 1900.

Year.	Domestic production.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
1889	24,197	$240,559	4,286	$78,391
1890	25,684	219,050	34,154	516,900
1891	23,416	239,129	28,825	380,618
1892	13,613	129,586	58,572	840,811
1893	7,718	66,614	68,113	880,238
1894	6,308	53,635	44,655	432,561
1895	9,547	71,769	86,111	747,910
1896	10,088	90,727	31,489	250,468
1897	11,108	95,505	119,961	1,023,824
1898	15,957	129,185	114,885	831,967
1899	9,935	82,278	188,349	1,584,528
1900	11,771	100,289	256,252	2,042,361
Total for 12 years	169,342	1,518,326	1,035,652	9,610,577
Average for 12 years	14,112	126,527	86,304	800,881

PRODUCTION OF MANGANESE IN FOREIGN COUNTRIES.

CANADA.

The product of the bog or "wad" manganese ore mines in New Brunswick in 1899 was manufactured into spiegeleisen and ferromanganese in a leased blast furnace in Nova Scotia; but as this furnace went out of blast in the latter part of 1899 and the smelting of manganese ore was not resumed, there was a falling off in production.

In the year 1900, 30 short tons were reported, of which 20 tons came from New Brunswick and 10 tons from Nova Scotia.

The following tables, supplied by the Geological Survey of Canada, show the production and valuation of manganese ores, by years, from 1886 to 1900, and the exportations and valuations, by provinces, from 1873 to 1900:

Production of manganese ore in Canada from 1886 to 1900.

Year.	Production.	Value.	Value per ton.
	Short tons.		
1886	1,789	$41,499	$23.20
1887	1,245	43,658	35.07
1888	1,801	47,944	26.62
1889	1,455	32,737	22.50
1890	1,328	32,550	24.51
1891	255	6,694	26.25
1892	115	10,250	89.13
1893	213	14,578	68.44
1894	74	4,180	56.49
1895	125	8,464	67.71
1896 *a*	123½	3,975	32.19
1897 *a*	15¼	1,166	76.46
1898	50	1,600	32.00
1899 *b*	1,581	20,004	12.66
1900 *c*	30	1,800	60.00

a Exports. *b* Nova Scotia mined 63 tons. New Brunswick's product was 1,518 tons.
c Nova Scotia mined 10 tons and New Brunswick 20 tons.

Exports of manganese ore from Canada, 1873 to 1900, inclusive.

Year.	Nova Scotia.		New Brunswick.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1873	....	....	1,031	$20,192	1,031	$20,192
1874	6	$12	776	16,961	782	16,973
1875	9	200	194	5,314	203	5,514
1876	21	723	391	7,316	412	8,039
1877	106	3,699	785	12,210	891	15,909
1878	106	4,889	520	5,971	626	10,860
1879	154	7,420	1,732	20,016	1,886	27,436
1880	79	3,090	2,100	31,707	2,179	34,797
1881	200	18,022	1,504	22,532	1,704	40,554

Exports of manganese ores from Canada, 1873 to 1900, inclusive—Continued.

Year.	Nova Scotia.		New Brunswick.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1882	123	$11,520	771	$14,227	894	$25,747
1883	313	8,635	1,013	16,708	1,326	25,343
1884	134	11,054	469	9,035	603	20,089
1885	77	5,054	1,607	29,695	1,684	34,649
1886	*a* 441	854	1,377	27,484	*a* 1,818	58,338
1887	578	14,240	837	20,562	1,415	34,802
1888	87	5,759	1,094	16,073	1,181	21,832
1889	59	3,024	1,377	26,326	1,436	29,350
1890	177	2,583	1,729	34,248	1,906	36,831
1891	22	563	233	6,131	255	6,694
1892	84	6,180	59	2,025	143	8,205
1893	123	12,409	10	112	133	12,521
1894	11	720	45	2,400	56	3,120
1895	108	6,348	$\frac{3}{10}$	3	108$\frac{3}{10}$	6,351
1896	123½	3,975	....	....	123½	3,975
1897	15¼	1,166	....	....	15¼	1,166
1898	11	325	....	....	11	325
1899	67	2,328	3	82	70	2,410
1900 *b*	....	....	....	....	34	1,720

a 250 tons should be more correctly classed under the heading of mineral pigments.
b Owing to changes in compiling customs returns, exports can no longer be given by provinces.

CUBA.

Manganese ore is mined in the southeastern portion of Cuba, and the following table will show the production for 1888 to 1900, inclusive:

Exports of manganese ore from Santiago district, Cuba, from 1888 to 1900.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1888	1,942	1895	1,394
1889	704	1896	None.
1890	21,810	1897	None.
1891	21,987	1898	950
1892	18,751	1899	13,686
1893	10,640	1900	22,600

BRAZIL.

In the report for 1899 extracts from Prof. J. C. Branner's monograph "On the occurrence of manganese ore in Brazil" were given. As this country is becoming an important contributor to the supply of the United States—54,451 tons being received in 1900; nearly double the 1899 imports—the following additional data, from a paper by Mr. Herbert Kilburn Scott on "The manganese ores of Brazil"[1] are given:

The Miguel Burnier deposits, of which mention has been made, vary much in thickness. They are made up in great part of hard, metallic-

[1] Jour. Iron and Steel Inst., No. 1, Vol. LVII, pp. 185 *et seq.* [London, 1900].

looking mineral, which shows bedding and has interstratified some softer and hydrated ore. The harder ore has a tendency to lie in lenticular masses, but occasionally the ore is grouped into hard, irregular blocks. The proportion of the hard ore varies, but generally averages about 80 per cent of the whole. The softer ore is heavily charged with hygroscopic moisture, and is responsible for the somewhat high percentage of water that the Miguel Burnier ores show in the rainy season.

The metallic ore is exceptionally pure, the small quantity of metalloids being mostly concentrated in the softer mineral.

The ore was discovered in the year 1888, during the construction of a railroad, and mining was begun in 1894 by Usina Wigg.

At the commencement of the exploitation the whole of the output was won by open-cast working, the bed being found uncovered or with such a small overburden that it could be cheaply extracted. When this open cast becomes impracticable, especially in the rainy season, underground work was commenced.

The mines are situated 4,000 feet above sea level. The workmen employed are Brazilians, Italians, and Spaniards, the miners earning 4½ milreis[1] and the other hands 3½ milreis per day, the latter working only ten hours. The railroad freight from the mines to Rio is 8.8 milreis.

Two cargo analyses of manganese ore shipped in 1895 and 1899 are given by Mr. Scott, as follows:

Analyses of two cargoes of Usina Wigg ore, by Mr. E. Riley, London.

Constituent.	Feb., 1895, ex "Cairnsmore."	Mar., 1899, ex "Virginia."
	Per cent.	*Per cent.*
Silica	0.53	1.27
Manganese peroxide	80.62	79.40
Manganese protoxide	5.47	6.23
Alumina	2.21	1.45
Oxide of iron	2.50	4.03
Baryta	2.30	1.90
Lime	.70	Traces.
Magnesia	1.05	.05
Phosphoric acid	.07	.048
Sulphuric acid	Traces.	.065
Arsenic acid	Nil.	.034
Carbonic acid	Nil.	Nil.
Potash and soda	Traces.	.55
Combined water	4.95	4.74
Total	100.30	99.757
Manganese	55.14	55.02
Phosphorus	.03	.021

[1] 1 milreis equals 54.6 cents.

This is about 1 per cent higher in manganese than the average of 40,000 tons of Brazilian ore imported into this country as given by Messrs. Ledoux & Co.

The firm of Airosa & Co. works deposits on the branch line to Ouro Preto, where the ore is won both by underground and open cast. A number of platforms along the line for storing the mineral and inclined planes for the transport of the ore are installed.

The analyses of cargoes of ore shipped give an average of about 50 per cent metallic manganese dried at 212° F., with 0.04 per cent of phosphorus, with moisture varying between 10 and 20 per cent.

Manganese deposits occur in the Lafayette district, and between Burnier and Ouro Preto, but have as yet little commercial value. A number of analyses show manganese varying from 27.9 to 54.62 per cent, with phosphorus from 0.020 to 0.316, the ore containing the highest percentage of manganese carrying 0.26 per cent of phosphorus.

Mr. Scott also gives a number of cargo analyses of manganese ores obtained from various countries.

Average analysis of manganese as per Messrs. MacQueen Brothers, London.

Constituent.	Cargo samples.													
	Caucasus.	Greece.		Turkey.	Spain.			India.		Chile.		Cuba.	France.	
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Metallic manganese.	51	52	45	43	53	43	33	48	46	49	52	47	52	43
Metallic iron	1	1	1	3	1	4	7	6	11	......	1	2	.....	.....
Siliceous residue	8	8	12	12	9	10	13	3	3	5	9	6	6	7
Phosphorous	.17	.09	.10	.015	.08	.03	.03	.13	.28	.015	.08	.073	.05	.05

Mr. Scott gives the total amount exported in 1899 as 68,392 tons.

COLOMBIA.

The manganese mines exploited are located on the Isthmus of Panama, not far from the Caribbean Sea, near Colon. Practically all of the ore mined is sent to the United States, the amount forwarded in the year 1900 being 8,610 long tons. The total shipments of this district to date are as follows:

Shipments of manganese ore from the United States of Colombia.

Calendar year.	Shipments.
	Long tons.
1896	18,215
1897	(*a*)
1898	8,595
1899	8,955
1900	8,610

a Not reported.

CHILE.

All of the manganese ore produced in Chile is exported, the amount in 1899 being 40,285 long tons, valued at $448,195.

The exports from 1885 to 1899, inclusive, together with the total value for the years when it could be obtained, will be found in the following table:

Exports of Chilean manganese ores, 1885 to 1899.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Long tons.			*Long tons.*	
1885	4,041	....	1893	36,162	$284,262
1886	23,928	....	1894	47,238	371,374
1887	47,521	....	1895	23,696	186,747
1888	18,713	....	1896	25,740	202,335
1889	28,683	....	1897	23,156	....
1890	47,986	....	1898	20,522	163,165
1891	34,462	....	1899	40,285	448,195
1892	50,871	$399,881			

GREAT BRITAIN.

True manganese ores are not mined in Great Britain, but a limited amount of manganiferous iron ore (415 long tons in 1899) is won. The production and value of this class of ore, by years, from 1884 to 1899, are given in the following table:

Production and value of manganiferous iron ores in the United Kingdom from 1884 to 1899.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Long tons.			*Long tons.*	
1884	909	$6,921	1892	6,078	$21,461
1885	1,688	11,669	1893	1,336	3,688
1886	12,763	52,722	1894	1,809	3,582
1887	13,777	53,772	1895	1,273	3,323
1888	4,342	9,361	1896	1,080	2,983
1889	8,852	31,354	1897	599	*a* 1,650
1890	12,444	32,588	1898	231	974
1891	9,476	30,071	1899	415	1,212

a Estimated.

FRANCE.

Mons. A. Pourcel has furnished copies of the official statistics of the production of manganese ore in France in the year 1899, amounting to 39,900 metric tons, valued at 1,117,000 francs.

The greater portion of the ore—21,000 metric tons of calcined carbonate of manganese and 6,000 tons of assorted carbonate—came from the mine of Las Cabesses (Ariege), while the mines of Romaneche and the Grand-Filon (Saône and Loire) contributed 9,000 metric tons of binoxide of manganese.

The table given below shows the production, in long tons, total valuation, and value per ton of the manganese ore mined in France from 1886 to 1899, inclusive:

Production and value of manganese ores in France from 1886 to 1899.

Year.	Production.	Total value.	Value per ton.	Year.	Production.	Total value.	Value per ton.
	Long tons.				*Long tons.*		
1886	7,555	$53,099	$7.03	1893	37,406	$290,073	$7.75
1887	11,932	50,501	4.23	1894	32,239	192,264	5.96
1888	10,873	60,757	5.59	1895	30,385	177,698	5.85
1889	9,842	59,000	5.99	1896	30,797	179,297	5.82
1890	15,731	89,517	5.69	1897	36,612	200,720	5.48
1891	15,101	90,316	5.98	1898	31,396	160,383	5.11
1892	31,894	205,074	6.43	1899	39,270	215,581	5.49

BELGIUM.

Mons. P. Trasenster states that Belgium, in the year 1899, produced 12,120 metric tons of manganiferous iron ores, valued at 12.93 francs per ton.

The following table will show the production and valuation of the manganiferous iron ores in Belgium from 1880 to 1899, inclusive:

Production of manganiferous iron ores in Belgium from 1880 to 1899.

Year.	Product.	Value.	Year.	Product.	Value.
	Metric tons.			*Metric tons.*	
1880	700	$772	1890	14,255	$33,968
1881	770	772	1891	18,498	49,022
1882	345	338	1892	16,775	40,202
1883	820	791	1893	16,800	38,793
1884	750	724	1894	22,048	53,596
1885	....	....	1895	22,478	55,250
1886	750	1,737	1896	23,265	66,589
1887	12,750	30,079	1897	28,372	66,141
1888	27,787	62,725	1898	16,440	40,820
1889	20,905	47,864	1899	12,120	30,245

GERMANY.

In 1899 Germany mined 61,329 metric tons of manganese ore, valued at 711,000 marks, of which 60,379 tons, 636,000 marks, came from Prussia. Herr E. Schrodter supplied the above figures.

From the low valuation placed on these ores it would seem probable that they are more truly manganiferous iron ores.

The following tables give the amounts of manganese ore mined in Germany from 1890 to 1899, and the amount and valuation of the manganese ores produced by Prussia in the years 1881 to 1899, inclusive.

Production of manganese ores in Germany from 1890 to 1899.

Year.	Quantity.	Year.	Quantity.
	Long tons.		*Long tons.*
1890	41,180	1895	40,674
1891	39,698	1896	44,350
1892	32,341	1897	45,694
1893	40,057	1898	42,669
1894	43,012	1899	60,360

Production and value of manganese ores in Prussia from 1881 to 1899.

Year.	Product.	Value.	Year.	Product.	Value.
	Long tons.			*Long tons.*	
1881	10,911	$79,104	1891	36,278	$174,624
1882	4,597	33,745	1892	30,892	101,844
1883	4,502	28,423	1893	38,384	93,506
1884	7,629	43,118	1894	41,854	94,992
1885	14,464	81,302	1895	39,266	100,832
1886	24,649	177,066	1896	42,925	97,469
1887	35,957	228,439	1897	44,538	98,185
1888	26,877	147,250	1898	41,565	92,050
1889	43,311	216,381	1899	59,425	151,368
1890	39,497	174,428			

ITALY.

Italy, in the year 1899, had seven active manganese mines, producing 4,356 metric, or 4,287 long, tons of ore, valued at 112,160 lire, or $21,647, and one active manganiferous iron ore mine, contributing 29,874 metric, or 29,402 long, tons, valued at 385,744 lire, or $74,449.

The following table shows the production and value of both manganese ore and manganiferous iron ore from the year 1860 to 1899, inclusive, as taken from the Catalogo della Mostra fatta del Corpo Reale dello Miniere.

Production of manganese and manganiferous iron ores in Italy from 1860 to 1899.

Year.	Manganese ores.		Manganiferous iron ores	
	Production.	Value.	Production.	Value.
	Long tons.		*Long tons.*	
1860	642	$12,373	....	....
1861	515	9,174	....	....
1862	1,714	15,661	....	....
1863	714	6,674	....	....
1864	712	8,567	....	....
1865	571	6,716	....	....
1866	711	7,191	....	....
1867	677	8,079	....	....
1868	661	7,894	....	....
1869	758	10,403	....	....
1870	630	8,646	....	....

Production of manganese and manganiferous iron ores in Italy from 1860 to 1899—Cont'd.

Year.	Manganese ores.		Manganiferous iron ores.	
	Production.	Value.	Production.	Value.
	Long tons.		*Long tons.*	
1871	779	$9,793	....	....
1872	1,125	12,311	....	....
1873	3,103	46,548	....	....
1874	3,169	58,697	3,445	$6,755
1875	3,750	64,341	19,684	96,500
1876	6,800	61,074	22,878	93,315
1877	6,704	56,546	7,874	26,248
1878	6,550	46,567	6,368	15,297
1879	5,614	33,842	1,366	2,679
1880	6,373	40,682	20,148	63,214
1881	8,629	45,219	*a* 29,526	*a* 92,640
1882	6,868	67,201	*a* 29,526	*a* 92,640
1883	11,204	52,975	8,858	27,792
1884	871	7,570	....	....
1885	1,774	10,899	....	....
1886	5,473	30,943	....	....
1887	4,363	21,872	....	....
1888	3,573	15,054	....	....
1889	2,168	9,998	....	....
1890	2,113	10,050	....	....
1891	2,391	12,467	....	....
1892	1,223	8,067	4,549	8,028
1893	797	6,320	8,666	14,445
1894	748	4,536	5,718	8,971
1895	1,544	13,634	....	....
1896	1,860	19,734	9,842	19,300
1897	1,608	14,483	20,926	32,829
1898	2,955	18,052	10,974	25,823
1899	4,287	21,647	29,402	74,449

a In original, 30,000 metric tons, valued at 480,000 lire, possibly an estimate.

SPAIN.

The writer is indebted to Señor Carlos Sundheim, M. E., for the data in regard to the production of manganese ore in Spain in the year 1900.

Practically all of this ore was of the carbonate and silicate varieties and came from the province of Huelva, which exported, in the years 1899 and 1900, the following amounts of manganese ores to the countries named:

Exports of Huelva manganese ores in 1899 and 1900.

Country.	Quantity.	
	1899.	1900.
	Metric tons.	*Metric tons.*
Belgium and Luxemburg	127,743	126,482
England	4,842	1,213
France	4,449	2,221
Germany	1,385	....
Total	138,419	129,916

A small amount of oxide of manganese is obtained in the provinces of Oviedo and Tereul.

The table given below shows the manganese-ore production in Spain from 1890 to 1900, inclusive:

Production of manganese ores in Spain from 1890 to 1900.

Year.	Quantity.	Year.	Quantity.
	Long tons.		*Long tons.*
1890	9,716	1896	90,546
1891	6,883	1897	101,937
1892	16,643	1898	136,182
1893	1,437	1899	136,533
1894	423	1900	127,864
1895	26,946		

PORTUGAL.

Portugal mines small amounts of manganese ore, 907 tons, valued at $2,594, having been produced in 1898, and 2,949 tons, valued at $21,484, in 1899.

AUSTRIA-HUNGARY.

According to the Statistiches Jahrbuch des k. k. Ackerbau Ministeriums 1898, the production of Austria was 6,132 metric tons of manganese ore, valued at 47,795 florins or $23,050.

The production from 1876 to 1898, inclusive, is given in the following table:

Production of manganese ore in Austria from 1876 to 1898.

Year.	Quantity.	Year.	Quantity.
	Centners.		*Centners.*
1876	67,817	1888	65,541
1877	78,999	1889	39,261
1878	41,836	1890	80,068
1879	34,337	1891	52,793
1880	88,744	1892	46,000
1881	91,097	1893	54,000
1882	84,183	1894	101,120
1883	93,821	1895	*a* 92,270
1884	79,423		*Metric tons.*
1885	61,577	1897	6,012
1886	92,464	1898	6,132
1887	93,108	1899	5,771

a Including Bosnia.

The Kingdom of Hungary is credited with 5,073 metric tons in 1899, and Bosnia and Herzegovina with 5,625 metric tons. The production of the former country from 1897 to 1899, and that of the latter from 1892 to 1899, are given below:

Production of manganese ore in Hungary. (a)

Year.	Quantity.
	Metric tons.
1897	3,976
1898	8,055
1899	5,073

a Ungarisches Statistiches Jahrbuch.

Production of manganese ore in Bosnia and Herzegovina.

Year.	Quantity.
	Long tons.
1892	7,819
1895	8,016
1896	6,713
1897	*a* 5,260
1898	*a* 5,235
1899	5,536

a Bosniches Bureau Montan Abtheilung.

SWEDEN.

Dr. Rich Åkerman has kindly supplied data as to the production of manganese ore in Sweden. The year 1899 showed a total of 2,622 metric tons, valued at 44,740 crowns or $11,990. Of this amount Wermlands län or district contributed 2,245 metric tons, valued at 30,000 crowns or $8,040, and Jönköpings län, 377 metric tons, valued at 14,740 crowns or $3,950.

A preliminary estimate of the 1900 production was 2,651 metric tons, valued at 49,175 crowns or $13,179.

The production of manganese ore in Sweden from 1888 to 1899 is given in the following table:

Production of manganese ore in Sweden, 1888 to 1899.

Year.	Product.	Value.	Year.	Product.	Value.
	Long tons.			*Long tons.*	
1888	9,537	....	1894	3,306	....
1889	8,509	....	1895	3,068	....
1890	10,529	....	1896	2,023	$7,197
1891	8,936	....	1897	2,706	12,616
1892	7,708	....	1898	2,321	11,060
1893	6,949	....	1899	2,581	11,990

RUSSIAN EMPIRE.

Russia is the largest producer of manganese in the world, the greater portion of the supply coming from the Caucasian district. The total amount exported in 1899 is given by Messrs. MacQueen & Brothers as 370,499 long tons.

The distribution of the manganese ore from the Caucasian district to foreign countries from 1893 to 1897 was as follows:

Distribution of exports of Caucasian manganese ore.

Country to which exported.	1893.	1894.	1895.	1896.	1897.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Great Britain	42,930	65,110	60,616	77,754	68,650
France	4,100	....	150	5,650	....
Russia	....	9,890	9,600	20,175	28,446
Belgium	3,125	2,520	....	220	....
Germany	40,405	51,455	59,565	58,825	70,810
United States	36,070	28,300	55,787	3,600	42,200
Total exports	126,630	157,275	185,718	166,224	210,106

The production and exports from the Caucasus from 1885 to 1898 will be seen in the table below:

Production and exports of Caucasian manganese ore.

Year.	Production.	Exports.	Year.	Production.	Exports.
	Long tons.	*Long tons.*		*Long tons.*	*Long tons.*
1885	58,722	41,396	1893	166,420	126,630
1886	67,985	53,751	1894	180,533	157,275
1887	51,890	59,523	1895	160,277	185,718
1888	29,401	49,076	1896	....	166,224
1889	68,439	55,489	1897	231,868	210,106
1890	168,840	135,492	1898	....	277,857
1891	98,670	84,040	1899	....	*a* 370,499
1892	165,101	129,835			

a Total production of Russian Empire.

TURKEY.

Manganese ore is mined in Macedonia and Asia Minor, 48,689 tons having been exported in 1899 from Salonica.

GREECE.

The production of manganese ore in Greece in 1898 was reported as 14,097 metric tons, valued at 422,910 francs ($81,622).

INDIA.

The British India Financial and Commercial Statistics gives an interesting statement in regard to the production of manganese ores in India from 1894 to 1899, inclusive, practically all of which is credited to the Presidency of Madras.

Exports of manganese ore from British India by sea to other countries from 1894 to 1899.

Year.	Quantity.
	Long tons.
1894	11,410
1895	15,816
1896	56,869
1897	73,680
1898	60,449
1899	87,126

JAPAN.

Japan has some manganese mines, but they are of limited extent. According to the Annual Returns of the Foreign Trade of the Empire of Japan (Department of Finance) 21,504,777 kin,[1] valued at 224,397 yen,[2] were exported in 1899.

The following table will show the export from 1881 to 1900, inclusive, and the value from 1893 to 1900, inclusive:

Exports of manganese ores in Japan from 1881 to 1900. *a*

Year.	Product.	Total value.	Year.	Product.	Total value.
	Long tons.			*Long tons.*	
1881	2	....	1891	3,178	....
1882	156	....	1892	4,948	....
1883	151	....	1893	18,510	$106,016
1884	125	....	1894	17,465	99,007
1885	123	....	1895	16,338	97,906
1886	404	....	1896	20,785	136,668
1887	312	....	1897	14,524	102,248
1888	813	....	1898	9,905	77,853
1889	945	....	1899	9,157	76,039
1890	2,604	....	1900	12,576	111,750

a Reports Department of Finance, Empire of Japan.

[1] Kin taken at 1.31 pounds.

[2] Yen equals 49.8 cents.

JAVA.

This island has some manganese deposits in the regencies of Pengasih and Manggoelan, 5,200 tons having been mined in 1897, and 4,800 tons in 1898.

NEW SOUTH WALES.

In 1899 no manganese ore was mined, the low market value preventing profitable working. The total exports from 1884 to 1899, inclusive, were 472 tons.

Some demand exists for manganese ore carrying a high percentage of binoxide, for use in the manufacture of chlorine for the reduction of gold sulphides, but as most of the native manganese ores are unavailable for this purpose, on account of their chemical composition, the smelting works use iron ore as a flux.

QUEENSLAND.

Queensland mines small amounts of manganese ore, the British Blue Book giving the quantity produced in 1899 as 735 tons. The following table gives the amounts won and the valuation from 1881 to 1884 and 1889 to 1899:

Production and value of manganese ores in Queensland from 1881 to 1884 and 1889 to 1899.

Year.	Product.	Value.	Year.	Product.	Value.
	Tons.			*Tons.*	
1881	87	$1,263	1893	....	....
1882	100	1,694	1894	140	$1,936
1883	20	290	1895	355	5,387
1884	55	799	1896	300	4,380
1889	4	87	1897	300	5,475
1890	5	97	1898	67	1,221
1891	10	126	1899	735	13,775
1892	....	....			

NEW ZEALAND.

This island in late years has contributed small amounts of manganese ore, 217 tons, valued at $3,420, having been reported in 1898, and 135 tons, valued at $1,980, in 1899.

WORLD'S PRODUCTION OF MANGANESE ORES.

It is difficult to obtain contemporaneous data for the various countries producing manganese ore, and the systematic collection of statistics or their publication is confined to a limited number. In the following table the latest figures obtainable are given, together with the year of record, the tons used being either the avoirdupois or metric, with the exception of Canada, where the short ton is used.

This table does not include statistics of manganiferous iron ores.

World's production of manganese ores.

Country.	Year.	Production.
		Tons.
North America:		
United States	1900	11,771
Canada *a*	1900	30
Cuba *a*	1900	22,600
South America:		
Brazil *a*	1899	68,392
Chile *a*	1899	40,285
Colombia *a*	1900	8,610
Europe:		
Austria *a*	1899	5,707
Bosnia and Herzegovina	1899	5,625
Hungary	1899	5,073
France	1899	39,270
Germany *a*	1899	60,360
Greece *a*	1899	15,300
Italy	1899	4,287
Portugal	1899	2,949
Russia *a*	1899	370,499
Spain	1900	127,864
Sweden	1899	2,581
Turkey *a*	1899	48,689
Asia:		
India *a*	1899	87,126
Japan *a*	1900	12,576
Java	1898	4,800
Oceania:		
New South Wales	1899	None.
New Zealand	1899	135
Queensland	1899	735

a Countries so marked contributed to manganese supply of United States in 1900.

COPPER.

By Charles Kirchhoff.

GENERAL TRADE CONDITIONS.

The year 1900 was an exceedingly prosperous one for the copper mining and smelting industry. Values remained at a relatively high level, and while some of the great producers, through a variety of special causes, did not contribute as much metal as in former years, others largely increased their output. There was very great activity in the opening of old mines and the development of new properties, but only a few reached the productive stage in 1900. One by one they will appear as sellers in the copper market in 1901 and 1902.

PRODUCTION.

The following table shows the production of copper in the United States since its rise to the dignity of an industry. For the earlier years the best available sources have been drawn upon for the estimates given. Since 1882 the figures are those collected by this office:

Production of copper in the United States from 1845 to 1900.

[Long tons.]

Year.	Total production.	Lake Superior.	Percentage of Lake Superior of total product.
1845	100	12	12
1846	150	26	17.3
1847	300	213	71
1848	500	461	92.2
1849	700	672	96
1850	650	572	88
1851	900	779	86.6
1852	1,100	792	72
1853	2,000	1,297	64.9
1854	2,250	1,819	80.8
1855	3,000	2,593	86.4
1856	4,000	3,666	91.7
1857	4,800	4,255	88.6
1858	5,500	4,088	74.3
1859	6,300	3,985	63.3

The production of copper in the United States from 1845 to 1900—Continued.

[Long tons.]

Year.	Total production.	Lake Superior.	Percentage of Lake Superior of total product.
1860	7,200	5,388	74.8
1861	7,500	6,713	89.5
1862	9,000	6,065	67.4
1863	8,500	5,797	68.2
1864	8,000	5,576	69.7
1865	8,500	6,410	75.4
1866	8,900	6,138	69
1867	10,000	7,824	78.2
1868	11,600	9,346	80.6
1869	12,500	11,886	95.1
1870	12,600	10,992	87.2
1871	13,000	11,942	91.9
1872	12,500	10,961	87.7
1873	15,500	13,433	86.7
1874	17,500	15,327	87.6
1875	18,000	16,089	89.4
1876	19,000	17,085	89.9
1877	21,000	17,422	83
1878	21,500	17,719	82.4
1879	23,000	19,129	83.2
1880	27,000	22,204	82.2

Year.	Total production, United States.	Lake Superior.	Percentage of Lake Superior of total product.	Montana.	Percentage of Montana of total product.	Arizona.	Percentage of Arizona of total product.
1881	32,000	24,363	76.1	....	....	....	....
1882	40,467	25,439	62.9	....	....	....	....
1883	51,574	26,653	51.6	11,011	21.3	10,658	20.7
1884	64,708	30,961	47.8	19,256	29.8	11,935	18.4
1885	74,052	32,209	43.5	30,267	40.9	10,137	13.7
1886	70,430	36,124	51.3	25,362	36	6,990	9.9
1887	81,017	33,941	41.9	35,133	43.4	7,910	9.7
1888	101,054	38,604	38.2	43,704	43.2	14,195	14
1889	101,239	39,364	38.7	43,849	43.3	13,654	13.5
1890	115,966	45,273	38.9	50,437	43.5	15,534	13.4
1891	126,839	50,992	40.2	50,028	39.5	17,800	14
1892	154,018	54,999	35.7	72,860	47.3	17,160	11.1
1893	147,033	50,270	34.2	69,290	47.1	19,200	13.1
1894	158,120	51,031	32.3	81,729	51.6	19,873	12.6
1895	169,917	57,737	34	84,900	50	21,408	12.6
1896	205,384	64,073	31.2	99,071	48.2	32,560	15.8
1897	220,571	64,858	29.4	102,807	46.6	36,398	16.5
1898	235,050	66,291	28.2	92,041	39.2	49,624	21.1
1899	253,870	65,803	25.9	100,503	39.6	59,399	23.4
1900	270,588	64,938	24	120,865	44.7	52,820	19.5

In detail, the production of copper, territorially distributed, has been as follows since 1883:

Total copper production in the United States, 1883 to 1887.

Source.	1883.	1884.	1885.	1886.	1887.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Lake Superior	59,702,404	69,353,202	72,147,889	80,918,460	76,028,697
Arizona	23,874,963	26,734,345	22,706,366	15,657,035	17,720,462
Montana	24,664,346	43,093,054	67,797,864	57,611,621	78,699,677
New Mexico	823,511	59,450	79,839	558,385	283,664
California	1,600,862	876,166	469,028	430,210	1,600,000
Utah	341,885	265,526	126,199	500,000	2,500,000
Colorado	1,152,652	2,013,125	1,146,460	409,306	2,012,027
Wyoming	962,468	....	....	....	....
Nevada	288,077	100,000	8,871	50,000	....
Idaho	....	46,667	40,381	....	....
Missouri	260,306	230,000	....	....	....
Maine and New Hampshire	212,124	249,018	} 211,609	315,719	200,000
Vermont	400,000	655,405			
Southern States	395,175	317,711	40,199	29,811	....
Middle States	64,400	2,114	190,641	....	....
Lead desilverizers, etc	782,880	950,870	910,144	1,282,496	2,432,804
Total domestic copper	115,526,053	144,946,653	165,875,483	157,763,043	181,477,331
From imported pyrites and ores	1,625,742	2,858,754	5,086,841	4,500,000	3,750,000
Total (including copper from imported pyrites)	117,151,795	147,805,407	170,962,324	162,263,043	185,227,331

Since 1888 the production has been as follows, in detail:

Total copper production in the United States, 1888 to 1900.

Source.	1888.	1889.	1890.	1891.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Lake Superior	86,472,034	88,175,675	101,410,277	114,222,709
Arizona	31,797,300	31,586,185	34,796,689	39,873,279
Montana	97,897,968	98,222,444	112,980,896	112,063,320
New Mexico	1,631,271	3,686,137	850,034	1,233,197
California	1,570,021	151,505	23,347	3,397,405
Utah	2,131,047	65,467	1,006,636	1,562,098
Colorado, including copper smelters *a*	1,621,100	1,170,053	3,585,691	6,336,878
Wyoming	232,819	100,000	....	....
Nevada	50,000	26,420	....	....
Idaho	50,000	156,490	87,243	146,825
Washington	....	....	....	....
Maine and New Hampshire	} 271,631	72,000	....	....
Vermont				
Southern States	18,201	18,144	} 378,840	296,463
Middle States	....	....		
Lead desilverizers, etc	2,618,074	3,345,442	4,643,439	4,989,590
Total domestic copper	226,361,466	226,775,962	259,763,092	284,121,764
From imported pyrites and ores and matte	4,909,156	5,190,252	6,017,041	11,690,312
Total (including copper from imported pyrites)	231,270,622	231,966,214	265,780,133	295,812,076

a Copper smelters in Colorado, purchasing argentiferous copper ores and mattes in the open market, sources not known. The quantity of Montana matte which goes to one of these works has been deducted.

Total copper production in the United States, 1888 to 1900—Continued.

Source.	1892.	1893.	1894.	1895.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Lake Superior	123,198,460	112,605,078	114,308,870	129,330,749
Arizona	38,436,099	43,902,824	44,514,894	47,953,553
Montana	163,206,128	155,209,133	183,072,756	190,172,150
New Mexico	1,188,796	280,742	31,884	143,719
California	2,980,944	239,682	120,000	218,332
Utah	2,209,428	1,135,330	1,147,570	2,184,708
Colorado, including copper smelters *a*	7,593,674	7,695,826	6,481,413	6,079,243
Wyoming	....	....	....	....
Nevada	....	20,000	....	....
Idaho	226,000	36,367	....	1,425,914
Washington	....	39,785	....	....
Maine and New Hampshire Vermont Southern States Middle States	467,448	732,793	2,374,514	3,105,036
Lead desilverizers, etc. *b*	5,491,702	7,456,838	2,136,473	....
Total domestic copper	344,998,679	329,354,398	354,188,374	380,613,404
From imported pyrites and ores and matte	7,973,065	10,431,574	10,678,434	*c* 5,300,000
Total (including copper from imported pyrites)	352,971,744	339,785,972	364,866,808	385,913,404

Source.	1896.	1897.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Lake Superior	143,524,069	145,282,059	158,491,703	147,400,338	145,461,498
Arizona	72,934,927	81,530,735	111,158,246	133,054,860	118,317,764
Montana	221,918,179	230,288,141	206,173,157	225,126,855	270,738,489
New Mexico	2,701,664	701,892	1,592,371	3,935,441	4,169,400
California	690,237	11,987,772	16,925,634	26,221,897	28,511,225
Utah	3,502,012	3,919,010	3,750,000	9,584,746	18,354,726
Colorado, including copper smelters *a*	6,022,176	11,873,033	16,274,561	11,643,608	7,826,949
Wyoming	....	....	233,044	3,104,827	4,203,776
Nevada	....	....	437,396	556,775	407,535
Idaho	....	183,277	1,266,920	110,000	290,162
South Dakota	....	2,440,338	1,261,393	17,020	15,147
Maine and New Hampshire Vermont Tennessee and Southern States Middle States	4,704,993	4,472,017	5,395,226	4,410,554	4,820,495
Lead desilverizers, etc. *b*	4,063,173	1,400,000	3,553,336	3,500,000	3,000,000
Total domestic copper	460,061,430	494,078,274	526,512,987	568,666,921	606,117,166
From imported pyrites and ores and matte	*c* 5,900,000	*c* 12,000,000	*c* 19,750,000	*c* 23,800,000	*c* 36,380,000
Total (including copper from imported pyrites)	465,961,430	506,078,274	546,262,987	592,466,921	642,497,166

a Copper smelters in Colorado, purchasing argentiferous copper ores and mattes in the open market, sources not known. The quantity of Montana matte which goes to one of these works has been deducted.

b For 1896 the quantity stated covers only that part of the incidental copper product the source of which could not be ascertained.

c Estimated.

Since July, 1892, Mr. John Stanton, of New York, has collected monthly, from sworn returns, the following figures showing the production of the leading mines of Lake Superior, Montana, and Arizona. The estimate of outside sources is drawn, particularly recently, from official returns of many of the principal outside mines, large and small.

American product of copper.

[Long tons.]

Year.	Reporting mines.	Outside sources.	Total.
Second six months of 1892	59,239	6,287	65,526
1893	129,760	12,730	142,490
1894	142,543	17,080	159,623
1895	155,497	15,700	171,197
1896	189,494	14,400	203,894
1897	204,206	11,900	216,106
1898	216,222	18,050	234,272
1899	230,806	31,400	262,206
1900	227,987	40,800	268,787

It will be observed that the increase in those mines which Mr. Stanton groups as "outside sources" has been quite notable in recent years, while the properties which have reported for many years, and which include every older mine of importance, actually showed a decrease in 1900 over 1899. The opinion has been expressed in some quarters that this falling off is the result of a deliberate policy of restriction, but there is no evidence of this—certainly not on the part of the majority of the mines, nor on the part of the leading interests.

The monthly reports, in detail, for the years 1892, 1893, and 1894 are published in Mineral Resources for 1895; for the years 1895 and 1896 in Mineral Resources for 1896, and for 1897 and 1898 in Mineral Resources for 1898. For 1899, 1900, and the first six months of 1901 the monthly production was as follows:

American product of copper, monthly, 1899, 1900, and the first six months of 1901.

[Long tons.]

Year and month.	Reporting mines.	Outside sources.	Total.
1899.			
January	16,774	1,850	18,624
February	17,899	2,000	19,899
March	19,918	2,000	21,918
April	17,854	2,100	19,954
May	19,832	2,250	22,082
June	19,710	2,300	22,010
July	18,533	2,800	21,333
August	19,886	2,800	22,686
September	19,515	3,200	22,715

American product of copper, monthly, 1899, 1900, and the first six months of 1901—Continued.

[Long tons.]

Year and month.	Reporting mines.	Outside sources.	Total.
1899.			
October	20,680	3,300	23,980
November	19,817	3,400	23,217
December	20,388	3,400	23,788
Total	230,806	31,400	262,206
1900.			
January	17,613	3,400	21,013
February	17,497	3,400	20,897
March	19,883	3,400	23,283
April	20,667	3,400	24,067
May	19,282	3,400	22,682
June	19,235	3,400	22,635
July	19,612	3,400	23,012
August	17,667	3,400	21,067
September	17,986	3,400	21,386
October	19,945	3,400	23,345
November	19,876	3,400	23,276
December	18,724	3,400	22,124
Total	227,987	40,800	268,787
1901.			
January	19,279	3,400	22,679
February	17,700	3,400	21,100
March	19,984	3,400	23,384
April	18,038	3,400	21,438
May	18,892	3,500	22,392
June	18,901	3,500	22,401
Total, six months	112,794	20,600	133,394

An analysis of these figures shows that production among the reporting mines fluctuates from month to month, and that record products were made as early as April and May of 1898.

A considerable number of foreign mines, including those of the Peninsula, the Cape, Australasia, Germany, and Mexico, report monthly to a secretary in London since July, 1892. During the last six months of 1892, and in 1893, 1894, 1895, 1896, 1897, 1898, 1899, and 1900 the product of this group, which maintains friendly relations with the American Producers' Association, has been as follows:

Foreign reporting mines.

Year.	Quantity.
	Long tons.
Second half 1892	39,655
1893	81,785
1894	88,531
1895	86,178
1896	86,196
1897	88,270
1898	84,554
1899	89,240
1900	89,431
First six months 1901	46,847

There, too, no exceptional development has taken place. The slight increase of production has taken place among the smaller mines and among the new producers.

According to the careful compilations of Mr. John Stanton, the exports of fine copper during recent years have been as follows:

Exports of fine copper from the United States.

Year.	Quantity.
	Long tons.
1893	80,392
1894	77,527
1895	64,722
1896	125,605
1897	129,210
1898	145,115
1899	119,811
1900	160,082

The heaviest exports took place during the first half of 1900, when 90,747 long tons were shipped. During the second half the exports fell off to 69,335 long tons, and during the first six months of 1901 they declined to 50,027 long tons, or at the rate of only 8,300 tons per month. It must be noted also that the imports of copper from a number of sources have lately grown larger, so that they offset to a considerable extent our shipments.

LAKE SUPERIOR DISTRICT.

The following is, in detail, the output of the Lake Superior mines, as reported by the companies, from 1884 to 1891:

Production of Lake Superior copper mines, 1884 to 1891.

Mine.	1884.	1885.	1886.	1887.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Calumet and Hecla	40,473,585	47,247,990	50,518,222	46,016,123
Quincy	5,650,436	5,848,530	5,888,511	5,603,691
Osceola	4,247,630	1,945,208	3,560,786	3,574,972
Franklin	3,748,652	4,007,105	4,274,297	3,915,838
Allouez	1,928,174	2,170,476	1,725,463	885,010
Atlantic	3,163,585	3,582,633	3,503,670	3,641,865
Pewabic	227,834	....	....	....
Central	1,446,747	2,157,408	2,512,886	2,199,133
Grand Portage	255,860	....	....	....
Conglomerate	1,198,691	....	....	....
Mass	481,396	363,500	247,179	....
Copper Falls	891,168	1,150,538	1,378,679	719,150
Phœnix	631,004	344,355	1,101,804	11,000
Hancock	562,636	203,037	150,000	....
Huron	1,927,660	2,271,163	1,992,695	1,881,760
Ridge	74,030	63,390	158,272	84,902
St. Clair	139,407	....	....	....
Cliff	28,225	....	22,342	....
Wolverine	751,763	328,610	3,125	2,300
Nonesuch	23,867	28,484	....	....
Isle Royale	16,074	....	....	....
National	87,368	162,252	184,706	25,187
Minnesota	1,144	12,608	....	....
Belt	130,851	27,433	7,300	....
Sheldon and Columbia	9,828	....	....	....
Adventure	4,333	4,000	1,000	....
Peninsula	1,225,981	....	....	....
Tamarack	....	181,669	3,646,517	7,396,529
Ogima	1,106	12,000	....	....
Kearsarge	....	....	....	21,237
Evergreen Bluff	954	1,500	1,000	....
Ash Bed	1,517	....	....	....
Sundry companies—tributers	21,696	34,000	50,000	50,000
Total	69,353,202	72,147,889	80,918,460	76,028,697

Production of Lake Superior copper mines, 1884 to 1891—Continued.

Mine.	1888.	1889.	1890.	1891.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Calumet and Hecla	50,295,720	48,668,296	59,868,106	....
Quincy	6,367,809	6,405,686	8,064,253	10,542,519
Osceola	4,134,320	4,534,127	5,294,792	6,543,358
Franklin	3,655,751	4,346,062	5,638,112	4,319,840
Allouez	314,198	1,762,816	1,407,828	1,241,423
Atlantic	3,974,972	3,698,837	3,619,972	3,653,671
Central	1,817,023	1,270,592	1,413,391	1,237,500
Mass	....	58,349	62,187	....
Copper Falls	1,199,950	1,440,000	1,330,000	1,427,000
Huron	2,370,857	2,219,473	1,736,777	1,257,059
Ridge	50,924	28,000	21,569	....
National	....	454,134	123,879	....
Adventure	....	692	15,485	....
Peninsula	....	736,507	1,108,660	1,599,670
Tamarack	11,411,325	10,605,451	10,106,741	16,161,312
Kearsarge	829,185	1,918,849	1,598,525	1,727,390
Evergreen Bluff	....	21,580	....	....
Sundry companies—tributers	50,000	6,224	....	....
Total	86,472,034	88,175,675	101,410,277	....

The following table records only the output of some of the leading producers in that district:

Production of some of the leading Lake Superior copper mines, 1892 to 1900.

Mine.	1892.	1893.	1894.	1895.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Tamarack	16,426,633	15,085,113	15,375,281	14,900,28[illegible]
Quincy	11,103,926	14,398,477	15,484,014	16,304,72[illegible]
Osceola	7,098,656	6,715,870	6,918,502	6,270,37[illegible]
Franklin	3,769,605	3,504,244	3,556,487	3,086,933
Atlantic	3,703,875	4,221,933	4,437,609	4,832,497
Kearsarge	1,467,758	1,627,030	1,998,710	1,946,163
Tamarack, jr	796,769	1,610,259	2,349,329	2,605,000
Peninsula	973,217	....	....	....
Copper Falls	1,350,000	750,000	....	....
Huron	461,499	562,776	....	....
Allouez	546,530	....	....	....
Central	1,625,982	1,180,040	584,590	379,020
Centennial	106,801	....	....	....
Wolverine	500,074	1,025,062	1,665,255	1,815,391

Production of some of the leading Lake Superior copper mines, 1892 to 1900—Continued.

Mine.	1896.	1897.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Tamarack	16,044,860	20,222,529	23,000,000	18,565,602	19,181,605
Quincy	16,863,477	16,924,618	16,354,061	14,301,182	14,116,551
Osceola	6,251,304				
Kearsarge	1,377,226	11,201,103	11,900,000	11,358,049	12,567,131
Tamarack, jr	2,135,000				
Franklin	2,746,076	2,908,284	2,623,702	1,230,000	3,663,710
Atlantic	4,895,985	5,109,663	4,377,399	4,675,882	4,930,149
Central	469,243	611,172	291,339		
Wolverine	2,220,933	2,316,296	4,588,114	4,756,646	4,778,829
Baltic			42,766	621,336	1,735,060

A good many enterprises launched during 1899 consumed the year 1900 in development work and will not appear in the list of producers until 1901 or 1902. A number of the mines which have been making copper for many years made extensive improvements, which, too, will not tell until later on.

The falling off in the output of the Lake Superior district in 1900 is principally due to the lessened product of the Calumet and Hecla mine, which is still developing the Osceola lode, for the crushing of whose rock a large new stamp mill is being built.

The annual report of the Calumet and Hecla Mining Company for the fiscal year ending April 30, 1901, was accompanied by a statement by Alexander Agassiz, containing the following:

During the past year we produced mineral equal to 37,932 tons of refined copper, as against 44,584 tons last year. Our product in refined copper was 36,326 tons; for the previous year our product in refined copper was 49,312 tons.

We have continued to push the openings on the conglomerate belt, especially in the vicinity of the Red Jacket shaft there has not been any improvement in the character of the lode in that district; it remains, as was noted in the last annual report, less rich than in the upper levels. Owing to the great delay in the delivery of the machinery destined to operate the amygdaloid lode, we practically suspended operations on the Osceola amygdaloid last fall; there being no improvement in the delivery of machinery, we propose still further to reduce our force there. The engine houses at Nos. 13, 14, and 15 shafts have been erected and are awaiting the hoisting engines.

At the Lake Linden smelting works a new mineral house has been built, a larger cupola furnace has been installed, and three of our furnaces have been enlarged. At the Buffalo smelting works the work on the electric plant is progressing favorably. No other changes have been made there.

The mine was closed for three weeks, owing to the breaking out of the fire at the nineteenth level in No. 2 Hecla on the 27th of May. We resumed work again on the 20th of June, but No. 2 Hecla remained closed and we were obliged to retimber it from the eleventh level downward; this curtailed our output fully 10 per cent for nine months. No. 2 Hecla went into commission again the 1st of March, so that in March our product came up again to the normal amount. When the fire broke out we were greatly disappointed to find that we could not carry on independent mining operations through the Red Jacket shaft. It was planned with this end in view, after two disastrous fires. Unfortunately, it was found that the gases developed by the underground fire sank to the bottom of the openings, which of necessity had to be connected with the other parts of the mine, and thus found their way through the levels and crosscuts, even when shut off with air locks and iron doors. These were most effective in preventing the spreading of the fire, but were useless against the infiltration of gases to the lower parts of the mine. The Red Jacket shaft was sunk and equipped at great expense. If it has failed of its original purpose we still propose to use it for the mining of the northern part of the lode, that part of the mine locally called the Five Forties, situated under the Tamarack, jr. By installing a Kimberly hoist at the fifty-seventh level we shall be able for a number of years to hoist from that station a large amount of rock, which will be brought along that level from a double-track slope operated by an electric or a compressed-air hoist. The conditions of hauling and of hoisting will be very similar to those existing at the De Beers mine. The other compartments of the shaft will be devoted to the service of the central part of the mine, in connection with Nos. 4 and 5 Calumet shafts.

A comparison of the treasurer's statement of assets and liabilities for three years follows:

ASSETS.

	1901.	1900.	1899.
Cash at mine	$122,367	$149,397	$112,282
Cash at New York office	15,000	15,000	15,000
Cash at Boston office	3,350,489	5,738,462	5,207,798
Bills receivable	382,011	573,576	801,237
Insurance fund	....	504,583	353,647
Total	3,869,867	6,981,018	6,489,964

LIABILITIES.

	1901.	1900.	1899.
Drafts in transitu	$79,074	$96,827	$127,360
Aid fund	31,539	32,824	27,745
Bills payable	650,288	365,509	291,315
Contracts for equipment	640,836	1,425,000	645,000
Cash for improvements	300,000	800,000	1,000,000
Total	1,701,737	2,720,160	2,091,420
Balance	2,168,130	4,260,858	4,398,544

According to the annual report of the Tamarack Mining Company, the production of mineral in 1900 was 31,738,405 pounds, as compared with 31,713,752 pounds in 1899 and 31,127,623 pounds in 1898. The quantity of rock mined was 766,058 tons, the quantity stamped having been 625,422 tons, at an average cost of 31.48 cents per ton. Special circumstances led to this relatively high figure. The most interesting event of the year was the completion of shaft No. 5, which encountered the vein on December 20, at a depth of 4,662 feet, the depths of the first four shafts being respectively 3,240, 4,142, 4,713, and 4,450 feet. The total cost of the shaft, with its equipment, so far as completed, to the end of the year 1900, was $663,508.60. The total receipts of the company during the year 1900 were $3,299,077.26, while the total costs, including $252,869.95 for construction, were $2,099,935.97, leaving a net income of $1,199,141.29, out of which dividends aggregating $1,020,000 were paid, making a total since 1888 of $7,290,000.

The Osceola Consolidated Mining Company in 1900 obtained the results from the new stamp mill of three heads completed in 1899. The production of mineral, which amounted to 14,767,430 pounds in the latter year, reached 17,166,715 pounds in 1900, obtained from crushing 683,066 tons of rock, at a cost of 27.20 cents per ton. The gross receipts amounted to $2,136,253.02, while the costs, including miscellaneous construction of $88,563.65, were $1,559,538.34, leaving a net income of $576,714.68, out of which $571,200 in dividends was distributed. Treasury stock was sold to the extent of $188,011.89, and $20,000 was received from the sale of land to the Centennial Copper Mining Company, out of which there was paid $89,405.44 on the new stamp mill account and $99,561.97 for sinking and construction at the new mine which the company is developing at the South Kearsarge, in addition to operating the old Osceola and Kearsarge mines. It is proposed to build a third stamp mill this year capable of holding four heads, three of which are to be put in to begin with.

The year 1900 witnessed the completion of betterments at the Quincy mine begun some years ago and involving a total outlay of over $1,500,000. The new mill of three stamps was in full running order early in January, 1901, so that the product of the mine will be materially increased and will probably reach 20,000,000 pounds per annum. During 1900 there were mined 650,545 tons of rock, of which 590,166 tons were hoisted and 558,723 tons treated. The product of the stamp mill was 13,818,830 pounds of mineral, and 4,672,919 pounds were obtained at the rock houses, the total yield of refined copper being 14,116,551 pounds. From this there has been realized the sum of $2,353,416.54. The running expenses at the mine were $1,112,145.78; the cost of smelting and marketing was $157,381.36, while the taxes in Michigan amounted to $50,265.67. This left as a mining profit $1,033,623.73, which was increased to $1,054,745.97 by miscellaneous income. The construction cost footed up to $604,870.91. The income of the year was therefore $449,875.06. Out of the balance on hand a sufficient sum was drawn to carry the dividend to $900,000, leaving a balance of assets on January 1 of $757,817.20.

The following table shows the operations of the Quincy mine for a series of years. It will be observed that until recent years the production has increased steadily; that the yield has very considerably fluctuated from year to year, and that the average monthly contract wages have shown a fairly steady increase for a series of years. In the table the average price realized is calculated from the gross income and product, the reports failing to show the quantity of copper on hand at the beginning of each fiscal year.

Operations of the Quincy mine, Lake Superior.

Year.	Product.	Yield fine copper per fathom broken.	Price obtained.	Cost per pound, exclusive of construction.	Number of miners on contract.	Average monthly contract wages.
	Pounds.	*Pounds.*	*Cents.*	*Cents.*		
1864	2,498,574	562	44.8	26.7	242	$65.50
1865	2,720,980	501	....	....	212	57.53
1866	2,114,220	451	31.3	29.0	227	53.16
1867	1,921,620	526	22.7	18.9	167	50.83
1868	1,417,941	447	25.2	23.1	157	50.44
1869	2,417,365	446	21.9	16.7	210	51.10
1870	2,496,774	528	21.5	15.3	181	46.09
1871 *a*	2,409,501	441	22.8	15.2	104	47.08
1872	2,269,104	391	32.5	22.9	233	60.62
1873	2,621,087	491	26.5	18.6	223	62.42
1874	3,050,154	577	21.9	15.1	234	43.38
1875	2,798,281	485	22.7	15.8	217	46.74
1876	3,073,171	507	20.0	15.7	227	47.13
1877	2,837,014	467	18.6	15.1	247	43.79
1878	2,991,050	395	14.9	14.0	234	41.50
1879	2,639,958	403	16.3	13.7	212	38.76
1880	3,609,250	563	18.5	11.8	192	49.10
1881	5,702,606	767	18.7	10.0	212	48.54
1882	5,682,663	800	17.1	9.5	152	48.83
1883	6,012,239	850	13.7	8.9	165	46.02
1884	5,680,087	722	12.2	8.6	157	43.35
1885	5,848,497	710	11.4	7.5	132	44.00
1886	5,888,517	638	11.1	6.8	140	45.80
1887	5,603,691	781	11.7	8.6	142	48.40
1888	6,367,809	690	15.9	10.1	158	49.60
1889	6,405,686	690	12.0	9.4	145	49.15
1890	8,064,253	769	15.7	8.2	146	52.60
1891	10,542,519	685	12.8	9.1	182	53.40
1892	11,103,926	572	11.27	8.8	238	53.75
1893	14,398,477	574	10.4	7.1	259	49.60
1894	15,484,014	584	9.5	5.7	285	50.70
1895	16,304,721	517	10.1	5.9	336	50.00
1896	16,863,477	477	10.9	6.5	379	52.00
1897	16,924,618	481	11.1	6.8	393	52.52
1898	16,354,061	513	12.0	6.8	381	52.50
1899	14,301,182	427	17.1	8.1	401	56.72
1900	14,116,551	391	16.7	9.3	433	62.00

a Introduction of steam drills.

The annual report of the Franklin Mining Company is encouraging, and attention is called to the fact that three distinct and separate properties are being operated—the old Franklin mine, the Franklin, jr., and a mine in the old Peninsular conglomerate on the Franklin, jr., property. At the old Franklin mine there were hoisted 118,460 tons of rock, 113,930 tons going to the stamp mill. Besides this it produced 1,004,055 pounds of mass copper. At the Franklin, jr., purchased in 1894, work has been proceeding on the Pewabic lode, from which there was hoisted 170,896 tons of rock, 154,641 tons being shipped to the mill. In addition to this the work of developing the old Peninsula conglomerate on the Franklin, jr., property has been carried on. The stamp mill treated 268,571 tons of rock at an average cost of 30.34 cents, the average cost during the second half of the year being 27.77 cents per ton. The amount of mineral produced at the mill was 3,621,273 pounds, while the mass and barrel work amounted to 1,020,475 pounds. The product of refined copper was 3,663,710 pounds. The stamp mill worked only two heads regularly, the third head not being yet fully supplied with rock. When the hoisting plants are in full working order, it is believed that the crushing will reach 1,300 tons a day. The receipts for the year were $594,252.36 for copper, the running expenses at the mine having been $582,785.62, the smelting and marketing expenses $63,908.07, and the construction at Grosse Point $9,639.40. This left a balance of expenditures of $62,080.76.

The Atlantic mine had another year of low-grade rock in 1900, the average for the year having been 12.04 pounds per ton, as compared with 12.28 pounds in 1899. The production of mineral was 6,577,955 pounds, which yielded 4,930,149 pounds of refined copper, as compared with 4,675,882 pounds in 1899. The average price realized was 16.4 cents, the gross receipts being $809,177.18. The working expenses at the mine were $555,254.64, while the smelting, freight, and other expenses footed up $60,301.40, leaving therefore a surplus of $193,621.14. The construction account was heavy, being $114,007.59, which included $58,373 for a new dam for the stamp mill and a new deep hoisting plant for one of the shafts. Dividends aggregating $80,000 were paid during the year.

The following record of costs for a series of years shows how it was possible by close and intelligent management to treat profitably an ore yielding only a small percentage of copper.

Cost of copper at the Atlantic mine per ton of rock treated.

Items of cost.	1889.	1890.	1891.	1892.	1893.	1894.
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
Mining, selecting, breaking, and all surface expenses, including taxes	87.87	104.14	95.29	83.98	79.49	75.18
Transportation to mill	3.88	3.46	3.86	3.33	3.28	3.03
Stamping and separating	27.78	27.78	25.82	25.09	24.95	23.30
Freight, smelting, marketing, and New York expenses	20.22	20.37	18.47	17.67	18.22	17.71
Total working expenses	139.75	155.75	143.44	130.07	125.94	119.22
Total expenditures, including construction	153.27	166.70	154.51	133.51	160.24	165.07
Net profit	6.23	27.71	0.16	....	....	....
Yield of copper, per cent	0.663	0.650	0.615	0.615	0.669	0.703

Cost of copper at the Atlantic mine per ton of rock treated—Continued.

Items of cost.	1895.	1896.	1897.	1898.	1899.	1900.
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
Mining, selecting, breaking, and all surface expenses, including taxes	75.25	76.43	73.43	89.11	103.60	103.58
Transportation to mill	4.08	4.96	4.54	5.55	6.50	6.92
Stamping and separating	22.20	24.87	23.94	24.11	23.35	24.70
Freight, smelting, marketing, and New York expenses	18.81	17.47	17.03	16.04	17.04	14.70
Total working expenses	120.34	123.73	118.94	134.81	150.49	149.90
Total expenditures, including construction	156.05	135.99	129.69	153.59	171.11	177.65
Yield of copper, per cent	0.730	0.660	0.648	0.590	0.614	0.602

Since the development of the Baltic mine that company has been using two stamps of the Atlantic mill. With the completion of the new Baltic mill, toward the close of 1901, the Atlantic mine should show gains in production as the result of entering into the possession of its entire mill.

The Baltic Mining Company has made rapid progress during 1900. Shaft sinking aggregated 433 feet, and drifting 3,264 feet. A large high-duty air compressor has been installed, and the erection is under way of a stamp mill planned for four heads, but to contain two of 500 tons capacity a day at the outstart. A concrete and steel dam is being built jointly with the Atlantic mine. The total outlays for construction amounted to $241,817.89, the larger sums being $8,404.13 for the compressor house, $19,691.58 for the compressor plant, $9,706.29 for the boiler house, and $11,203.48 for the boiler plant, $70,728.59 for the stamp-mill buildings, and $10,926 for the outer plant and $58,373.01 for the dam.

The Baltic mine produced, with the aid of leased stamps, 1,735,060 pounds of fine copper from 88,598 tons of rock, producing 2,280,715 pounds of mineral. The rock therefore yielded 19.58 pounds of copper per ton. Selling the copper at an average of 16.49 cents per pound, the receipts were $286,046.85, which miscellaneous income carried up to $297,179.82. The running expenses of the mine were $256,791.06, and the smelting and freight $25,326.85, thus leaving a surplus of $15,061.91. The surplus of 1899 was $240,594.78. As stated, the sums expended for construction aggregated $241,817.89, thus leaving a balance of $13,838.80.

The annual report of the Wolverine Copper Mining Company for the year ending June 30, 1901, shows that the product was 5,853,000 pounds of mineral, which yielded 4,907,646 pounds of refined copper. The average price realized was 16.74 cents, making the total sum of $821,671.88. Interest receipts carried this to $828,797.32. The working expenses at the mine were $348,395.92, the smelting, freight, and marketing charges aggregated $57,158.19, and the construction outlays $27,708.39, leaving a net profit of $395,534.82. Dividends aggregating $240,000 were paid, so that the surplus at the end of the fiscal year, including the previous surplus, footed up to $540,141.88. The Wolverine is building a new two-head stamp mill at Traverse Bay, which will have an estimated capacity of 1,000 tons per day, and is expected to go into commission in the summer of 1902. The Wolverine hoisted 223,971 tons of rock, and crushed 190,104 tons, the cost per ton of rock stamped being $1.83. The total cost per pound of refined copper, marketed, including construction costs, was 8.84 cents per pound. Exclusive of construction account it was 8.265 cents.

The Trimountain Mining Company, whose property is located west and south of the Baltic mine, nearly completed its surface plant in 1900, and some very good ground has been opened. Contracts have been signed for a mill that is to contain two heads, which, it is expected, will be put in operation in 1901. The expenses of the year were $325,502, leaving a balance of $255,051 at the end of the year.

With the Isle Royale Copper Company the year 1900 was one of further development, 12,920 feet of drifting being done, and sloping ground being opened which is estimated to contain, available, 1,356,666 tons of rock. The surface improvement includes a large hoisting engine for No. 2 shaft and a Nordberg cross-compound, two-stage air compressor. A large mill has been built with three heads of stamps, of which two were running in May, while the third was started in July. The total expenditures during the year were $677,810.55, leaving a balance on hand at the close of the year of $832,742.21.

The Mohawk Mining Company has continued the development of the mine. Contracts have been let for two heads of stamps with an estimated capacity of 1,000 tons of rock in twenty-four hours. In a cross vein a new mineral, named by Dr. G. A. Koenig "mohawkite," has been discovered in quantity. It contains about 60 per cent of copper, besides some nickel, cobalt, and arsenic. A lot of 57 tons shipped to Swansea netted $140 per ton. Arrangements for its treatment are now in progress. The total expenditures of the year were $241,913.08 and a surplus of $136,181.53 was carried over into the new year.

The Adventure Consolidated Copper Company has issued its first report for the period from the organization of the company to the end of the year 1900. The underground openings and the surface equipment have proceeded to the point that the building of a modern 3-stamp mill on Lake Superior, near the Salmon Trout River, has been determined upon. It is believed that the mine will become a contributor to the copper production in 1902. The total receipts, including $800,000 from assessments, have amounted to $813,151, out of which $250,000 was paid for property, $14,255 for organization expenses, and $242,921 for mining and machinery.

The Centennial Copper Mining Company, after testing the Calumet conglomerate and the Osceola amygdaloid, has turned its attention to the Kearsarge lode. About 7,000 feet of new ground were opened during the year, and preliminary contracts were let to begin this year on the mill site on Torch Lake. The last annual report shows a balance of over $240,000, to which $180,000 has been added in April by an assessment of $2 on the stock.

The Mass Consolidated Mining Company is expected to reenter the ranks of producers in the second half of 1901, when a new stamp mill will be completed.

A project is being discussed for the consolidation, under one management, of the South Range mines, the Baltic, the Copper Range, and the Trimountain.

A plant for treating the tailings of the Franklin mine has been started by the Lake Superior Reduction Works. It is to some extent experimental.

MONTANA.

The production of Montana broke all records in 1900, reaching the enormous total of 270,738,489 pounds. There has been deducted from the total product of the individual smelting works such quantities of custom matte as were treated by them for other concerns, so that all danger of duplication has been avoided.

The Anaconda Company largely increased its output, and during 1900 carried forward extensive improvements in the concentrating, smelting, and electrolytic plants.

The year 1900 has been a prosperous one for the Boston and Montana Consolidated Copper and Silver Mining Company. The total receipts from the sales of copper, bluestone, and the precious metals having been $13,242,576.64. The expenses at Butte, at Great Falls, and at the electrolytic refinery were $4,241,895.84, and the outlays for handling copper footed up to $807,828.62, leaving a gross income of $8,192,852.18, from which are to be deducted net interest $31,468.19. After deducting $1,093,513.41 for special construction account at Great Falls, and $48,089.31 for bonds maturing, $7,019,781.27 remained available for dividends, the disbursements being $43 per share, or $6,450,000. Frank Klepetko, the manager, reports that the construction work at Great Falls, nearly completed, will permit of treating 2,000 tons of concentrating ore and from 300 to 400 tons of smelting ore a day, the capacity of the plant being nearly doubled. The work in hand for 1901 is to supplement, to a certain extent, the water power at Great Falls, there having been at times a lack of water. The intention is to install about 3,000 horsepower by August to drive the concentrators, the blast-furnace blowers, and the electric-power generators. Special mention is made of a reduction in the cost of calcining by a modified form of the McDougall furnace.

The Butte and Boston Company resumed control of its smelting plant on February 1, 1900, and made in the year the largest production in its history.

In the summer of 1901 the Amalgamated Copper Company increased its capital stock from $75,000,000 to $155,000,000, in order to acquire the stock of the Boston and Montana Consolidated Copper and Silver Mining Company and of the Butte and Boston Consolidated Mining Company, either on the basis of $375 cash for the former or $92.50 cash for the latter, or on the basis of an exchange of four shares of Amalgamated for one share of Boston and Montana and one share of Amalgamated for one share of Butte and Boston stock. In the latter manner $3,447,200 of the total issue of $3,750,000 stock of the Boston and Montana Company and $1,838,500 out of a total of $2,000,000 of the Butte and Boston Company was secured. The Amalgamated Copper Company now controls the Washoe Copper Company, the Colorado Smelting and Mining Company, the Anaconda Copper Mining Company, the Parrot Silver and Copper Company, the Boston and Montana, and the Butte and Boston, subject to $600,000 outstanding Boston and Montana 7 per cent bonds and $1,500,000 Butte and Boston 6 per cent bonds. The total production of these concerns in 1900 was 235,000,000 pounds of fine copper, including custom ores smelted.

ARIZONA.

The production of Arizona has shown a considerable falling off, due largely to interruption of the fuel supply and to the destruction by fire of the smelting plant of the Detroit Copper Company. Outside of the Helvetia, which appeared as a new producer, no contributors of importance have appeared to swell the total production. A very large amount of development work is progressing in many districts, and it is likely that in the early future copper from new mines and smelting works will reach the markets.

Among those which are preparing are the Shannon Copper Company at Clifton, the Copper Belle, the Arizona Gold and Copper Company at Patagonia, the Yavapai Copper Company at Prescott, the Arizona Blue Bell Copper Company in Yavapai County, the Catalina Copper Mining Company, of southeastern Arizona, the Black Diamond Copper Mining Company in Cochise County, the Copper King of Arizona, which is planning a smelting plant at Barrett, the Calumet and Arizona and the Copper Glance Mining Company, of Bisbee, and the Rio Hondo Copper Company, which is about to build a smelter.

At the United Verde mines a cave in put out of commission a part of the smelting works and cut down the output.

The annual report of the Old Dominion Copper Mining and Smelting Company refers to the building of new hoisting works and pumping plant and to the enlargement of the smelting plant. The search for sulphides in depth was unsuccessful and the purchase of the Continental group of mines made to secure a supply did not lead to the development of a sufficient quantity. The company has been producing at the rate of 750,000 pounds of copper monthly. The statement covering the operations from the formation of the new company to the end of 1900 shows receipts of $3,567,557.83 from copper, silver, and gold. The cost of mining, smelting, and electrolytic refining was $2,161,293.11 and the expenses of handling the copper was $553,303.56, thus leaving a profit from production of $852,961.16. There were expended for the purchase of mining claims $109,821 and for construction and improvement account $841,217.64. The company is operating one blast furnace, three being completed, and is preparing to build a converter plant to Bessemerize the matte accumulated.

UTAH.

The Bingham Consolidated Mining and Smelting Company has been formed with a capital of $10,000,000 to acquire for $5,000,000 stock, the shares of the Bingham Copper and Gold Mining Company, for $2,500,000 stock, the Dalton and Lark, Brooklyn, Antelope, and other mines, of the Copper Belt Railway, and to provide $1,000,000 in cash in the treasury, leaving $2,500,000 in stock unissued. The company completed in 1900, a smelting plant at Bingham Junction with three furnaces, 40 by 176 inches at the tuyeres, with a total daily capacity of 450 tons of ore per day, the furnaces having been blown in in January, February, and March. The matte produced carries about 20 per cent of copper. The principal source of ore is the Bingham mine, a smaller quantity coming from the Tesora at Tintic, owned also by the company.

NEW MEXICO.

The new works of the Santa Fe Gold-Copper Mining Company were not completed until very late in the year, so that the output will not appear until the year 1901. The greater part of the copper ores originating in New Mexico in 1900 was handled at the smelting works of the Silver City Reduction Works, Silver City, which also treated a considerable quantity of ore from Arizona.

NEVADA.

The Nevada Consolidated Copper and Gold Mining Milling Company has begun producing, and the Excelsior Mining Company near Yerington has also prepared for smelting.

WYOMING.

Considerable quantities of copper ore have been shipped to various smelters in other States from Wyoming. The first local smelting plant to be in operation will be that of the Boston-Wyoming Smelter Power and Light Company, of Grand Encampment.

CALIFORNIA.

By far the greater part of the copper product of California comes from the Mountain Copper Company, of Shasta County. According to the annual report of the company for 1900, there were extracted 179,694 short tons of ore as compared with 203,965 tons in 1899 and 221,895 tons in 1898. The smelting works handled 207,571 tons in 1900, as compared with 176,689 tons in 1899 and 168,514 tons in 1898, the copper contents of the matte made at Keswick being 11,978 short tons in 1900, 10,664 tons in 1899, and 10,721 tons in 1898. The percentage of copper in the ore smelted, which was 7.45 per cent in 1897, fell to 6.33 per cent in 1898, to 6.04 per cent in 1899, and to 5.77 per cent in 1900. The exploration of the property of the company during the past year has not led to any discoveries of importance. The profits of the year aggregated £318,129, the charges against it amounting to £17,859, leaving £300,270 net. Dividends aggregating £200,000 were paid, and £100,000 was assigned to the reserve and depreciation fund, which now amounts to £250,000.

A new undertaking is that of the Trinity Copper Company, a Boston corporation, which is to build a large smelting plant at Kennett, Shasta County.

A copper and lead smelting plant has been erected at the Needles, California, on the Colorado River, the works having been started in March, 1901, with one blast furnace.

The Copper King Limited has built a smelting plant at Seal Bluff Landing to treat the ores from its mines in Fresno County and to handle custom ores.

TENNESSEE.

Mining and smelting on modern lines are being introduced into the old Ducktown district by the Tennessee Copper Company. New equipment has been provided for the Burra Burra and London shafts of the company. Arrangements have been perfected for the economic surface handling of the ore to the roast heaps and a new smelter has been built at Isabella Station. It has two blast furnaces, 56 by 180 inches, at the tuyeres and two converter stands. A large amount of development work has been done, the annual report estimating that about 800,000 tons of ore are blocked out and ready for stoping. The treasurer's report of receipts and expenditures from June 15, 1899, to January 1, 1901, shows cash received at time of incorporation, $1,000,000; interest and discounts, $32,931, and royalty on iron ore, $11,250, a total of $1,044,181. The expenditures were $698,221, remitted to the Tennessee office; real estate purchased, $31,250; incorporation and general expenses, $51,449, leaving a balance of $263,261. The company is expected to produce 700,000 pounds per month.

Production in 1900 was practically confined to the Ducktown Sulphur and Copper Company.

VERMONT.

The Copperfield mines, at Copperfield, Vt., owned by George Westinghouse, are still being developed. They did not produce any copper in 1900. Smelting, however, did begin in January, 1901. The Elizabeth Mining Company of South Strafford, has developed about 400,000 tons of calcopyrite ore. There is in operation one 150-ton ore furnace, one 40-ton matte furnace, and one 10-ton blister furnace, the latter started in May, 1901. About 16,000 tons of ore have been smelted.

NEW JERSEY.

The Arlington Copper Company has reopened the old Schuyler mine, worked intermittingly from 1719 to 1862. A crushing plant has been built. The fine rock is roasted in a long reverberatory furnace and is then charged into tanks containing dilute sulphuric acid. The resulting solution of copper sulphate is discharged into vats in which an electric current is made to pass from one set of lead anode plates to a corresponding set of lead cathode plates. The copper, after reaching a sufficient thickness, is stripped off and the resulting plates are hung in the solution again to receive a thicker coat.

OTHER STATES.

At Tacoma, Wash., the Tacoma Smelting Company, for many years engaged in lead smelting, proposes to erect a plant for handling copper ores, which probably will be secured from Alaska and British Columbia.

A project is on foot to build a large copper-smelting plant at El Paso, Tex., the Federal Smelting Company being the name of the company which is reported to control copper-mining property in Arizona and in Mexico.

In Virginia the principal operations are those of the Eustis mines, the ores of which are smelted at Norfolk. The Union Copper Company has been building a concentrating mill.

The works of the Southern Smelting Company at Oakdale, Ga., were not put into operation until early in 1900.

In South Dakota the Golden Reward Consolidated Gold Mining and Milling Company of Deadwood continued smelting, obtaining copper from ores mined in South Dakota, Montana, Utah, and Wyoming. The copper matte is shipped to refineries at Omaha, Denver, and Pueblo.

The building has begun of a large new copper refining plant on New York harbor.

IMPORTS.

The imports of fine copper contained in ores, and of regulus and black copper, and of ingot copper, old copper, plates not rolled, rolled plates, sheathing metal, and manufactures not otherwise specified, and of brass are given in the following tables:

Fine copper contained in ores, and regulus and black copper imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	Finer copper contained in ores.		Regulus and black copper. *a*		Total value.
	Quantity.	Value.	Quantity.	Value.	
June 30—	*Pounds.*		*Pounds.*		
1867	....	$936,271	....	....	$936,271
1868	3,496,994	197,203	....	....	197,203
1869	24,960,604	448,487	....	....	448,487
1870	1,936,875	134,736	....	....	134,736
1871	411,315	42,453	499	$60	42,513
1872	584,878	69,017	4,247	1,083	70,100
1873	702,086	80,132	1,444,239	279,631	359,763
1874	606,266	70,633	28,880	5,397	76,030
1875	1,337,104	161,903	12,518	2,076	163,979
1876	538,972	68,922	8,584	1,613	70,535
1877	76,637	9,756	1,874	260	10,016
1878	87,039	11,785	....	....	11,785
1879	51,959	6,199	....	....	6,199
1880	1,165,283	173,712	2,201,394	337,163	510,875
1881	1,077,217	124,477	402,640	51,633	176,110
1882	1,473,109	147,416	224,052	30,013	177,429
1883	1,115,386	113,349	....	....	113,349
1884	2,204,070	219,957	2,036	204	220,161
1885	3,665,739	343,793	285,322	20,807	364,600
Dec. 31—					
1886	4,503,400	341,558	1,960	98	341,656
1887	3,886,192	194,785	27,650	1,366	196,151
1888	4,859,812	381,477	4,971	324	381,801
1889	3,772,838	274,649	60,525	4,244	278,89[illegible]
1890	3,448,237	241,732	221,838	15,688	257,42[illegible]
1891	8,931,554	774,057	2,403,919	214,877	988,93[illegible]
1892	7,669,978	453,474	303,087	17,390	470,86[illegible]
1893	7,256,015	435,448	3,175,559	202,197	637,645
1894	4,804,614	260,402	5,873,820	144,832	405,234
1895	*b* 8,921,920	213,689	*b* 3,104,640	125,853	339,542
1896	*b* 2,620,800	126,580	*b* 3,427,200	210,725	337,305
1897	*b* 43,919,680	683,497	2,974,720	226,704	910,201
1898	*b* 107,253,440	565,245	1,583,680	92,135	657,380
1899	*b* 120,934,616	1,141,180	7,763,885	784,232	1,925,412
1900	*b* 109,123,840	2,164,386	27,534,080	2,966,449	5,130,835

a Not enumerated until 1871. *b* Ores.

Copper imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	Bars, ingots, and pigs.		Old, fit only for remanufacture.		Old, taken from bottoms of American ships abroad. *a*	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*		*Pounds.*	
1867	1,635,953	$287,831	569,732	$81,930	....	....
1868	61,394	6,935	318,705	42,652	....	....
1869	13,212	2,143	290,780	34,820	....	....
1870	5,157	418	255,386	31,931	....	....
1871	3,316	491	369,634	45,672	....	....
1872	2,638,589	578,965	1,144,142	178,536	....	....
1873	9,697,608	1,984,122	1,413,010	255,711	32,307	$4,913
1874	713,935	134,326	733,326	137,087	9,500	930
1875	58,475	10,741	396,320	55,564	11,636	1,124
1876	5,281	788	239,987	35,545	10,304	1,981
1877	230	30	219,443	28,608	41,482	5,136
1878	1	1	198,749	25,585	....	6,004
1879	2,515	352	112,642	11,997	11,000	1,107
1880	1,242,103	206,121	695,255	91,234	....	....
1881	219,802	36,168	541,074	63,383	14,680	1,504
1882	6,200	836	508,901	59,629	16,075	1,629
1883	....	....	330,495	36,166	9,415	666
1884	*b* 542	107	149,701	12,099	....	554
1885	914	172	81,312	6,658	....	1,160
Dec. 31—						
1886	276	37	37,149	2,407	....	584
1887	212	22	39,957	2,374	....	120
1888	1,787	299	37,620	2,535	....	....
1889	3,160	522	19,912	1,176	....	....
1890	5,189	859	284,789	26,473	....	....
1891	2,556	389	134,407	9,685	....	....
1892	22,097	2,588	71,485	6,114	....	....
1893	554,348	58,480	59,375	6,945	....	6,326
1894	606,415	42,688	160,592	15,726	....	1,143
1895	7,979,322	726,347	1,336,901	109,340	....	....
1896	9,074,379	750,976	2,422,554	196,419	....	....
1897	12,646,552	1,142,526	1,780,390	158,829	....	....
1898	35,892,944	3,094,541	1,986,133	168,405	....	....
1899	64,282,583	9,350,582	6,678,145	758,010	....	....
1900	62,404,489	9,931,059	3,354,756	373,957	....	....

a Not enumerated until 1873.

b Includes "plates not rolled" since 1884.

Copper imported and entered for consumption in the United States, 1867 to 1900, inclusive—Continued.

Year ending—	Plates not rolled.		Plates rolled, sheets, pipes, etc.		Sheathing metal, in part copper. *a*		Manufactures not otherwise specified.	Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.	
June 30—	*Pounds.*		*Pounds.*		*Pounds.*			
1867	....	....	....	$1,101	220,889	$37,717	$15,986	$424,565
1868	....	....	....	1	101,488	18,852	21,492	89,932
1869	....	....	....	39	43,660	6,592	43,212	86,806
1870	....	....	....	2,039	....	....	485,220	519,608
1871	430	$129	....	7,487	....	....	668,894	722,673
1872	148,192	33,770	....	18,895	....	....	1,007,744	1,817,910
1873	550,431	97,888	....	4,514	....	....	869,281	3,216,429
1874	....	....	....	27	282,406	50,174	125,708	448,252
1875	8	4	....	617	136,055	23,650	35,572	127,272
1876	5,467	600	....	326	18,014	2,903	29,806	71,949
1877	....	....	....	203	110	22	41,762	75,761
1878	....	....	....	1,201	647	55	35,473	68,319
1879	27,074	4,496	....	786	300	20	39,277	58,035
1880	120	11	....	4,134	6,044	693	130,329	432,522
1881	20	3	....	82	39,520	4,669	284,509	390,318
1882	....	....	5,855	1,551	....	....	77,727	141,372
1883	....	....	2,842	379	6,791	1,047	40,343	78,601
1884	....	....	6,529	2,330	19,637	926	55,274	71,290
1885	....	....	470	120	86,619	9,894	61,023	79,027
Dec. 31—								
1886	....	....	3,770	339	21,573	1,917	31,871	37,155
1887	....	....	37,925	5,493	18,189	1,867	37,289	47,174
1888	....	....	5,208	737	23,622	2,696	14,567	20,834
1889	....	....	13,848	2,082	23,520	2,572	13,430	19,782
1890	....	....	4,209	917	37,458	4,467	24,752	57,468
1891	....	....	122,219	23,291	228,486	29,112	12,926	75,403
1892	....	....	1,788	600	417,134	51,380	49,764	110,446
1893	....	....	7,056	1,065	1,670	167	16,166	89,149
1894	....	....	12,681	1,821	8,422	1,470	3,851	66,699
1895	....	....	27,156	2,586	5,698	389	13,166	851,828
1896	....	....	34,481	4,834	3,183	303	20,953	973,485
1897	....	....	3,116	430	15,282	1,929	30,729	1,334,443
1898	....	....	11,793	2,193	5,801	679	*b* 20,071	3,285,889
1899	....	....	827	331	13,763	6,310	13,629	10,128,862
1900	....	....	5,821	3,416	22,783	2,367	8,145	10,318,944

a Does not include copper sheathing in 1867, 1868, and 1869.

b Including wire.

The sources of the imports of copper in the form of pigs, bars, old material, etc., are shown in the following table for the calendar years 1899 and 1900:

Imports of copper and copper ore, pigs, bars, ingots, plates, old and other unmanufactured, in the calendar years 1899 and 1900.

Countries.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*	
France	7,121,944	$1,067,231	4,312,454	$658,180
Germany	896,972	134,982	809,144	120,256
United Kingdom	34,188,172	5,200,036	36,809,986	6,341,696
Dominion of Canada:				
Quebec and Ontario	746,846	81,078	582,038	71,775
British Columbia	647,541	64,238	164,530	11,095
West Indies:				
British	507,006	52,675	466,064	42,458
Cuba	3,041,631	328,929	1,510,017	174,858
San Domingo	49,851	5,407	38,090	3,163
Mexico	19,703,367	2,511,760	20,168,888	2,664,249
Japan	112,020	15,187	2,478,967	305,933
British Australasia	4,029,645	584,698	....	....
All other countries	877,345	93,169	1,456,630	164,207
Total	71,922,340	10,139,390	68,796,808	10,557,870

Aside from the scattered quantities of old copper drawn from many sources, with Cuba leading, the copper imported is nearly all material which our refineries are able to treat more cheaply than those of other countries. Working as they do very important quantities also of foreign mattes, they do a very large business.

The following table, showing by customs districts the imports of bars, etc., during the calendar years 1899 and 1900, proves how largely the seaboard routes at New York and Baltimore handle the material:

Imports of copper pigs, bars, ingots, plates, old and other unmanufactured, by customs districts, calendar years 1899 and 1900.

Customs district.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*	
Baltimore, Md	12,645,594	$2,086,086	21,893,250	$4,175,209
Newark, N. J	563,071	56,308	....	....
New York, N. Y	47,905,124	6,785,681	40,567,109	5,697,467
Passamaquoddy, Me	63,459	5,738	28,075	2,417
Perth Amboy, N. J	1,548,221	278,941	1,802,472	257,399
Corpus Christi, Tex	5,331,323	551,739	3,327,972	303,213
Arizona	2,656,631	247,445	193,000	17,250
San Francisco, Cal	61,441	5,021	57,437	5,484
Champlain, N. Y	368,028	49,717	199,746	24,324
Detroit, Mich	341,067	19,928	35,293	5,022
All other districts	438,381	52,786	692,454	70,085
Total	71,922,340	10,139,390	68,796,808	10,557,870

The imports of ore and of matte are shown in the following table for the calendar years 1899 and 1900:

Imports of copper ore and matte, by countries, in the calendar years 1899 and 1900.

Countries.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Germany	377	$103,618	138	$22,357
Dominion of Canada:				
Quebec and Ontario	1,424	268,292	733	61,415
British Columbia	4,298	938,544	10,298	1,969,245
Newfoundland and Labrador	19,109	97,966	30,299	75,754
Mexico	3,681	606,859	8,176	1,900,662
Chile	2,748	228,304	4,372	1,036,293
All other countries			1,096	129,284
Total	31,637	2,243,583	55,112	5,195,010

The imports from Chile and miscellaneous sources are mattes which are treated at the seaboard. The Newfoundland ores, as indicated by the valuation, are of low grade. The Mexican mattes are largely treated at Western works, while a part of the imports from British Columbia are concentrates and high-grade ores which are handled by smelters, the bulk thereof going to branch works of the Canadian company. The balance of the British Columbia material is matte which is treated at Western refineries.

The following table shows the ports of entry, which throws some light on the movement of the material:

Imports of copper ore and regulus, by customs districts, during the calendar years 1899 and 1900.

Customs districts.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
New York, N. Y	24,054	$685,000	36,585	$1,302,524
Corpus Christi, Tex	136	42,114	2,015	258,867
Paso del Norte, Tex	56	9,588	138	39,536
Arizona	1,585	317,926	5,260	1,556,451
Puget Sound, Wash	2,753	747,049	5,373	1,415,592
Memphremagog, Vt	361	29,540	322	28,985
Oswegatchie, N. Y	1,802	244,451	5,146	556,158
All other districts	890	167,915	273	36,897
Total	31,637	2,243,583	55,112	5,195,010

No official data exist as to the copper contents of the ores and mattes imported. Small quantities of this foreign furnace material are exported, the Bureau of Statistics reporting the exports thereof in 1899 at 1,715 tons, and in 1900 at 964 tons.

A study of the situation and of returns from refiners, however, justifies an estimate of 25,000,000 pounds as the copper contents of this material.

In addition thereto copper is recovered from imported pyrites which are not classed in the import returns as cupriferous material. Reports from those who handle this material justify an estimate of 5,000,000 pounds. Finally, we have the copper contents of the Sudbury nickel mattes, which we place at 6,380,000 pounds.

Thus the net supply for 1900 through imports of cupriferous furnace material may be estimated as follows, the figures for 1899 having been arrived at in a similar manner:

Imports of copper in furnace material and ores in 1899 and 1900.

	1899.	1900.
	Pounds.	*Pounds.*
In mattes and ores	13,750,000	25,000,000
In iron pyrites	4,500,000	5,000,000
In nickel mattes	5,550,000	6,380,000
Total	23,800,000	36,380,000

For 1898 the same sources of supply were estimated to account for 19,750,000 pounds.

Summarizing, therefore, we have the following:

Imports of foreign copper, calendar years 1898, 1899, and 1900.

	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*
Bars, etc	54,166,467	71,922,340	68,796,808
In ores and mattes	19,750,000	23,800,000	36,380,000
Total imports	73,916,467	95,722,340	105,176,808
Less exports of foreign bars	....	2,550,149	1,281,782
Net imports	....	93,172,191	103,895,026

EXPORTS.

The exports of copper in the form of ore (including matte), ingots, and manufactured copper, for a series of years, have been as follows:

Copper and copper ore of domestic production exported from the United States, 1864 to 1900.

[Cwts. are long hundredweights of 112 pounds.]

Year ending—	Ore and matte.		Pigs, bars, sheets, and old.		Value of manufactured product.	Total value.
	Quantity.	Value.	Quantity.	Value.		
June 30—	*Cwts.*		*Pounds.*			
1864	109,581	$181,298	102,831	$43,229	$208,043	$432,570
1865	225,197	553,124	1,572,382	709,106	282,640	1,544,870
1866	215,080	792,450	123,444	33,553	110,208	936,211
1867	87,731	317,791	*a* 4,637,867	303,048	171,062	791,901
1868	92,612	442,921	1,350,896	327,287	152,201	922,409
1869	121,418	237,424	1,134,360	233,932	121,342	592,698
1870	*a* 19,198	537,505	2,214,658	385,815	118,926	1,042,246
1871	*a* 54,445	727,213	581,650	133,020	55,198	915,431
1872	35,564	101,752	267,868	64,844	121,139	287,735
1873	45,252	170,365	38,958	10,423	78,288	259,076
1874	13,326	110,450	503,160	123,457	233,301	467,208
1875	*a* 51,305	729,578	5,123,470	1,042,536	43,152	1,815,266
1876	15,304	84,471	14,304,160	3,098,395	343,544	3,526,410
1877	21,432	109,451	13,461,553	2,718,213	195,730	3,023,394
1878	32,947	169,020	11,297,876	2,102,455	217,446	2,488,921
1879	23,070	102,152	17,207,739	2,751,153	79,900	2,933,205
1880	21,623	55,763	4,206,258	667,242	126,213	849,218
1881	9,958	51,499	4,865,407	786,860	38,036	876,395
1882	25,936	89,515	3,340,531	565,295	93,646	748,456
1883	112,923	943,771	8,221,363	1,293,947	110,286	2,348,004
1884	386,140	2,930,895	17,044,760	2,527,829	137,135	5,595,859
1885	432,300	4,739,601	44,731,858	5,339,887	107,536	10,187,024
Dec. 31—						
1886	417,520	2,241,164	19,553,421	1,968,772	76,386	4,386,322
1887	501,280	2,774,464	12,471,393	1,247,928	92,064	4,114,456
1888	794,960	6,779,294	31,706,527	4,906,805	211,141	11,897,240
1889	818,500	8,226,206	16,813,410	1,896,752	86,764	10,209,722
1890	431,411	4,413,067	10,971,899	1,365,379	139,949	5,918,395
1891	672,120	6,565,620	69,279,024	8,844,304	293,619	15,703,543
1892	943,040	6,479,758	30,515,736	3,438,048	245,064	10,162,870
1893	835,040	4,257,128	138,984,128	14,213,378	464,991	18,935,497
1894	87,040	440,129	162,393,000	15,324,925	378,040	16,143,094
1895	276,480	1,631,251	121,328,390	12,222,769	1,084,289	14,938,309
1896	414,265	2,393,914	259,223,924	27,822,280	819,017	31,035,211
1897	181,280	1,199,029	277,255,742	30,597,645	958,379	32,755,053
1898	186,860	755,443	291,955,905	33,598,869	1,190,939	35,545,251
1899	74,540	442,868	246,826,331	41,190,287	1,852,499	43,485,654
1900	200,140	1,332,829	337,973,751	55,285,047	2,257,563	58,875,439

a Evidently errors in quantities.

The destination of our exports of copper bars, ingots, plates, and old copper during the years 1896, 1897, 1898, 1899, and 1900 is shown by the following table, the data having been furnished by the Bureau of Statistics:

Exports of copper bars and ingots for 1896, 1897, 1898, 1899, and 1900, and countries to which exported.

Country.	1896.	1897.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
United Kingdom	78,479,716	63,774,004	88,443,870	50,675,849	63,522,445
Austria	6,532,949	5,918,993	7,478,730	6,354,287	11,258,115
Belgium	9,648,271	16,651,776	13,613,183	5,069,456	12,554,191
France	45,502,864	59,630,864	53,909,508	58,450,866	67,725,989
Germany	29,609,837	29,746,200	42,891,345	49,285,139	67,348,848
Netherlands	72,994,600	86,581,616	72,418,633	69,304,699	101,398,394
Italy	4,067,160	3,757,920	3,733,672	3,449,565	5,550,285
Russia	10,741,821	8,515,772	7,340,276	2,689,610	5,650,423
Mexico	170,340		253,975	285,222	296,684
British North America	234,845	2,678,597	1,523,505	985,525	1,616,778
West Indies	1,241,705		6,143	5,599	1,317
Other countries	...		343,065	270,514	1,050,282
Total	259,224,108	277,255,742	291,955,905	246,826,331	337,973,751

Of course a considerable, though unknown part, of the copper thus exported has been obtained from refining foreign bars and mattes. It is not by any means all of domestic production. Some of it is foreign material simply in transit, this being the case with considerable quantities of Mexican copper, particularly in the years 1897 and 1898.

Germany is by far our largest customer for copper, since the greater part of the metal shipped to the Netherlands is in transit for that country. On the other hand some of the copper which goes to the United Kingdom is reshipped from there to other countries. The details of these movements can not well be followed.

Besides the copper classed as being of domestic origin—although, as stated, largely foreign material reworked here—moderate quantities of foreign copper are reexported direct. The Bureau of Statistics reports that in 1899 2,550,149 pounds and in 1900 1,281,782 pounds of foreign copper was exported.

The following table shows the export ports:

Exports of ingots, bars, and old copper in 1897, 1898, 1899, and 1900, by ports.

District.	1897.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Baltimore, Md	88,389,939	87,027,133	90,786,853	86,264,231
Boston and Charlestown, Mass	928,584	439,368	1,568,197	1,496,387
Newark, N. J	....	673,180	....	....
Newport News, Va	5,899,609	2,638,868	4,085,580	2,016,000
Norfolk, Va	....	5,249,820	4,707,267	....
New York, N. Y	167,344,812	178,400,314	134,412,540	230,178,643
Philadelphia, Pa	227,023	68,624	2,733,692	12,468,680
New Orleans, La	13,882,408	15,508,831	7,459,623	3,937,350
Galveston, Tex	....	444,920	3,700	....
Detroit, Mich	164,317	728,689	320,121	469,819
Huron, Mich	229,226	118,827	107,562	149,525
Burlington, Vt	102,718	410,410	434,340	678,589
All others	87,106	246,921	206,856	314,527
Total	277,255,742	291,955,905	246,826,331	337,973,751

Baltimore continues the export port of the bulk of the copper refined at the local works. From New York nearly all the Lake Superior copper exported and the metal treated by the great local smelting works goes out.

There were exported also in 1900 10,004 long tons of domestic ore and matte, of which a part went over the border to Mexico, and of which some part was leady material. The contents may be estimated at 7,000,000 pounds of copper. In 1899 the quantity was 3,747 long tons, whose copper contents, then being a larger proportion of matte, was placed at 3,500,000 pounds fine.

The available supply for the domestic markets may be computed as follows:

Supply of copper for the United States, 1892 to 1899.

Source.	1892.	1893.	1894.	1895.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Production of domestic copper	344,998,679	329,354,398	354,188,374	380,613,404
Imports:				
Fine copper in ore, entered for consumption	7,669,978	7,256,015	4,804,614	*a* 5,300,000
Fine copper in regulus, entered for consumption	303,087	3,175,559	5,873,820	
Bars and ingots	22,097	554,348	606,415	7,979,322
Old copper	71,485	59,375	160,592	1,336,901
Total	353,065,326	340,399,695	365,633,815	395,229,627
Exports:				
Ingots and bars	30,515,736	138,984,128	162,393,000	121,328,390
Estimated fine copper contents of matte	66,000,000	50,000,000	5,750,000	15,200,000
Total	96,515,736	188,984,128	168,143,000	136,528,390
Available supply	256,549,590	151,415,567	197,490,815	258,701,237

a Estimated.

Supply of copper for the United States, 1892 to 1899—Continued.

Source.	1896.	1897.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Production of domestic copper..	460,061,430	494,078,274	526,512,987	568,666,921	606,117,166
Imports:					
Fine copper in ore, entered for consumption............ Fine copper in regulus, entered for consumption.....	*a* 5,900,000	*a* 12,000,000	*a* 19,750,000	*a* 23,800,000	*a* 36,380,000
Bars and ingots...............	9,074,379	16,923,098	50,840,000	71,922,340	68,796,808
Old copper	2,422,554				
Total	477,458,363	523,001,372	597,102,987	664,389,261	711,293,974
Exports:					
Ingots and bars—					
Domestic	258,473,285	277,255,742	291,955,905	246,826,331	337,973,751
Foreign	....	....	....	2,550,149	1,281,782
Estimated fine copper contents of matte	22,881,936	11,000,000	5,420,000	3,500,000	7,000,000
Total	281,355,221	288,255,742	297,375,905	252,876,480	346,255,533
Available supply	196,103,142	234,745,630	299,727,082	411,512,781	365,038,441

a Estimated.

STOCKS.

Some of the producers decline to furnish a statement of the stock carried by them. Still, mines in Michigan, Montana, and Arizona, which in 1900 produced 420,596,269 pounds of fine copper out of the total of 533,517,751 pounds from those States, reported that they held 85,719,639 pounds of copper on January 1, 1900, and 91,215,571 pounds on January 1, 1901, a moderate increase, which might justify the conclusion that the consumption of copper in 1900 was about 355,000,000 pounds, not counting possible changes in the stocks held by consumers or by dealers and merchants.

PRICES.

The following table summarizes the highest and lowest prices obtained for Lake copper yearly in the New York markets from 1860 to 1895, and the highest and lowest prices monthly during the last five years.

Highest and lowest prices of Lake Superior ingot copper, by years, from 1860 to 1895.

[Cents per pound.]

Year.	Highest.	Lowest.	Year.	Highest.	Lowest.
1860	24	$19\frac{3}{4}$	1878	$17\frac{5}{8}$	$15\frac{1}{2}$
1861	27	$17\frac{1}{2}$	1879	$21\frac{3}{4}$	$15\frac{1}{2}$
1862	$32\frac{7}{8}$	$20\frac{3}{4}$	1880	25	$18\frac{1}{2}$
1863	$38\frac{1}{2}$	29	1881	$20\frac{3}{8}$	16
1864	55	39	1882	$20\frac{3}{8}$	$17\frac{7}{8}$
1865	$50\frac{1}{2}$	28	1883	$18\frac{1}{8}$	$14\frac{7}{8}$
1866	42	$26\frac{1}{2}$	1884	15	11
1867	$29\frac{1}{4}$	$21\frac{1}{2}$	1885	$11\frac{1}{2}$	$9\frac{4}{5}$
1868	$24\frac{1}{2}$	$21\frac{1}{2}$	1886	$12\frac{1}{8}$	10
1869	$26\frac{1}{2}$	$21\frac{7}{8}$	1887	$17\frac{3}{4}$	$9\frac{19}{20}$
1870	$23\frac{3}{8}$	19	1888	$17\frac{4}{10}$	$15\frac{17}{20}$
1871	27	$21\frac{1}{4}$	1889	$17\frac{1}{2}$	11
1872	44	$27\frac{1}{8}$	1890	$17\frac{1}{4}$	14
1873	35	21	1891	15	$10\frac{1}{4}$
1874	25	19	1892	$12\frac{3}{8}$	$10\frac{1}{2}$
1875	$23\frac{7}{8}$	$21\frac{1}{2}$	1893	$12\frac{1}{2}$	$9\frac{3}{5}$
1876	$23\frac{1}{4}$	$18\frac{3}{4}$	1894	$10\frac{1}{4}$	9
1877	$20\frac{1}{2}$	$17\frac{1}{2}$	1895	$12\frac{3}{4}$	$9\frac{1}{4}$

Highest and lowest prices of Lake Superior ingot copper, by months, from 1896 to 1900.

[Cents per pound.]

Year.	January.		February.		March.		April.		May.		June.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1896	$10\frac{1}{8}$	$9\frac{3}{4}$	$11\frac{1}{4}$	10	$11\frac{1}{4}$	$10\frac{7}{8}$	11	$10\frac{3}{4}$	$11\frac{1}{2}$	$10\frac{7}{8}$	$11\frac{3}{4}$	$11\frac{1}{2}$
1897	12	$11\frac{1}{2}$	12	$11\frac{7}{8}$	$11\frac{7}{8}$	$11\frac{1}{2}$	$11\frac{1}{2}$	11	$11\frac{1}{8}$	$10\frac{3}{4}$	$11\frac{1}{8}$	$10\frac{7}{8}$
1898	11	$10\frac{9}{10}$	$11\frac{3}{4}$	11	12	$11\frac{7}{8}$	$12\frac{1}{8}$	$11\frac{7}{8}$	$12\frac{1}{8}$	12	$11\frac{7}{8}$	$11\frac{3}{4}$
1899	17	$13\frac{1}{4}$	18	17	18	17	$19\frac{1}{2}$	18	$19\frac{1}{4}$	$18\frac{1}{2}$	$18\frac{1}{2}$	18
1900	$16\frac{1}{2}$	$16\frac{1}{4}$	$16\frac{1}{2}$	16	17	$16\frac{1}{4}$	$17\frac{1}{4}$	17	$17\frac{1}{4}$	$16\frac{1}{2}$	$16\frac{1}{2}$	$16\frac{1}{4}$

Year	July.		August.		September.		October.		November.		December.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1896	$11\frac{3}{4}$	11	$11\frac{1}{8}$	$10\frac{7}{8}$	$10\frac{7}{8}$	$10\frac{3}{8}$	$10\frac{7}{8}$	$10\frac{1}{2}$	$11\frac{1}{2}$	$10\frac{7}{8}$	$11\frac{1}{2}$	$11\frac{1}{4}$
1897	$11\frac{1}{8}$	11	$11\frac{1}{4}$	11	$11\frac{3}{8}$	$11\frac{1}{4}$	$11\frac{1}{4}$	11	11	$10\frac{3}{4}$	11	$10\frac{7}{8}$
1898	$11\frac{3}{4}$	$11\frac{1}{2}$	$12\frac{1}{8}$	$11\frac{3}{8}$	$12\frac{1}{4}$	$12\frac{1}{8}$	$12\frac{1}{2}$	$12\frac{1}{4}$	$12\frac{3}{4}$	$12\frac{1}{2}$	$12\frac{7}{8}$	$12\frac{5}{8}$
1899	$18\frac{1}{2}$	$18\frac{1}{4}$	$18\frac{1}{2}$	$18\frac{1}{4}$	$18\frac{1}{2}$	$18\frac{1}{4}$	$18\frac{1}{2}$	17	$17\frac{1}{4}$	17	17	$16\frac{1}{2}$
1900	$16\frac{1}{2}$	$16\frac{1}{8}$	$16\frac{3}{4}$	$16\frac{1}{2}$	$16\frac{7}{8}$	$16\frac{3}{4}$	$16\frac{7}{8}$	$16\frac{3}{4}$	17	$16\frac{3}{4}$	17	$16\frac{3}{4}$

The following table shows the fluctuations in prices in the English market:

Average values of copper in England.

Year.	Chile bars or G. O. B.			Ore, 25 per cent.		Precipitate.	
	Long tons.			*Per unit.*		*Per unit.*	
	£.	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
1880	62	10	0	12	9	12	11
1881	61	10	0	12	6	13	8 3/16
1882	66	17	0	13	6¾	13	10 1/16
1883	63	5	10	12	4½	12	10 1/16
1884	54	9	1	10	5½	11	1
1885	44	0	10	8	4	9	0⅛
1886	40	9	3	7	9	8	3⅝
1887	43	16	11	8	6	8	11¾
1888	79	19	4½	14	3¼	16	3
1889	49	10	5	9	6⅛	.....	.....
1890	54	5	5	10	7	.....	.....
1891	51	9	8½	9	7	.....	.....
1892	45	12	8¾	8	7	.....	.....
1893	43	15	6¾	8	5	.....	.....
1894	40	7	4	7	6½	.....	.....
1895	42	19	7	8	4¼	.....	.....
1896	46	18	1¾	9	1	.....	.....
1897	49	2	6¾	9	5	.....	.....
1898	51	16	7¼	10	1½	.....	.....
1899	73	13	8½	13	2	.....	.....
1900	73	12	6¼	13	1	.....	.....

In detail, the fluctuations, monthly, of good merchant copper in the English market were as follows in 1895, 1896, 1897, 1898, 1899, and 1900:

Fluctuations in good merchant copper in England in 1895, 1896, 1897, 1898, 1899, and 1900.

[Per long ton.]

Month.	1895.			1896.			1897.			1898.			1899.			1900.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
January	40	13	9¾	41	13	8¼	50	10	8¼	48	19	2	62	18	1½	70	14	2
February	39	14	3¾	44	16	11¼	51	6	6	49	12	8¼	72	16	0	74	4	9
March	39	1	9½	45	8	0¾	50	4	0¼	50	13	2½	69	1	0¼	78	0	4
April	40	3	6¾	45	3	2¼	48	16	9	51	14	2½	74	10	0¾	78	7	1
May	43	0	0	46	6	6	48	10	11½	51	9	9¾	77	5	11	74	1	8
June	42	15	6¼	48	18	0	49	1	1½	50	8	0	76	2	0½	71	14	3
July	44	0	2½	49	3	7¾	48	1	0¼	50	3	1	76	19	3½	72	11	5
August	46	13	2½	47	16	9¾	48	12	10¼	51	10	7½	76	4	7¼	73	12	5
September	46	15	7½	47	18	7½	49	8	5	52	2	8¾	76	15	7	73	4	11¼
October	46	4	10	47	11	7	48	10	3	53	8	2	75	3	10¼	72	7	7¼
November	43	16	3¾	49	3	11	48	0	11½	55	18	8¼	74	8	5½	72	9	3¾
December	42	15	11	48	16	9¾	48	7	0¼	55	18	11¼	71	19	8	72	2	3½

THE COPPER MARKET IN 1900.

The copper market during 1900 has been characterized by remarkable steadiness in this country, and by a moderate series of fluctuations in London, where American interests were largely in control during the greater part of the year. January opened with a quiet market, Lake copper selling at 16½ cents, while electrolytic was quoted 15⅝ cents. As the month progressed business became more active, stimulated by a moderate recession in values. February brought large sales by a leading interest for the domestic market and for export at 16 cents for Lake. Prices then began to harden, advancing on both sides of the Atlantic, through the month of March, until 17 cents had been reached. In London, American electrolytic was sold at £3 per ton below the price of standard copper, the stipulation being, however, that buyers must not put it into the public stocks. In April the market was steady at 17 cents to 17¼ cents, until early in May the sensational developments in the iron trade caused an uneasiness which developed receding values. This continued, until early in July prices had declined to 16⅛ cents. Then followed a growing confidence in values which culminated on the eve of the Presidential election in a heavy movement and an active advancing market in October and the first half of November. The year closed with a quiet but firm feeling.

THE ENGLISH COPPER TRADE.

Since England is one of the leading copper markets of the world, the following tables, showing the import and export movement, are of great interest:

British imports and exports of copper.

[Long tons.]

Year.	Imports of—		Total imports.	Exports.	Apparent English consumption.
	Bars, cakes, and ingots.	Copper in ores and furnace products.			
1860	13,142	13,715	26,857	26,117	....
1865	23,137	23,922	47,059	41,398	....
1870	30,724	27,025	57,749	53,006	....
1871	33,228	23,671	56,899	56,633	....
1872	49,000	21,702	70,702	53,195	....
1873	35,840	26,756	62,596	55,716	....
1874	39,906	27,894	67,800	59,742	....
1875	41,931	29,483	71,414	51,870	....
1876	39,145	36,191	75,336	52,468	....
1877	39,743	53,582	93,325	54,088	....
1878	39,360	48,212	87,572	55,001	....
1879	46,670	50,421	97,091	62,412	30,774
1880	36,509	56,225	92,734	59,482	32,879
1881	32,170	54,057	86,227	61,689	31,607
1882	35,509	58,366	93,875	55,683	42,877

British imports and exports of copper—Continued.

[Long tons.]

Year.	Imports of— Bars, cakes, and ingots.	Imports of— Copper in ores and furnace products.	Total imports.	Exports.	Apparent English consumption.
1883	35,653	63,493	99,146	59,350	40,469
1884	39,767	69,623	109,390	64,691	51,263
1885	41,933	81,616	123,549	62,080	54,323
1886	42,969	65,046	108,015	60,511	41,158
1887	29,198	73,891	103,089	69,453	53,096
1888	44,063	90,867	135,470	*a* 72,066	42,562
1889	*b* 38,576	101,407	139,983	75,627	65,759
1890	*c* 49,461	91,788	141,249	89,747	66,170
1891	44,213	94,403	138,616	76,056	59,223
1892	*d* 35,015	99,356	134,371	82,542	*e* 48,367
1893	41,829	88,003	129,832	70,986	66,817
1894	56,157	68,851	125,008	54,689	*f* 50,330
1895	42,135	77,806	119,941	65,990	*f* 50,692
1896	60,458	75,398	135,856	59,334	*f* 76,036
1897	60,428	76,127	136,555	56,542	*f* 69,787
1898	67,978	71,726	139,704	63,370	*f* 69,284
1899	58,880	82,730	141,610	75,271	*f* 60,877
1900	70,247	84,694	154,941	56,997	*f* 81,896

a Including 22,557 tons of Chile bars transferred to France.
b Including 1,166 tons of Chile bars transferred from France to England.
c Including 3,501 tons of Chile bars transferred from France to England.
d Including 3,585 tons of Chile bars transferred from France to England.
e Add 4,001 tons for comparison with former years, the difference arising from the new method of making up stock.
f Deducting copper contents of sulphate exported (13,078 tons in 1898, 10,045 tons in 1899, and 10,728 tons in 1900).

The following figures for the last ten years from the board of trade returns, supplemented by Messrs. James Lewis & Son, of Liverpool, show in detail the form in which the copper is brought into Great Britain and in what form it is exported:

Imports of copper into Great Britain from 1891 to 1900, inclusive.

[Long tons.]

Character.	1891.	1892.	1893.	1894.	1895.
Pure in pyrites	15,406	15,110	15,320	15,401	14,561
Pure in precipitate	29,326	28,444	24,988	24,878	26,508
Pure in ore	14,172	13,585	11,701	12,804	15,240
Pure in matte	35,499	42,217	35,994	15,767	21,497
Bars, cake, etc	44,213	35,015	41,829	56,158	42,135
Total	138,616	134,371	129,832	125,008	119,941

Imports of copper into Great Britain from 1891 to 1900, inclusive—Continued.

[Long tons.]

Character.	1896.	1897.	1898.	1899.	1900.
Pure in pyrites	14,726	15,576	16,626	17,529	18,519
Pure in precipitate	23,160	25,932	21,558	24,387	23,462
Pure in ore	12,499	11,980	14,576	19,514	17,886
Pure in matte	25,013	22,639	18,966	21,300	24,827
Bars, cakes, etc	60,458	60,428	67,978	58,880	70,247
Total	135,856	136,555	139,704	141,610	154,941

The following table gives the details relating to the British imports of precipitate and matte:

Imports of precipitate and matte into Great Britain from 1890 to 1900, inclusive.

[Long tons.]

Country.	Fine copper.				
	1890.	1891.	1892.	1893.	1894.
Portugal and Spain	28,018	32,425	32,509	29,359	28,645
Chile	2,122	595	2,040	2,714	626
United States	18,897	19,109	24,668	20,700	2,133
Other countries	8,329	12,696	11,444	8,209	9,242
Total	57,366	64,825	70,661	60,982	40,646

Country.	Fine copper.					
	1895.	1896.	1897.	1898.	1899.	1900.
Portugal and Spain	30,196	28,596	32,821	28,137	30,669	32,075
Chile	212	797	2,233	1,758	1,838	3,551
United States	8,337	10,016	5,259	2,181	354	2,767
Other countries	9,660	8,764	8,258	8,458	12,826	9,896
Total	48,405	48,173	48,571	40,534	45,687	48,289

Messrs. James Lewis & Son, of Liverpool, estimate as follows the imports of copper product in Liverpool, Swansea, and London during the years from 1888 to 1900, which represent the total imports, with the exception of precipitate into Newcastle and Cardiff, reliable returns of which can not be obtained, but which were estimated to vary from 8,000 to 10,000 tons fine per annum in former years, and in the last few years have been placed as high as 12,000 tons, but in 1898, 1899, and 1900 were reduced to 6,000 tons:

Imports of copper product into Liverpool, Swansea, and London.

[Long tons.]

Country.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Chile	24,479	22,070	22,909	14,378	17,619	14,875	16,971
United States	25,730	30,729	20,171	26,120	26,475	35,647	30,495
Spain and Portugal	5,915	5,189	5,202	4,734	5,372	5,674	4,674
Spain and Portugal (precipitate)	15,568	17,192	18,430	17,439	14,831	10,296	10,642
Spain and Portugal (pyrites)	15,448	16,097	16,422	15,406	15,110	15,320	15,401
Australasia	6,746	6,285	6,561	6,265	5,547	6,293	6,481
Cape of Good Hope	8,829	11,507	9,927	7,452	8,092	5,472	6,112
Venezuela	3,574	4,299	5,245	5,017	5,028	1,434	2,327
Japan	4,469	2,523	10,674	7,852	4,989	2,370	3,299
Italy	1,058	1,043	953	649	725	1,091	763
Norway	545	234	80	30	38	....	30
Canada	156	181	264	189	120	50	105
Newfoundland	465	631	1,552	1,617	3,229	2,265	1,279
Mexico	158	3,938	3,325	3,616	869	1,185	1,408
Peru	202	271	254	279	287	462	443
Plata River	135	184	143	211	196	160	229
Other countries	4,054	1,389	225	236	1,245	1,944	855
Total tons fine	117,531	123,762	122,337	111,490	109,772	104,538	101,514

Country.	1895.	1896.	1897.	1898.	1899.	1900.
Chile	18,197	15,923	14,982	17,734	19,752	19,875
United States	17,098	39,676	32,792	38,979	20,773	32,256
Spain and Portugal	3,288	6,298	7,697	7,293	7,084	9,721
Spain and Portugal (precipitate)	12,612	11,474	17,386	15,664	16,847	17,028
Spain and Portugal (pyrites)	14,561	14,726	15,576	16,626	17,529	18,519
Australasia	8,223	10,635	10,218	13,409	17,085	19,977
Cape of Good Hope	6,524	5,905	7,575	9,381	7,076	8,927
Venezuela	360	107	21	....	....	....
Japan	4,258	3,492	3,654	2,086	7,812	6,763
Italy	283	418	100	177	157	119
Norway	486	528	130	....	182	679
Canada	....	....	127	....	10	25
Newfoundland	3,244	2,467	2,484	1,359	2,044	1,589
Mexico	4,623	7,792	6,217	4,888	5,679	8,781
Peru	449	741	998	3,041	5,163	8,220
Plata River	148	94	190	124	63	73
Other countries	930	797	1,613	1,807	8,232	3,633
Total tons fine	95,284	121,073	121,760	132,568	135,488	156,185

The quantities of copper in different forms imported into Great Britain and France from the United States are given in the following table:

Imports of copper into England and France from the United States.

[Long tons.]

Country.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
England:							
Ore	298	349	5	4	18	23	5
Matte	20,752	26,581	18,897	19,109	24,668	20,700	2,133
Bars and ingots	4,680	3,799	1,269	7,007	1,427	14,924	28,357
Total	25,730	30,729	20,171	26,120	26,113	35,647	30,495
France	6,496	1,058	1,733	8,329	4,340	12,483	9,248
United States into England and France	32,226	31,787	21,904	34,449	30,453	48,130	39,743
Chile into England and France	32,947	22,020	24,641	18,820	19,840	19,717	20,783

Country.	1895.	1896.	1897.	1898.	1899.	1900.
England:						
Matte	8,337	10,016	5,259	2,181	354	2,767
Bars and ingots	12,250	29,780	27,591	36,790	20,739	29,267
Total	20,587	39,796	32,850	38,971	21,093	32,034
France	11,806	21,998	26,165	22,753	24,695	29,100
United States into England and France	32,393	61,794	59,015	61,724	45,788	61,134
Chile into England and France	22,161	22,593	20,842	24,303	25,482	30,912

The exports of copper from Great Britain, estimating the fine contents of alloys, have been as follows:

Exports of copper from Great Britain from 1889 to 1900, inclusive.

[Long tons.]

Character.	1889.	1890.	1891.	1892.	1893.	1894.
English, wrought and unwrought, and sheets	48,189	58,571	51,765	58,518	45,349	34,874
Yellow metal, at 60 per cent	9,195	10,514	8,547	8,853	8,745	9,514
Brass, at 70 per cent	3,773	3,721	3,992	3,783	4,049	3,808
Sulphate of copper	....	....	....	....	....	*a* 10,000
Total	61,157	72,806	64,304	71,154	58,143	58,196
Fine foreign	14,470	16,941	11,752	11,388	12,843	6,493
Total	75,627	89,747	76,056	82,542	70,986	64,689

a Estimated.

Exports of copper from Great Britain from 1889 to 1900, inclusive—Continued.

[Long tons.]

Character.	1895.	1896.	1897.	1898.	1899.	1900.
English, wrought and unwrought, and sheets	45,299	38,734	35,951	40,223	42,992	28,632
Yellow metal, at 60 per cent	8,978	6,773	6,609	6,172	4,156	5,279
Brass, at 70 per cent	3,747	4,172	3,936	3,733	3,994	4,224
Sulphate of copper	*a* 12,000	13,155	14,844	13,078	10,045	10,728
Total	70,024	62,834	61,340	63,206	61,187	48,863
Fine foreign	7,966	9,655	10,046	13,242	24,129	18,862
Total	77,990	72,489	71,386	76,448	85,316	67,725

a Estimated.

Since 1894 the copper contents of sulphate exported have been introduced into the table.

The speculation in London is based upon the warrants in public warehouses which on December 31, 1900, amounted to 21,155 tons. Of this about 19,500 tons was what is known as standard copper, as which all copper over 96 per cent fine is classed. Since the close of 1898 a material called English standard has been produced largely from low-grade raw material, or from old material, for the special purpose of being put into warehouses, the quantity at the close of 1899 having risen to 8,378 tons, while in 1900 it reached 12,000 tons. This low-grade copper is not directly fit for consumption and must be refined. The result is that the speculative price of English warrants has fallen very much below the price of merchantable copper like best selected, lake, or electrolytic.

THE GERMAN COPPER TRADE.

Germany has become the second largest consumer of copper, the United States ranking as the first and the United Kingdom as the third. A very painstaking and interesting review of the statistics has been published by Aron Hirsch & Sohn, of Halberstadt, who estimate the consumption as follows:

Copper consumption of Germany.

[Metric tons.]

	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Imports	51,806	52,504	59,742	73,123	82,903	89,772	89,746	106,620
Exports	11,304	10,406	10,893	12,452	12,568	14,957	20,304	15,618
Excess of imports	40,502	42,098	48,849	60,671	70,335	74,815	69,442	91,002
Production	24,011	25,857	26,013	29,489	29,468	30,704	*a* 37,676	*a* 31,950
Total	64,513	67,955	74,862	90,160	99,803	105,519	107,118	122,952
Copper contents of imported copper ore and iron pyrites	4,000	5,000	4,500	5,000	3,500	4,000	4,500	4,500
Home consumption	60,513	62,955	70,362	85,160	96,303	101,519	102,618	118,452

a Estimated.

To provide against duplication a certain amount of copper obtained from foreign ores and pyrites is deducted.

The imports in 1900 consist of 83,502 metric tons of bars, 4,602 tons of coin and scrap, 1,476 tons copper in 2,214 tons of brass, at 66⅔ per cent; 6,010 tons in 10,929 tons of ores and mattes, at 55 per cent, and 11,030 tons of copper in 441,204 tons of cupriferous pyrites, at 2½ per cent.

The source of the imports of bars and ingots for a series of years is shown in the following table, which proves how important a contributor to the German markets this country has become:

Source of German imports of ingot copper.

[Metric tons.]

Country.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Free port (Hamburg)	1,689	1,185	2,371	2,669	2,873	2,496	2,222
Belgium	356	356	115	9	216	19	177
France	303	152	81	268	121	93	87
Norway	128	362	71	45	32	1	11
Austria-Hungary	50	197	11	9	12	105	224
Sweden	33	83	198	250	328	215	161
Switzerland	....	....	5	6	2	1	1
Spain	10	....	10	41	69	31	446
England	7,430	7,363	7,478	8,660	12,754	14,350	9,545
Netherlands	109	139	73	18	19	184	216
United States	23,795	31,311	42,504	50,420	52,473	47,742	66,264
Japan	2,072	1,932	1,916	2,655	2,196	3,050	2,377
Chile	884	825	827	2,217	1,216	1,187	1,016
Australasia	....	313	183	259	742	581	593
Other countries	173	147	271	46	25	39	162
Total	37,032	44,365	56,114	67,572	73,078	70,094	83,502

The imperial German statistical bureau takes pains to trace the imports to their original source, so that, although a very large amount of copper is sent from this country via Holland, the latter is credited with only a very small amount. Our own export statistics in 1900 returned 67,348,848 pounds shipped to Germany and 101,398,394 pounds to the Netherlands, or 76,543 metric tons. This shows a discrepancy of nearly 10,000 metric tons, which may be partly explained by the fact that some of the copper shipped to the Netherlands went to other countries and that some of the copper entering through the free port of Hamburg came from this country. There may, too, have been some differences in the quantities afloat.

The production of Germany for a series of years has been as follows. The output of the Mansfeld Company is added, since that corporation is the dominating factor:

Copper production of Germany.

[Metric tons.]

Year.	Total production.	Production of Mansfeld.
1891	24,688	15,365
1892	25,406	15,588
1893	24,011	14,358
1894	25,857	15,217
1895	26,013	15,083
1896	29,489	18,541
1897	29,468	18,248
1898	30,704	18,335
1899	37,676	21,116
1900	31,950	18,675

The figures of the production of the Mansfeld Company are taken from the annual report.

Germany has greatly developed her exports of manufactures of copper, as is shown by the following table, which gives the details for a series of years.

Exports of copper manufactures from 1893 to 1900, inclusive.

[Metric tons.]

Products.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Rods and sheets	4,889	5,009	4,700	5,429	5,712	5,369	4,869	5,270
Wire	3,052	4,433	3,975	5,909	6,175	5,930	7,578	9,604
Cables	1,957	2,193	3,713	7,631	8,119	10,432	11,481	15,444
Miscellaneous	563	501	556	279	245	263	243	212
Coarse forgings	2,050	2,538	2,643	2,648	2,703	2,988	3,162	3,174
Cartridges, caps, etc	3,682	3,376	4,450	4,156	2,712	3,288	2,682	1,731
Fine copper goods	3,859	4,117	4,912	7,837	7,425	8,454	9,855	11,177
Perforated sheets and netting						275	306	327
Total	20,052	22,167	24,949	33,889	33,091	36,999	40,176	46,939
Less imports	1,828	1,778	1,892	2,301	1,606	2,449	2,811	3,073
Net exports	18,224	20,389	23,057	31,588	31,485	34,550	37,365	43,866

Messrs. Aron Hirsch & Sohn, of Halberstadt, Germany, early in 1901, made an estimate of the distribution of the German consumption, which is very interesting in view of the subsequent developments in that country, where a very severe industrial depression must be telling on the current consumption of the red metal. They estimate that the consumption in 1900 of 118,000 tons was distributed as follows: 40,000 tons, electrical works; 20,000 tons, copper sheets and bars; 35,000 tons, brass and wire; 3,000 tons, chemical works and bluestone, and 20,000 tons shipyards, railroads, alloys, german silver, etc. They urge that while the electrical works may witness a decline in their profits, the actual consumption for electrical purposes will go on unabated, if, in fact, it does not increase.

THE FRENCH COPPER TRADE.

According to the French official statistics, the imports of bars, ingots, etc., have been as follows:

Imports and exports of bar and ingot copper into France.

[Metric tons.]

Source.	1895.	1896.	1897.	1898.	1899.	1900.
England	8,250	5,596	3,884	5,970	8,650	3,289
Chile	3,494	4,573	2,804	4,469	4,442	3,509
United States	11,157	21,279	28,118	26,210	24,470	33,187
Other countries	11,717	12,197	14,830	10,712	13,650	14,246
Total imports	34,618	43,645	49,636	47,361	51,212	54,231
Less exports	4,910	5,144	4,768	5,458	8,285	7,651
Net imports	29,708	38,501	44,870	41,903	42,927	46,580

In order to arrive at the consumption it is necessary to add the net imports of old material and the copper contents of foreign ores and pyrites, and to account for fluctuations in stocks. The following table summarizes the results:

Copper consumption of France.

[Metric tons.]

	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Net imports, raw material	25,743	34,352	44,026	50,060	48,060	49,667	54,862
Contents of ore	4,635	6,074	5,570	8,685	7,024	6,004	6,976
Total	30,378	40,426	49,596	58,745	55,084	55,671	62,838
Increase (+) or decrease (−) of stocks	+1,459	−103	−589	−379	−515	+670	−1,006
Consumption	31,837	40,323	49,007	58,366	54,569	56,341	61,832

Since 1894, therefore, the consumption of France has nearly doubled.

THE RUSSIAN COPPER TRADE.

The following table shows the consumption of copper in Russia, to which American producers contribute to some extent:

Copper consumption of Russia.

[Metric tons.]

	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
Imports of fine copper	7,803	12,340	10,442	11,033	14,090	15,280	14,458	21,155
Imports of manufactures	1,032	1,442	1,049	655	723	673	716	870
Production	4,901	5,436	5,730	5,413	5,721	6,596	6,500	6,000
Consumption	13,736	19,218	17,221	17,101	20,534	22,549	21,674	28,025

THE COPPER TRADE OF AUSTRIA-HUNGARY.

The following statistics have been compiled by Messrs. Aron Hirsch & Sohn, of Halberstadt, Germany:

Copper statistics of Austria-Hungary.

[Metric tons.]

	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Production:							
Austria	1,810	983	1,083	1,151	1,118	928	880
Hungary	308	243	209	139	138	132	250
Total production	2,118	1,226	1,292	1,290	1,256	1,060	1,130
Imports:							
Bars	13,383	11,746	13,666	15,925	17,441	16,193	18,981
Fine, in ores	1,049	911	480	524	973	901	1,105
Fine, in manufactures	967	2,253	2,278	1,669	2,147	2,087	1,959
Total imports	15,399	14,910	16,424	18,118	20,561	19,181	22,045
Exports:							
Raw materials	1,060	401	1,218	1,120	1,219	1,370	1,684
Fine, in manufactures	1,300	2,198	1,847	1,300	1,522	1,357	1,840
Total exports	2,360	2,599	3,065	2,420	2,741	2,727	3,524
Home consumption	15,157	13,537	14,651	16,988	19,076	17,514	19,651

The import statistics of Austria show that copper in bars and ingots was imported from the United States to the extent of 7,017 metric tons in 1898, 6,531 tons in 1899, and 10,487 tons in 1900. Germany contributed 5,557, 4,689, and 4,442 tons respectively. England 3,129, 2,600, and 2,151 tons, and Japan 771 tons in 1898, 868 tons in 1899, and 798 tons in 1900.

THE WORLD'S PRODUCTION.

Messrs. Henry R. Merton & Co., of London, have compiled the following statement of the world's production, the figures being modified by this office where official statistics are available:

The copper production of the world, 1889 to 1900, inclusive.

[Long tons.]

Country.	1889	1890.	1891.	1892.	1893.	1894.
EUROPE.						
Great Britain	905	935	720	495	425	445
Spain and Portugal:						
Rio Tinto	29,500	30,000	31,827	31,539	31,954	31,061
Tharsis	*a*11,000	*a*10,300	*a*11,100	11,258	11,000	11,000
Mason and Barry	*a*5,250	*a*5,600	*a*4,150	*a*4,400	*a*4,400	*a*4,200
Sevilla	1,350	810	875	1,070	1,270	1,170
Other mines	*a*7,170	*a*4,790	*a*6,390	*a*7,992	6,225	4,805

a Estimated.

The copper production of the world, 1889 to 1900, inclusive—Continued.

[Long tons.]

Country.	1889.	1890.	1891.	1892.	1893.	1894.
EUROPE—continued.						
Germany:						
Mansfeld	15,506	15,800	14,250	15,360	14,150	14,990
Other German	*a* 1,850	1,825	1,900	1,935	2,000	2,210
Austria	1,225	1,210	1,016	823	1,211	1,781
Hungary	*a* 300	*a* 300	285	285	210	310
Sweden	830	830	655	735	535	350
Norway	1,357	1,390	1,247	1,410	1,860	1,885
Italy	1,300	1,362	1,536	2,523	2,333	2,629
Russia	4,070	4,800	4,800	4,823	5,349	5,638
Total	81,613	79,952	80,751	84,648	82,922	82,474
NORTH AMERICA.						
United States	101,239	115,966	126,839	154,072	147,033	158,120
Canada	3,040	2,685	3,986	3,164	*a* 1,000	1,204
Newfoundland	2,615	1,735	2,040	2,390	2,040	1,900
Mexico:						
Boleo	3,280	3,450	4,175	6,415	7,980	10,370
Other Mexican	500	875	1,025	900	500	1,400
Total	110,674	124,711	138,065	166,941	158,553	172,994
SOUTH AMERICA.						
Chile	24,250	26,120	19,875	22,565	21,350	21,340
Bolivia:						
Corocoro	*a* 1,200	1,900	2,150	2,860	2,500	2,300
Peru	275	150	280	290	460	440
Venezuela:						
New Quebrada	6,068	5,640	6,500	3,100	2,850	2,500
Argentina	190	150	210	200	160	230
Total	31,983	33,960	29,015	29,015	27,320	26,810
AFRICA.						
Algiers	160	120	120	....	....	....
Cape of Good Hope:						
Cape Company	} *a* 7,700	5,000	5,100	5,670	5,200	5,000
Namaqua Company		1,450	900	450	890	1,500
Total	7,860	6,570	6,120	6,120	6,090	6,500
ASIA.						
Japan	16,125	17,972	18,500	19,000	18,000	20,050
AUSTRALASIA.						
New South Wales	4,082	3,455	4,192	4,185	1,558	1,847
South Australia	7,500	6,000	6,100	4,600	4,600	4,944
Total	11,582	9,455	10,292	8,785	6,158	6,791

a Estimated.

The copper production of the world, 1889 to 1900, inclusive—Continued.

[Long tons.]

Country.	1895.	1896.	1897.	1898.	1899.	1900.
EUROPE.						
Great Britain	580	555	555	640	635	*a* 650
Spain and Portugal:						
Rio Tinto	32,985	34,501	33,923	33,705	34,370	35,732
Tharsis	12,000	12,000	*a* 11,000	*a* 11,150	9,448	7,965
Mason and Barry	*a* 4,100	*a* 3,900	*a* 4,300	3,600	3,600	3,460
Sevilla	1,050	1,025	810	800	1,200	1,460
Other mines	4,300	3,400	3,050	3,120	3,550	4,255
Germany:						
Mansfeld	14,860	18,265	17,960	18,045	20,785	18,390
Other German	1,695	1,800	2,185	2,040	2,675	2,020
Austria	869	1,065	1,210	1,110	915	865
Hungary	239	205	445	430	590	490
Sweden	203	500	545	480	520	450
Norway	2,685	2,500	3,450	3,615	3,610	3,935
Italy	2,236	3,400	3,480	2,965	2,965	3,000
Russia	5,326	5,100	6,025	6,260	7,210	*a* 8,000
Turkey	....	....	975	470	920	520
Total	83,128	88,216	89,913	88,430	92,993	91,192
NORTH AMERICA.						
United States	169,917	205,384	220,571	235,050	253,870	270,588
Canada	3,923	4,190	5,938	8,040	6,731	8,446
Newfoundland	1,800	1,800	1,800	2,100	2,700	1,900
Mexico:						
Boleo	10,450	9,940	10,170	9,435	10,335	11,050
Other Mexican	1,170	1,210	*a* 4,200	*a* 7,000	*a* 9,000	*a* 11,000
Total	187,260	222,524	242,679	261,625	282,636	302,984
SOUTH AMERICA.						
Chile	22,075	23,500	21,900	24,850	25,000	25,700
Bolivia:						
Corocoro	2,250	2,000	2,200	2,050	2,500	2,100
Peru	450	740	1,000	3,040	5,165	8,220
Argentina	150	100	200	125	65	75
Total	24,925	26,340	25,300	30,065	32,730	36,095
AFRICA.						
Algiers	35	....	....	50	....	....
Cape of Good Hope:						
Cape Company	5,350	5,470	5,290	4,660	4,140	4,420
Namaqua Company	1,730	1,980	2,150	2,400	2,350	2,300
Total	7,115	7,450	7,440	7,110	6,490	6,720
ASIA.						
Japan	18,430	21,000	23,000	25,175	27,560	27,840
AUSTRALASIA.						
New South Wales	3,322	4,467	6,922	5,743	5,394	*a* 5,500
South Australia	5,251	4,877	4,705	5,000	*a* 6,500	*a* 7,000
Tasmania	....	1,928	4,956	5,200	*a* 9,000	*a* 10,000
Total	8,573	11,272	16,583	15,943	20,894	22,500

a Estimated.

The copper production of the world, 1889 to 1900, inclusive—Continued.

RECAPITULATION.

[Long tons.]

Country.	1890.	1891.	1892.	1893.	1894.	1895.
Europe	79,952	80,751	84,648	82,922	82,474	83,128
North America	124,711	138,065	166,941	158,553	172,994	187,260
South America	33,960	29,015	29,015	27,320	26,810	24,925
Africa	6,570	6,120	6,120	6,090	6,500	7,115
Asia	17,972	18,500	19,000	18,000	20,050	18,430
Australasia	9,455	10,292	8,785	6,158	6,791	8,573
Total	272,620	282,743	314,509	299,043	315,619	329,431

Country.	1896.	1897.	1898.	1899.	1900.
Europe	88,216	89,913	88,430	92,993	91,192
North America	222,524	242,679	261,625	282,636	302,984
South America	26,340	25,300	30,065	32,730	36,095
Africa	7,450	7,440	7,110	6,490	6,720
Asia	21,000	23,000	25,175	27,560	27,840
Australasia	11,272	16,583	15,943	20,894	22,500
Total	376,802	404,915	428,348	463,303	487,331

SPAIN.

The Rio Tinto Company considerably increased its product in 1900, the quantity of pyrites extracted having been 1,894,504 tons, with an average of 2.744 per cent of copper contents, as compared with 1,649,844 long tons and 2.719 per cent in 1899 and 1,465,380 tons and 2.852 per cent in 1898. The pyrites extracted for shipment amounted to 704,803 tons in 1900, while the pyrites extracted for local treatment amounted to 1,189,701 tons. The company invoiced to consumers of pyrites in England, Germany, and the United States 665,967 tons in 1900, as compared with 636,323 tons in 1899 and 618,110 tons in 1898. It appears that a large demand has sprung up for pyrites carrying practically no copper, the deliveries of material of this class having risen from 80,717 tons in 1899 to 116,305 tons in 1900.

Like all the Spanish and Portuguese pyrites mines, the Rio Tinto extracts copper locally. Thus, in 1900, the copper produced by treatment at the mines amounted to 21,120 long tons, as compared with 20,230 tons in 1899 and 20,426 tons in 1898. The copper contained in the pyrites shipped amounted to 14,612 tons, which, of course, appears in the market at the copper extraction works of England, Germany, and the United States. In 1900, 18,971 tons were sold as refined copper, 1,134 tons as sulphate, and 14,526 tons in pyrites, the total marketed, therefore amounting to 34,631 tons. The copper contents of the reserve heaps are now estimated at 128,016 tons fine copper, which are carried on the books at £4 6s. 10d. per ton.

The year 1900 was not quite so profitable as that preceding it, the gross returns, after deducting expenses of administration, income, and other taxes, having been £1,643,078. There were paid for the redemption of bonds £63,240; there were written off for plant £31,705, and there were placed to reserve and other funds £71,000. The payments for dividends aggregated £1,458,776, being 5 shillings per share on preferred shares and 85 shillings on common stock. The share capital is £1,625,000 of £5 preferred shares entitled to 5 per cent and a like amount of common shares. There are outstanding £3,307,440 of 4 per cent bonds, and there is a reserve fund of £360,000.

The Tharsis Copper and Sulphur Company mined in 1900 468,738 long tons of ore, a decrease of 104,116 tons as compared with 1899. The quantity of mineral exported was 220,019 tons in 1900, as compared with 222,475 tons in 1899. The deliveries of iron ore amounted to 168,791 tons. After writing off £47,465, a profit remained of £405,108, out of which 30 per cent on a capital of £1,250,000 was paid in dividends, carrying over £30,108.

The shipments of pyrites of Mason & Barry, Limited, were 394,740 tons in 1900, as compared with 339,298 tons in 1899. After writing off £15,746, a net profit remained of £106,250. Adding to this £8,310, dividends on Sabina shares, and £5,565 sundry profits, a total of £120,125 was reached on a capital of £420,000.

GERMANY.

One of the most interesting copper mining enterprises is that of the Mansfeld'sche Kupferschieferbauende Gewerkschaft, at Eisleben, Germany, which celebrated the seven hundredth anniversary of its existence on June 12, 1900. The company works a bed of shale, carrying copper and silver, which is locally subdivided. Samples taken during 1900 at a number of points may be quoted as characteristic examples:

	Thickness.	Copper contents.
Schafbreit district, III Deep level, north:	*Cm.*	*Per cent.*
Fine "lette"	3	1.18
Coarse "lette"	4	5.29
"Kammschale"	3	6.45
Grey "head"	8	3.86
Schafbreit district, III Deep level, south:		
Fine "lette"	3	3.04
Coarse "lette"	4	3.97
"Kammschale"	3	4.57
Schafbreit district, II Deep level:		
Fine "lette"	3	3.26
Coarse "lette"	5	3.97

	Thickness.	Copper contents.
Glueck Auf district, IV Deep level:	*Cm.*	*Per cent.*
Fine "lette"	3	6.11
Coarse "lette"	4	4.69
"Kammschale"	3	5.55
Grey "head"	8	3.76
Kuxberg district, IV Deep level, north:		
Fine "lette"	4	2.70
Coarse "lette"	6	7.80
"Kammschale"	4	6.82
Black "head"	3	3.64
Grey "head"	6	3.86
Kuxberg district, V Deep level, north:		
Fine "lette"	4	3.74
Coarse "lette"	6	8.33
"Kammschale"	4	3.91
Kuxberg district, V Deep level, south:		
Coarse "lette"	6	3.30
"Kammschale"	4	3.41
Black "head"	3	2.55
Grey "head"	6	1.13

The total quantity of cupriferous slate mined in 1900 amounted to 671,918 metric tons, at a cost of 32.98 marks per ton, the earnings of the miners ranging between 3.68 marks and 3.99 marks per shift of eight hours. The cost of hoisting ranged between 7.04 marks and 7.52 marks per ton in the different districts. The total outlays for mining aggregated 22,177,466 marks, or 33.01 marks per ton. In addition thereto, 1,275,144 marks were expended for various improvements. The four blast-furnace plants handled 668,971 tons of ore, which yielded 47,573 tons of matte, carrying on an average in 1900 of 27.83 per cent of copper and 0.0155 per cent of silver. At the two calcining plants 46,377 tons of matte were roasted, which produced 21,648 tons of chamber acid. The second matte smelting produced from 48,392 tons of roasted matte, 1,123 tons of raw matte and 461 tons of siliceous ore, 23,963 tons of second matte, and 142 tons of copper bottoms. This matte carried from 75.1 to 75.2 per cent of copper and 0.4234 to 0.4442 per cent of silver. There was also produced 1,034 tons of blister for the electrolytic plant, containing 98.8 per cent of copper and 0.4189 per cent of silver. In the desilverizing plant 23,769 tons of second matte yielded 97,506 kilograms of fine silver. In the refining plant there were produced 17,634 tons of ingot copper, 965 tons of electrolytic copper, and 76 tons of fine copper from outside materials, the total being 18,675 tons of fine copper for 1900, as compared with 21,116 tons in 1899.

The company markets a variety of incidental products outside of sulphuric acid. Its receipts have been 29,101,322.63 marks for copper, 8,146,093.36 marks for silver, 526,865.12 marks for sulphuric acid, 228,033.52 marks for first matte sold, and 737,848.93 marks for miscellaneous products. The average price received for the refined copper was 153.45 marks in 1900, as compared with 145.37 marks in 1899, per 100 kilograms. The receipts from all sources were 69,518,431.41 marks, while the expenditures were 59,195,067.83 marks, leaving a gross profit of 10,323,363.58 marks, the net being 9,314,149.51 marks. For special reasons, 4,102,563.58 marks are reserved, and 6,220,800 marks were distributed as dividends, equal to 90 marks per share.

BRITISH COLUMBIA.

The report for 1900 of W. F. Robertson, provincial mineralogist, shows the production of copper to have been as follows from 1897 to 1900, both inclusive:

Production of copper in British Columbia.

District.	1897.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
East Kootenay	....	....	397	2,147
Nelson, West Kootenay	3,453,644	1,955,286	1,371,633	36,929
Trail Creek, West Kootenay	1,819,586	5,232,011	5,693,889	2,071,865
Boundary Creek	....	....	1,700	5,672,177
Texada Island	51,950	84,381	654,972	2,193,962
Total	5,325,180	7,271,678	7,722,591	9,977,080

The falling off in the Nelson district is due to the fact that the Hall Mining and Smelting Company, Limited, has sent little ore to its smelter, pending the installation of new machinery and further development of the mine. In the Trail Creek district the tonnage of ore mined was considerably larger, but the copper contents declined from 33 pounds to about 10 pounds to the ton. The largest shippers were the Le Roi, with 159,734 tons, the Center Star, with 40,875 tons, the War Eagle, with 9,886 tons, the Le Roi No. 2, with 3,013 tons, and the Iron Mask, with 2,739 tons. The Le Roi Mining Company, Limited, has now acquired all the stock in the smelting works at Northport, Wash., and is enlarging the plant considerably.

The Boundary Creek district has as its leading producer the British Columbia Copper Company, owning mines in Deadwood camp in the Kettle River mining division, and a smelting plant at Greenwood, with one water jacket furnace. The Granby Consolidated Mining and Smelting Company controls the City of Paris, Old Ironsides, Knob Hill, and other mines, and a smelter at Grand Forks with two stacks, which treats 300 tons of ore per day. The plant was started in the fall of 1900. On Texada Island the Van Anda Copper and Gold Company, Limited, produced at its smelter, from 9,527 tons of its own and of purchased ore, 1,127,533 pounds of copper, 19,303 ounces of silver, and 2,664 ounces of gold. The capacity of the plant has been more than doubled.

MEXICO.

In the year 1900 the ore production of the Boleo Company, of Mexico, rose to 261,170 tons, while the product of copper was 11,297 metric tons, or 911 tons more than in the previous year. The gross profit footed up to 6,300,000 francs, as compared with 6,500,000 francs during the previous year. It was distributed as follows: 315,000 francs to the legal reserve fund; a like sum to a special reserve fund; 4,224,184 francs in dividends, being 175 francs per share; 975,016 francs in dividends on founders' shares, or 105.98 francs per share; 94,200 francs to the board, and 376,354 francs to the extraordinary reserve fund.

An important new producer in Mexico is the Greene Consolidated Copper Company, whose smelting plant during ninety days prior to July 1, 1901, treated 34,346 tons of ore, yielding 5,494,501 pounds fine. It is stated that when the plant now under construction is completed the productive capacity will be 6,000,000 pounds of blister copper per month. The properties of the company are located at La Cananea, Sonora.

LEAD.

By Charles Kirchhoff.

INTRODUCTION.

Never in the history of the lead industry of the United States has so large an increase in the production taken place in a single year as in 1900. This sudden jump can not, however, be regarded either as normal or safe, since it was brought about probably by the stimulating effects of high prices, artificially established and held by the consolidation of the smelting and refining works. There is good reason for the belief, too, that consumption failed to cope with increased supply, and that important accumulations of the metal were unmarketed during the year, in spite of the fact that throughout the whole of 1900 the demand in the metal trade was very good, and during the first half of the year exceptionally so. To the extent to which the increase in the production of lead in the United States in 1900 was unsound, it is to be deplored.

A startling proof has been furnished of the capacity of the mines to expand production and of the fact that in times of a normal demand the prices prevailing during 1900 were too high.

During 1900 negotiations were begun, which culminated in the spring of 1901, for the fusion of the interests of the American Smelting and Refining Company, and of M. Guggenheim's Sons.

PRODUCTION.

The following series of tables present the figures of the total gross production of lead in the United States from 1825. Up to the year 1882 the figures have been compiled from the best data available. Since 1882 the statistics are those collected by this office, with the exception of the year 1889, when they were gathered by the Census Office:

Production of refined lead in the United States from 1825 to 1872, inclusive.

Year.	Production.	Year.	Production.	Year.	Production.
	Short tons.		*Short tons.*		*Short tons.*
1825	1,500	1844	26,000	1859	16,400
1830	8,000	1845	30,000	1860	15,600
1831	7,500	1846	28,000	1861	14,100
1832	10,000	1847	28,000	1862	14,200
1833	11,000	1848	25,000	1863	14,800
1834	12,000	1849	23,500	1864	15,300
1835	13,000	1850	22,000	1865	14,700
1836	15,000	1851	18,500	1866	16,100
1837	13,500	1852	15,700	1867	15,200
1838	15,000	1853	16,800	1868	16,400
1839	17,500	1854	16,500	1869	17,500
1840	17,000	1855	15,800	1870	17,830
1841	20,500	1856	16,000	1871	20,000
1842	24,000	1857	15,800	1872	25,880
1843	25,000	1858	15,300		

The sources from which are drawn the lead that comes into the market are numerous, and since the metal passes through a number of channels from the ore the complications are serious.

We have, first, the lead produced from the nonargentiferous ores of southeastern Missouri, the bulk of which is treated in smelting works controlled and owned by the mining companies themselves. This is a directly marketable product. A part of the ores and some furnace material are purchased by outside smelters, chiefly those of the St. Louis district, although at times Eastern desilverizers have drawn upon the district for smelting material.

Second, there are the lead ores raised in the zinc-lead mines of southwestern Missouri and southeastern Kansas, known as the Joplin-Galena district. A part of these is smelted in local works, one of them, however, marketing a certain quantity of metal annually in the form of a pigment. In Iowa a small quantity of lead ore is also smelted locally, being the product of the Dubuque district.

The lead thus obtained is directly marketable, being practically free from silver. It is known as "soft lead." In the tables of production this also includes a small amount of lead from Virginia, to which, at times, lots of metal produced in Tennessee have been added.

In former years there were some Scotch hearths in Wisconsin to treat local ores, but they have suspended work for many years.

A growing percentage of the ores of southwestern Missouri and southeastern Kansas, and of Wisconsin, Iowa, and Illinois, is purchased by desilverizers, by whom it is used in connection with the production of hard lead, and by lead smelters as a carrier for silver. The "soft lead" does not, therefore, represent the entire output to be credited to the Mississippi Valley.

By far the greatest quantity of lead, however, is obtained by the smelting of argentiferous lead ores mined in the Rocky Mountain region in mixture with ores of the precious metals free from lead, so-called "dry ores," which can be handled more economically by lead smelters than they can be treated locally by amalgamation or by other processes used for the extraction of gold and silver. Practically the lead in these ores has become the carrier for the precious metals in the "dry" ores, and, generally speaking, it may be stated that the offerings of "dry" ores have usually been so heavy for many years that suitable lead ores always find eager buyers. There are a few lead smelting plants, relatively unimportant, in Idaho, Montana, New Mexico, and California, built to reduce the ores locally mined. The great mass of the ores, however, are hauled often great distances to meet the fuel and to encounter ores carrying the precious metals. The principal large plants are in Colorado, Utah, and Montana. An excellent illustration of this movement is afforded by the famous Cœur d'Alene district in Idaho, which yields over one-quarter of the lead mined in the United States. Not a pound is smelted locally, the concentrates and ore being shipped for reduction to the smelters in Colorado, Montana, Utah, Nebraska, Illinois, and the Puget Sound.

From 1873 to 1885, inclusive, the production was separated into the two groups, that of desilverized lead obtained from smelting argentiferous ores drawn from the Rocky Mountain region and that of the "soft lead" from the nonargentiferous ores of the Mississippi Valley.

Production of refined lead in the United States from 1873 to 1885.

Year.	Total production.	Desilverized lead.	Soft lead. *a*
	Short tons.	*Short tons.*	*Short tons.*
1873	42,540	20,159	22,381
1874	52,080	....	....
1875	59,640	34,909	24,731
1876	64,070	37,649	26,421
1877	81,900	50,748	31,152
1878	91,060	64,290	26,770
1879	92,780	64,650	28,130
1880	97,825	70,135	27,690
1881	117,085	86,315	30,770
1882	132,890	103,875	29,015
1883	143,957	122,157	21,800
1884	139,897	119,965	19,932
1885	129,412	107,437	21,975

a Including a small quantity of lead produced in the Southern States.

In 1886, however, another source of lead began to assume importance and became a factor, introducing further complications. The smelters of the Rocky Mountain regions, some of the desilverizers, the border plants, and the Puget Sound works began to draw largely, first upon

Mexico, and later upon British Columbia, for growing quantities of argentiferous lead ores. Before the advent of these supplies the product of the American mines was easily arrived at by adding together the desilverized and the soft lead. From 1886 on, a third table was prepared, and for a series of years the lead production was held to be the total output minus the lead contents of foreign ores smelted.

Later on the refining in bond of foreign base bullion became an important industry. Varying quantities of the metal so produced were retained in this country for home consumption. A certain quantity was "exempt" from payment of duty as representing the metallurgical loss, and varying amounts are entered for domestic consumption by the payment of duty. The overlapping of receipts and shipments from one year to the other and the time required for the completion of the treatment of the material to the marketable product introduced uncertainties which rendered unreliable the simple and direct method of deducting from the total product of refined lead the estimated lead contents of the foreign material imported during the year.

Since it was also deemed highly desirable to ascertain as closely as possible the source, territorially, of our home product, the system was adopted of ascertaining through the smelters the quantities of lead in the ores worked by them from different States and Territories. From these returns the estimates of the domestic product have been made which appear in the following table in the last column, the system having been adopted in 1894:

Production of refined lead in the United States from 1886 to 1900.

Year.	Total production. *a*	Desilverized lead. *a*	Soft lead. *b*	From foreign ores and base bullion.	Net American product.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
1886	135,629	114,829	20,800	*c* 5,000	*c* 130,629
1887	160,700	135,552	25,148	*c* 15,000	*c* 145,700
1888	180,555	151,465	29,090	28,636	151,919
1889	182,967	153,709	29,258	26,570	156,397
1890	161,754	130,403	31,351	18,124	143,630
1891	202,406	171,009	31,397	23,852	178,554
1892	213,262	181,584	31,678	39,957	173,305
1893	229,333	196,820	32,513	65,351	163,982
1894	219,090	181,404	37,686	59,739	*d* 162,686
1895	241,882	201,992	39,890	76,173	*d* 170,000
1896	264,994	221,457	43,537	77,738	*d* 188,000
1897	291,036	247,483	43,553	83,671	*d* 212,000
1898	310,621	267,842	42,779	99,945	*d* 222,000
1899	304,392	263,826	40,566	95,926	*d* 210,500
1900	377,679	329,658	48,021	106,855	270,824

a Including foreign base bullion refined in bond.
b Including a small quantity of lead produced in the Southern States.
c Estimated.
d Arrived at from direct returns from smelters.

Hard lead.—Since 1891 special returns from desilverizers have been made on the quantity of antimonial or hard lead produced. The quantity was 4,043 tons in 1891, 5,039 tons in 1892, and 5,013 tons in 1893. In 1896 the production of hard lead was 7,507 tons, rising to 8,867 tons in 1897, and declining again to 8,473 tons in 1898. It amounted to 6,345 tons in 1899, and to 9,906 tons in 1900.

SOURCES OF LEAD.

For a number of years the lead smelters and refiners furnished complete returns showing the source, territorially, of the lead ores smeltered by them. These reports, covering the years 1894 to 1898, inclusive, are the basis of the figures given in the following table. For 1899 some of the reports of the American Smelting and Refining Company were available only for the first fiscal year from May, 1899, to May, 1900. Therefore the figures in the table for 1899 do not exactly represent the output for that year. For 1900 the detailed returns of the sources of the lead contents of the ores smelted by the American Smelting and Refining Company were not available. There are available, however, for some of the States, the reports of local mining bureaus which have been placed in the accompanying table to serve as a guide so far as they go. The absence of the returns is particularly deplorable in the case of the group covering Missouri, Kansas, Wisconsin, and Illinois, because it renders it impossible to arrive at its total output. The greater part of the lead ores raised in these districts is smelted at local works, or (notably in the St. Louis district) at plants which handle only nonargentiferous ores, a certain quantity, too, going in recent years to the plant of the Electric Reduction Company at Niagara Falls, N. Y. The balance goes to smelters and desilverizers now all controlled by the American Smelting and Refining Company. How large this quantity is may be judged from the fact that in 1899 it amounted to 13,878 short tons of lead. If, as there is reason to believe, at least a like amount was handled by the consolidation—and there are indications from the fact that new producers of concentrates sold to them—then the total production of Missouri, Kansas, and Wisconsin must have risen to about 62,000 short tons.

Lead contents of ores smelted by the works in the United States.

State or Territory.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Colorado	50,613	46,984	44,803	40,576	57,352	70,308	82,137
Idaho	33,308	31,638	46,662	58,627	59,142	52,154	85,444
Utah	23,190	31,305	35,578	40,537	39,299	29,987	48,044
Montana	9,637	9,802	11,070	12,930	10,745	10,227	....
New Mexico	2,973	3,040	3,461	9,123	5,797	4,856	....
Nevada	2,254	2,583	1,173	959	4,714	3,388	....
Arizona	1,480	2,053	1,165	2,184	2,224	3,377	....
California	478	949	691	383	482	487	520
Washington, Oregon, Alaska, South Dakota, Texas	150	381	1,006	638	1,349	862	....
Missouri, Kansas, Wisconsin, Illinois, Iowa, Virginia	46,300	53,596	51,887	56,542	54,469	54,444	....
Total lead contents American ores smelted	170,383	182,331	197,496	222,499	235,573	230,090	....
Contents Mexican ores	*a* 21,000	16,437	15,403	13,430	10,520	10,293	....
Contents Canadian ores		5,040	10,100	19,515	17,377	5,110	....
Contents miscellaneous or unknown	....	....	2,118	344	428	772	....

a Estimated.

DOMESTIC PRODUCERS.

The compilation of the lead ore sales in the Joplin-Galena district for 1900, made by the Joplin Mining News, shows total sales of 29,132 short tons, valued at $1,407,816, as compared with 23,953 tons in 1899, 26,475 tons in 1898, and 29,578 tons in 1897. The principal producing camps were Joplin, with 11,489 tons, as compared with 6,513 tons in 1899 and 8,329 tons in 1898; Galena, with 5,059 tons in 1900, 7,083 tons in 1899, and 7,878 tons in 1898, and Carterville, with 7,265 tons in 1900, 5,193 tons in 1899, and 4,246 tons in 1898. Webb City produced 1,151 tons, Aurora 705 tons, and Duenweg 823 tons.

The Guggenheim Exploration Company was organized to take over the properties of M. Guggenheim's Sons in southeastern Missouri, including the Federal Lead Company, which had purchased the Missouri Smelting Company at St. Louis. The company also operates the mines and mineral lands of the Union Lead and Oil Company, including the large area purchased from the Missouri Lead Fields Company. It is the purpose to develop the mines and build concentrating plants and smelters, but it is not likely that much metal will come from these sources until well into 1902.

The third annual report of the Columbia Lead Company shows that since the mill was started, on January 10, 1900, there were produced 3,444 tons of concentrates from 50,483 cars of crude ore, weighing about 1 ton each. During 1900 the company was engaged principally in sinking its No. 2 shaft to develop the Pim ore body, which was completed to the depth of 500 feet. The upper level of the ore was encountered at a depth of 356 feet, the ore being 34 feet in thickness. The lower level of ore was found at a depth of 470 feet, with a thickness of 11 feet. The ore body is estimated from the drill records to be capable of producing over 100,000 tons of pig lead. The directors of the company have closely studied the question of building a smelting plant. Temporarily a small works, consisting of three Scotch hearths, each of a capacity of 5 tons of concentrates per day, has been put in operation at Granite City. It is proposed, however, to build a smelting plant of large capacity in the St. Louis district. During the year 1900 there was spent for betterments $106,526.45. Including lands valued at $409,000, and $20,930 treasury stock, the assets on December 1, 1900, aggregated $632,962.72, while the liabilities, excluding $500,000 capital stock but including balances due on lands purchased of $56,692, were $117,605.17. There was a surplus of $15,357.55.

The Catherine Lead Company, of which H. J. Cantwell is president, started its mill on December 1, 1900. There are fully equipped two shafts, distant about 1,000 feet from one another, the mine being connected with the mill by a Bleichert tramway 9,125 feet long. The mill has 2 Blake crushers, 2 sets of 36 by 12 high-speed rolls, 7 three-compartment double Hartz jigs, and 2 double-deck 18-foot sluice tables. A water power has been developed on the Little St. François River, there being 3 McCormick wheels. The assets of the company, including $476,641.36 for lands, are $573,718.36, while the liabilities are $85,374.10.

A new development in which H. J. Cantwell is concerned, in the Flat River district, is that of the St. Louis Prospecting Company on a tract immediately adjoining the Columbia. A fine ore body has been developed by the diamond drill, but no shaft has yet been sunk.

Statistics compiled by the Herald-Democrat, of Leadville, show that the metals produced from ores mined in the district amounted to 32,664 short tons of lead, 2,849,832 pounds of copper, 7,547,993 ounces of silver, and 37,936 ounces of gold. The tonnage of carbonate ores was 102,761 short tons; of sulphides, 297,421 tons, and of oxidized iron, 231,144 tons. Of the carbonates, 46,730 tons were derived from the Resurrection, while the leading producers of sulphides were the A. Y. and Minnie, with 44,570 tons; the Ibex and the A. M. W., with 36,000 tons each; the Greenback, with 23,800 tons; the Moyer, with 32,280 tons; the Marion lease, with 22,179 tons; the Habendum, with 17,000 tons; the Mab, with 16,000 tons, and the Yak, with 12,000 tons.

Utah also reached its greatest production in 1900, the lead contents of the base bullion produced and of the ores shipped out of the State having been 48,044 short tons, according to the statement prepared by Wells, Fargo & Co. Nearly one-half of this lead product came from the mines of Park City, the lead contents of the ores and concentrates shipped having been 20,142 short tons. During 1900 eight concentrating plants were in operation on low-grade ores, and others are to be added. The largest producer is the Silver King, followed by the Daly-West, from which 25,701 short tons of ore was obtained—6,434 tons of lead, 1,353,017 ounces of silver, 504,770 pounds of copper, and 1,262 ounces of gold. The Ontario produced 42,000 tons of ore, from which there was derived 687 tons of lead, 950,000 ounces of silver, and 962 ounces of gold. The Anchor Mining Company made 6,055 tons of concentrates and marketed a small quantity of crude ore, the whole carrying 2,600 tons of lead, 155,501 ounces of silver, and 330 ounces of gold.

In the Tintic district the Centennial-Eureka has produced 38,975 tons of ore, the shipments of the mine going to the smelters of the American Smelting and Refining Company under contract.

At Frisco the Horn Silver marketed concentrates and crude ore carrying 1,844 tons of lead, 143,208 ounces of silver, 277 ounces of gold, and 678,351 pounds of copper.

CONSUMPTION.

Based on the data at hand, the following estimate is presented of the consumption of lead in recent years. The figures representing domestic stocks are aggregates of returns received by this office. They are not, however, complete.

Estimate of the consumption of lead in the United States from 1894 to 1900.

	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Supply—	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Total product desilverized lead	181,404	201,992	221,457	247,483	267,827	263,826	329,658
Soft lead	37,686	39,890	43,537	43,553	42,779	40,566	48,021
Imports, foreign refined	8,200	22,947	2,020	2,000	437	215	452
Stock, domestic, beginning of year	7,496	8,586	9,557	9,299	17,608	....	....
Stock, foreign in bond, beginning of year	3,302	7,181	9,865	4,124	6,691	7,341	11,320
Total supply	238,088	280,596	286,436	306,459	335,342	311,948	389,451
Deduct—							
Foreign base bullion and ores refined in bond and exported	29,000	18,130	57,612	62,409	84,666	73,313	97,959
Lead in manufactures exported under drawback	950	2,000	1,500	500	1,200	1,000	1,000
Stock, domestic, close of year	8,586	9,557	9,299	17,608	14,683	....	....
Stock, foreign in bond	7,181	9,865	4,124	6,694	7,341	11,320	21,190
Total	45,717	39,552	72,535	87,211	107,890	85,633	120,149
Apparent home consumption	192,371	241,044	213,901	219,248	227,452	226,315	269,302

During the years 1899 and 1900 no figures have been collected on domestic stocks.

At the end of the year 1900 the stock in the hands of refiners was admittedly heavy, so that the actual consumption by no means shows the extraordinary increase which the statistics display in which the domestic stocks have been ignored. The Government returns of warehouse transactions of foreign lead in ores and in bullion record the fact that 7,915 short tons of lead were withdrawn for consumption in the United States.

IMPORTS AND EXPORTS.

The following tables are from the records of the Bureau of Statistics:

Lead imported and entered for consumption in the United States, 1867 to 1900.

Year ending—	Ore and dross.		Pigs and bars.	
	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*	
1867	611	$25	65,322,923	$2,812,668
1868	6,945	239	63,254,677	2,668,915
1869			87,865,471	3,653,481
1870	5,973	176	85,895,724	3,530 837
1871	316	10	91,496,715	3,721,099
1872	32,231	1,425	73,086,657	2,929,623
1873			72,423,641	3,233,011
1874			46,205,154	2,231,817
1875	13,206	320	32,770,712	1,559,017
1876			14,329,366	682,132
1877	1,000	20	14,583,845	671,482
1878			6,717,052	294,233
1879			1,216,500	42,983
1880			6,723,706	246,015
1881	5,981	97	4,322,068	159,129
1882	21,698	500	6,079,304	202,603
1883	600	17	4,037,867	130,108
1884	419	13	3,072,738	85,395
1885	4,218	57	5,862,474	143,103
1886	715,588	9,699	17,582,298	491,310
December 31—				
1887	153,731	21,487	7,716,783	219,770
1888	88,870	2,468	2,582,236	69,891
1889	328,315	7,468	2,773,622	76,243
1890	11,065,865	504,067	19,336,233	593,671
1891	40,692,478	1,120,067	3,392,562	104,184
1892	54,249,291	1,278,114	1,549,771	110,953
1893	58,487,319	1,004,295	3,959,781	129,290
1894	33,020,250	437,999	39,168,529	895,496
1895	45,050,674	687,222	109,551,082	2,052,209
1896	37,829,583	631,381	10,551,148	191,479
1897	31,036,882	535,094	16,050,987	314,549
1898	16,610,607	331,116	311,502	8,787
1899	6,824,556	125,344	3,473,252	78,062
1900	10,209,742	623,802	3,673,616	76,141

Lead imported and entered for consumption in the United States, 1867 to 1900—Cont'd.

Year ending—	Sheets, pipe, and shot.		Shot.		Not otherwise specified.	Total value.
	Quantity.	Value.	Quantity.	Value.		
June 30—	*Pounds.*		*Pounds.*			
1867	185,825	$9,560			$6,222	$2,828,475
1868	142,137	7,229			6,604	2,682,987
1869	307,424	15,531			18,885	3,687,897
1870	141,681	6,879			10,444	3,548,336
1871	86,712	4,209			8,730	3,734,045
1872	15,518	859			20,191	2,952,098
1873	105	12	420	$50	21,503	3,254,576
1874			30,219	1,349	36,484	2,269,650
1875			58	4	25,774	1,585,115
1876			20,007	1,204	27,106	710,442
1877			16,502	1,242	1,041	673,785
1878			15,829	963	113	295,309
1879			3,748	209	930	44,122
1880			1,120	54	371	246,440
1881			900	65	1,443	160,734
1882			1,469	99	2,449	205,651
1883			1,510	79	8,030	138,234
1884	15,040	630			1,992	88,030
1885	971,951	22,217			1,372	166,749
1886	27,357	1,218			964	503,191
December 31—						
1887	27,941	1,286			302	242,845
1888	23,103	1,202			977	74,538
1889	35,859	1,417			1,297	86,425
1890	91,660	5,591			1,136	1,104,465
1891	334,179	12,406			604	1,237,467
1892	90,135	6,207			2,063	1,397,337
1893	59,798	2,955			1,691	1,138,231
1894	44,080	2,050			536	1,336,081
1895	128,008	5,030			1,277	2,745,738
1896	96,010	3,818			644	827,322
1897	95,891	4,042			513	854,198
1898	242,759	9,389			312	349,604
1899	110,372	4,402			8,626	216,434
1900	27,945	1,393			877	702,213

Old and scrap lead imported and entered for consumption into the United States, 1867 to 1889.

Year ending—	Quantity.	Value.	Year ending—	Quantity.	Value.
June 30—	*Pounds.*		June 30—	*Pounds.*	
1867	1,256,233	$53,202	1880	213,063	$5,262
1868	2,465,575	101,586	1881	123,018	2,729
1869	2,983,272	123,068	1882	220,702	5,949
1870	3,756,785	150,379	1883	1,094,133	31,724
1871	2,289,688	94,467	1884	160,356	4,830
1872	4,257,778	171,324	1885	4,866	106
1873	3,545,098	151,756	December 31—		
1874	395,516	13,897	1886	24,726	882
1875	382,150	13,964	1887	136,625	4,323
1876	265,860	9,534	1888	33,100	904
1877	249,645	8,383	1889	50,816	1,494
1878	106,342	3,756	1890	(*a*)	(*a*)
1879	42,283	1,153			

a Included in pigs and bars after 1889.

Lead, and manufactures of lead, of domestic production, exported from the United States.

Year ending—	Manufactures of— Lead. Quantity.	Manufactures of— Lead. Value.	Manufactures of— Pewter and lead. Value.	Pigs, bars, and old. Quantity.	Pigs, bars, and old. Value.	Total value.
September 30—	*Pounds.*			*Pounds.*		
1790	13,440	$810				$810
1803	*a* 900					
1804	19,804					
1805	8,000					
1808	40,583					
1809	126,537					
1810	172,323					
1811	65,497					
1812	74,875					
1813	276,940					
1814	43,600					
1815	40,245					
1816	35,844					
1817	111,034	9,993				9,993
1818	281,168	22,493				22,493
1819	94,362	7,549				7,594
1820	25,699	1,799				1,799
1821	56,192	3,512				3,512
1822	66,316	4,244				4,244
1823	51,549	3,098				3,098
1824	18,604	1,356				1,356
1825	189,930	12,697				12,697
1826	47,337	3,347	$1,820			5,167
1827	50,160	3,761	6,183			9,944
1828	76,882	4,184	5,545			9,729
1829	179,952	8,417	5,185			13,602
1830	128,417	4,831	4,172			9,003
1831	152,578	7,068	6,422			13,490

a Barrels.

Lead, and manufactures of lead, of domestic production, exported, etc.—Continued.

Year ending—	Manufactures of— Lead. Quantity.	Manufactures of— Lead. Value.	Manufactures of— Pewter and lead. Value.	Pigs, bars, and old. Quantity.	Pigs, bars, and old. Value.	Total value.
September 30—	*Pounds.*			*Pounds.*		
1832	72,439	$4,483	$983			$5,466
1833	119,407	5,685	2,010			7,695
1834	13,480	805	2,224			3,029
1835	50,418	2,741	433			3,174
1836	34,600	2,218	4,777			6,995
1837	297,488	17,015	3,132			20,147
1838	375,231	21,747	6,461			28,208
1839	81,377	6,003	12,637			18,640
1840	882,620	39,687	15,296			54,983
1841	2,177,164	96,748	20,546			117,294
1842	14,552,357	523,428	16,789			540,217
June 30—						
1843 (*a*)	15,366,918	492,765	7,121			499,886
1844	18,420,407	595,238	10,018			605,256
1845	10,188,024	342,646	14,404			357,050
1846	16,823,766	614,518	10,278			624,796
1847	3,326,028	124,981	13,694			138,675
1848	1,994,704	84,278	7,730			92,017
1849	680,249	30,198	13,196			43,394
1850	261,123	12,797	22,682			35,479
1851			16,426	229,448	$11,774	28,200
1852			18,469	747,930	32,725	51,194
1853			14,064	100,778	5,540	19,604
1854			16,478	404,247	26,874	43,352
1855			5,233	165,533	14,298	19,531
1856			5,628	310,029	27,512	33,140
1857			4,818	870,544	58,624	63,442
1858			27,327	900,607	48,119	75,446
1859			28,782	313,988	28,575	57,357
1860			56,081	903,468	50,446	106,527
1861			30,534	109,023	6,241	36,775
1862			28,832	79,231	7,334	36,166
1863			30,609	237,239	22,634	53,243
1864			30,411	223,752	18,718	49,129
1865			29,271	852,895	132,666	161,937
1866			44,483	25,278	2,323	46,806
1867			27,559	99,158	5,300	32,859
1868			37,111	438,040	34,218	71,329
1869			17,249			17,249
1870		28,315				28,315
1871		79,880				79,880
1872		48,132				48,132
1873		13,392				13,392
1874		302,044				302,044
1875		429,309				429,309
1876		102,726				102,726
1877		49,835				49,835
1878		314,904				314,904
1879		280,771				280,771
1880		49,899				49,899
1881		39,710				39,710

a Nine months.

Lead, and manufactures of lead, of domestic production, exported, etc.—Continued.

Year ending—	Manufactures of— Lead. Quantity.	Manufactures of— Lead. Value.	Manufactures of— Pewter and lead. Value.	Pigs, bars, and old. Quantity.	Pigs, bars, and old. Value.	Total value.
June 30—	*Pounds.*			*Pounds.*		
1882	....	$178,779	....	....	....	$178,779
1883	....	43,108	....	....	....	43,108
1884	....	135,156	....	....	....	135,156
1885	....	123,466	....	....	....	123,466
December 31—						
1886	....	136,666	....	....	....	136,666
1887	....	140,065	....	....	....	140,065
1888	....	194,216	....	....	....	194,216
1889	....	161,614	....	....	....	161,614
1890	....	181,030	....	....	....	181,030
1891	....	173,887	....	....	....	173,887
1892	....	154,375	....	....	....	154,375
1893	....	508,090	....	....	....	508,090
1894	....	456,753	....	....	a $41,240	497,993
1895	....	164,083	....	1,696,879	50,773	214,856
1896	....	164,877	....	b 16,359,452	442,496	607,373
1897	c 150,473	d 49,816	....	b 7,725,624	223,037	433,319
	....	e 160,466				
1898	c 265,062	d 97,862	....	118,960	4,450	215,239
	....	e 112,927				
1899	c 314,348	d 115,137	....	93,115	4,286	273,919
	....	e 154,496				
1900	c 363,600	d 130,758	....	1,993,773	88,664	459,571
	....	e 240,149				

a Not enumerated between 1868 and July 1, 1894.
b Part of this is foreign lead returned by collectors of customs by mistake as domestic lead.
c Type.
d Value of type.
e Value of all other manufactures.

According to the returns of the Treasury Department the sources of imports of lead in the calendar years 1895, 1896, 1897, 1898, 1899, and 1900 were as follows:

Sources of imports of lead.

Country.	1895.	1896.	1897.
	Pounds.	*Pounds.*	*Pounds.*
United Kingdom	8,161,411	1,365,132	1,120,528
Germany	1,113,148	....	....
Other Europe	36,618,228	1,235,981	1,101,151
Total refined pig lead	45,892,787	2,601,113	2,221,679
British North America	15,860,906	25,672,833	44,171,421
Mexico	138,312,146	130,388,173	137,364,677
Total ore and base bullion	154,173,052	156,061,006	181,536,098
Other countries	931,116	1,656,398	1,560,635
Total imports	200,996,955	160,318,517	185,318,412

Sources of imports of lead—Continued.

Country.	1898.	1899.	1900.
	Pounds.	*Pounds.*	*Pounds.*
United Kingdom	322,167	317,321	567,482
Germany			225,222
Other Europe		111,952	111,905
Total refined pig lead	322,167	429,273	904,609
British North America	36,255,163	17,871,875	37,689,162
Mexico	142,205,851	173,432,976	178,602,486
Total ore and base bullion	178,461,014	191,304,851	216,291,648
Other countries	482,800	1,142,950	7,147,092
Total imports	179,265,981	192,877,074	224,343,349

The subdivision by groups representing refined pig lead and lead in ore and base bullion is made by this office.

It will be observed that the imports from Canada were in 1900 restored to their normal volume. There has been much agitation in the Dominion of late years to encourage the establishment of home refineries, so that the ore and base bullion originating in that country be smelted, desilverized, and refined in Canada. As yet no desilverizing plant has been started.

The production of Mexico continues at its high level and promises to increase. Practically all of the base bullion made and lead ore exported from that country goes to smelters and refineries in the United States.

The greater part of the lead shown as coming from "other countries" reaches us from South America.

WAREHOUSE TRANSACTIONS.

The following table shows the warehouse transactions of lead in ore and in base bullion monthly during 1900 and the corresponding totals for the years 1899, 1898, and 1897:

Imports of lead in ore and base bullion during the calendar year 1900, showing warehouse transactions by months.

Month.	Remaining in warehouse first day of each month.	Entered warehouse.		Addition by liquidation.
		Of direct importation.	From other districts.	
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
January	22,639,987	9,147,145	23,529,875	7,585
February	26,924,673	19,229,963	14,202,100	4,328
March	26,134,583	17,466,846	19,844,050	214,166
April	27,880,022	20,179,937	18,538,466	49,266
May	27,693,725	15,456,325	28,819,502	62,917
June	41,030,381	20,170,454	15,519,509	20,907
July	33,836,374	19,909,074	25,392,309	171,851
August	40,191,004	22,841,602	21,829,753	6,002
September	37,773,785	20,916,142	22,227,091	115,138
October	36,680,712	15,937,247	20,409,282	414,715
November	34,484,852	20,406,243	18,199,059	96,894
December	31,508,865	24,983,212	21,163,012	412,628
January (1901)	42,379,270			
Total		226,644,190	249,674,008	1,576,397
Total, 1899		188,512,454	216,031,498	1,156,632
Total, 1898		170,017,006	177,837,309	1,326,934
Total, 1897		163,365,627	167,963,673	305,862

Month.	Withdrawn from warehouse—			Deductions by liquidations.
	For exportation.	For transportation.	For consumption.	
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
January	10,588,044	15,525,475	1,281,844	1,004,556
February	12,678,128	19,423,300	1,537,013	588,040
March	15,779,118	18,429,368	1,072,706	498,431
April	16,409,678	20,091,624	1,435,176	1,017,488
May	14,911,663	13,556,040	1,758,584	775,801
June	15,827,817	17,691,817	1,444,912	7,940,331
July	17,663,644	19,325,894	1,292,131	836,935
August	19,603,041	21,132,138	1,506,966	4,852,431
September	19,813,897	22,153,665	969,324	1,414,558
October	19,962,949	16,254,614	392,061	2,347,480
November	17,928,050	16,628,533	605,677	6,515,923
December	14,751,593	17,352,821	2,533,237	1,050,796
Total	195,917,622	217,565,289	15,829,631	28,842,770
Total, 1899	151,202,762	204,545,816	14,403,027	27,591,976
Total, 1898	147,978,938	163,405,296	7,844,184	28,650,385
Total, 1897	109,847,156	183,006,461	23,929,569	7,769,593

PRICES.

The following table gives the highest and lowest prices monthly for a series of years, compiled from market quotations:

Highest and lowest prices of lead at New York City, monthly, from 1870 to 1900, inclusive.

[Cents per pound.]

Year.	January.		February.		March.		April.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1870	*a*6.30	6.20	6.25	6.17	6.20	6.10	6.25	6.15
1871	*a*6.30	6.15	6.25	6.20	6.20	6.15	6.20	6.10
1872	*a*6	5.90	6	5.87	6	5.87	6.12	5.90
1873	*a*6.37	6.25	6.50	6.40	6.50	6.25	6.50	6.25
1874	*a*6	5.90	6.25	6	6.25	6.12	6.25	5.90
1875	*a*6.20	6	5.90	5.85	5.75	5.62	5.87	5.80
1876	*a*6	5.87	6.37	6	6.50	6.40	6.40	6.12
1877	*b*6.15	6.12	6.40	6.20	6.75	6.50	6.50	6.25
1878	4.35	4	3.87	3.65	3.87	3.62	3.75	3.50
1879	4.50	4	4.50	4.50	4.50	3.25	3.25	2.87
1880	6.10	5.50	6	5.87	5.95	5.30	5.75	5.40
1881	5	4.30	5.10	4.80	4.85	4.62	4.85	4.37
1882	5.15	4.95	5.20	5	5.12	4.85	5	4.90
1883	4.70	4.60	4.60	4.50	4.65	4.50	4.62	4.40
1884	4.50	3.75	4.10	3.75	4.15	4.10	4.05	3.62½
1885	3.70	3.55	3.70	3.60	3.70	3.62½	3.70	3.62½
1886	4.70	4.50	4.90	4.60	4.95	4.85	4.90	4.65
1887	4.45	4.15	4.50	4.25	4.45	4.25	4.32½	4.20
1888	4.90	4.50	5.15	4.60	5.25	5	5.05	4.55
1889	3.90	3.75	3.75	3.60	3.75	3.65	3.67½	3.60
1890	3.85	3.80	3.85	3.75	3.95	3.85	4.07½	3.85
1891	4.50	4.05	4.50	4.25	4.37½	4.25	4.32½	4.10
1892	4.30	4.10	4.25	4.05	4.22½	4.10	4.30	4.20
1893	3.90	3.85	3.95	3.90	4.05	3.85	4.12½	4.05
1894	3.25	3.15	3.35	3.20	3.45	3.25	3.45	3.37½
1895	3.12½	3.05	3.12½	3.07½	3.10	3.07½	3.12½	3.05
1896	3.15	3	3.20	3.07½	3.22½	3.07½	3.07½	3.02½
1897	3.12½	3.02½	3.37½	3.12½	3.40	3.35	3.40	3.25
1898	3.70	3.55	3.80	3.55	3.70	3.60	3.62½	3.55
1899	4.25	3.90	4.50	4.25	4.45	4.30	4.35	4.27½
1900	4.75	4.70	4.75	4.70	4.75	4.70	4.75	4.65

a Gold. *b* Currency.

Highest and lowest prices of lead at New York City, monthly, from 1870 to 1900, inclusive—Continued.

[Cents per pound.]

Year.	May.		June.		July.		August.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1870	6.25	6.20	6.25	6.20	6.30	6.20	6.37	6.32
1871	6.18	6.10	6.15	6.12	6.15	6.10	6.12	6
1872	6.62	6.25	6.62	6.40	6.62	6.40	6.50	6.40
1873	6.62	6.35	6.55	6.12	6.12	6	6.25	6
1874	6	5.75	6	5.62	5.80	5.62	5.80	5.65
1875	5.95	5.90	5.90	5.75	6	5.95	5.95	5.87
1876	6.50	6.10	6.50	6.25	6.35	6.20	6.37	6.25
1877	6	5.55	5.70	5.60	5.60	5.37	5.12	4.90
1878	3.50	3.25	3.50	3.12	3.62	3.25	3.50	3.20
1879	3.12	2.87	3.80	3.12	4.10	3.90	4.05	4
1880	5.25	4.40	4.75	4.50	4.75	4.25	5	4.30
1881	4.70	4.25	4.50	4.25	4.90	4.50	4.95	4.75
1882	4.85	4.60	4.90	4.55	5.15	4.90	5.10	4.95
1883	4.55	4.40	4.45	4.40	4.40	4.30	4.30	4.20
1884	3.75	3.52½	3.65	3.57½	3.70	3.55	3.70	3.52½
1885	3.75	3.60	3.85	3.62½	4.15	3.87½	4.25	4.12
1886	4.75	4.65	4.90	4.65	4.90	4.75	4.80	4.75
1887	4.70	4.30	5.70	4.50	4.67½	4.40	4.62½	4.55
1888	4.62½	4	4.10	3.65	4.07½	3.85	4.97½	4.15
1889	3.87½	3.60	4.05	3.90	4.05	3.80	3.95	3.75
1890	4.35	4	4.50	4.25	4.50	4.40	4.72½	4.35
1891	4.37½	4.20	4.50	4.35	4.45	4.30	4.53	4.40
1892	4.25	4.20	4.20	4.05	4.25	4	4.15	4
1893	4	3.75	3.90	3.45	3.60	3.30	3.75	3.25
1894	3.40	3.30	3.37½	3.25	3.65	3.37½	3.70	3.30
1895	3.25	3.07½	3.30	3.25	3.50	3.30	3.55	3.50
1896	3.05	3	3.05	3	3	2.90	2.90	2.65
1897	3.37½	3.22½	3.60	3.25	3.90	3.65	4.10	3.70
1898	3.80	3.60	3.90	3.75	4	3.80	4.10	3.90
1899	4.50	4.37½	4.50	4.45	4.60	4.50	4.60	4.50
1900	4.70	4	4.25	3.75	4.25	4	4.37½	4.25

Highest and lowest prices of lead at New York City, monthly, from 1870 to 1900, inclusive—Continued.

[Cents per pound.]

Year.	September.		October.		November.		December.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1870	6.37	6.30	6.37	6.25	6.35	6.20	6.35	6.25
1871	6.10	6	6	5.87	6	5.90	6	5.75
1872	6.50	6.30	6.62	6.40	6.60	6.50	6.60	6.42
1873	6.62	6.37	6.75	6.25	6.50	6	6.12	6
1874	6.10	5.65	6.35	6.10	6.50	6.25	6.40	6.12
1875	5.87	5.70	5.65	5.60	5.87	5.65	5.95	5.87
1876	6.25	6	6	5.80	5.80	5.70	5.70	5.65
1877	4.85	4.75	4.85	4.25	4.75	4.50	4.60	4.50
1878	3.45	3.25	3.60	3.37	3.95	3.60	4	3.90
1879	4	3.75	5.50	4	5.62	5	5.60	5.50
1880	4.90	4.80	4.87	4.65	4.85	4.75	4.75	4.25
1881	5.37	4.95	5.25	4.87	5.25	4.90	5.25	5
1882	5.15	4.95	5.15	4.85	4.90	4.50	4.75	4.50
1883	4.32	4.30	4.32	4.12	4.05	3.65	3.75	3.60
1884	3.75	3.55	3.75	3.60	3.55	3.37½	3.75	3.50
1885	4.25	4	4.25	4	4.60	4	4.67½	4.50
1886	4.70	4.45	4.30	4	4.40	4.10	4.35	4.25
1887	4.55	4.25	4.40	4.20	4.75	4.25	5.15	4.90
1888	5.12½	4.90	5.12½	3.62½	3.82½	3.60	3.82½	3.60
1889	4	3.85	3.90	3.75	3.90	3.75	3.90	3.75
1890	5	4.67½	5.25	5	5.25	4.60	4.60	4.05
1891	4.55	4.40	4.55	4.10	4.35	4.10	4.25	4.25
1892	4.15	4	3.95	3.85	3.85	3.70	3.85	3.70
1893	3.95	3.75	3.75	3.25	3.37½	3.30	3.30	3.20
1894	3.30	3.10	3.15	3.05	3.12½	3.10	3.12½	3.02½
1895	3.45	3.32½	3.35	3.30	3.27½	3.15	3.30	3.20
1896	2.80	2.72½	2.92½	2.72½	3.05	2.85	3.05	2.95
1897	4.35	4.25	4.25	3.85	3.85	3.75	3.75	3.65
1898	4.05	3.90	3.90	3.60	3.70	3.65	3.80	3.60
1899	4.60	4.55	4.60	4.57½	4.60	4.57½	4.75	4.57½
1900	4.37½	4.35	4.37½	4.35	4.37½	4.35	4.37½	4.35

THE LEAD MARKET.

Throughout the whole of the year 1900 the lead markets in the United States were practically under the control of the American Smelting and Refining Company, which maintained the price during the first four months at 4.70 and 4.75 cents for 50-ton lots. In the first half of May there came in very quick succession a series of startling reductions through which the price was dropped $14 per short ton—from 4.70 to 4 cents per pound. Early June brought another decline to 3⅞ cents, and on the 14th of the month a reduction to 3.75 cents was announced, making the total decline $19 per short ton of metal. The reason given for this lowering was that consumption was dragging and that the general situation in the metal trade was unfavorable. Conditions apparently improved very suddenly, since on June 25 an advance was decreed to 4⅛ cents, and on June 27 to 4.25

cents. July 2 brought another turn, with a reaction to 4⅛ cents, followed by a further drop to 4 cents on the 9th. That figure was maintained until the close of the month, when the price was advanced to 4.25 cents. On August 27 the price was established at 4⅜ cents, at which it was held to the end of the year.

THE WORLD'S PRODUCTION.

An effort to state correctly the lead production of the world is beset by many difficulties. In some countries there are no reliable official statistics whatever. In others the official statistics deal only with the production of lead ores or concentrates, without any reference to their metal contents. Metallurgical statistics, which after all are the only ones of commercial value, are not touched at all. Lead ores are shipped, often in large quantities, to distant countries for smelting, and base bullion travels from the country of origin to distant refineries and desilverizing works. This renders the danger of duplication very great and makes it almost impossible to assign the lead to its actual country of origin. Thus the mineral statistics of Great Britain deal only with the production of dressed lead ore. There is no attempt to present figures relating to the production of refined lead from domestic or foreign sources. The same is true of the Australian colonies.

The only comprehensive effort to deal with these difficulties is that of the Metallgesellschaft of Frankfort on the Main, upon which the following table is based. The figures for the United States are those arrived at by this office. In the case of some of the other countries the official reports have been followed.

The world's production of lead during the years 1887 to 1900.

[Metric tons.]

Country.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
Germany	95,000	97,000	100,000	101,000	95,000	98,000	95,000
Spain	a 119,000	129,200	136,900	140,300	145,700	152,300	157,100
Great Britain	a 50,000	a 50,000	a 47,800	49,800	49,000	44,900	38,200
Austria	7,800	8,000	8,000	8,300	7,600	7,300	7,200
Hungary	1,800	2,000	2,300	1,200	2,100	2,300	2,500
Italy	a 19,000	17,000	18,000	17,700	18,500	22,000	19,900
Belgium	10,000	11,000	9,400	9,600	12,700	10,100	12,000
France	a 5,000	6,500	5,400	4,600	6,700	8,800	8,100
Greece	12,500	14,500	13,500	14,200	13,300	14,400	12,800
Other European countries	a 2,000	a 2,000	a 2,000	a 2,000	a 2,000	a 2,500	a 3,000
United States	132,150	137,790	141,852	130,272	161,948	157,187	147,627
Mexico	18,100	30,100	27,500	22,300	30,200	47,500	64,000
Canada	....	....	....	....	....	....	1,000
Australia b	a 10,000	a 19,000	a 35,000	40,500	56,000	54,000	58,000
Other countries	a 1,000	a 1,000	a 1,000	a 1,000	a 1,000	a 1,000	a 1,000
Total	483,350	525,090	548,652	542,772	601,748	622,287	627,427

a Estimated. b Exclusive of that part of product not exported to Europe and America.

The world's production of lead during the years 1887 to 1900—Continued.

[Metric tons.]

Country.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Germany	101,000	111,058	113,792	118,881	132,742	129,225	121,500
Spain	152,620	160,786	167,017	189,000	193,000	180,000	154,600
Great Britain	42,800	55,300	57,200	40,300	50,000	41,500	35,000
Austria	7,500	8,085	10,120	9,680	10,340	9,700	13,000
Hungary	2,113	2,277	1,911	2,527	2,305	2,200	
Italy	19,600	20,353	20,786	20,469	22,500	18,195	23,900
Belgium	13,500	15,573	17,222	17,023	19,330	*a* 16,500	17,500
France	8,758	7,627	8,232	9,916	10,920	16,000	17,800
Greece	14,000	19,800	13,200	15,600	19,200	18,400	16,100
Other European countries	*a* 4,000	*a* 4,000	3,500	3,600	3,800	4,300	5,300
United States	147,600	154,265	170,600	192,000	201,452	190,994	244,770
Mexico	57,000	68,000	63,000	69,800	70,600	86,500	90,500
Canada	2,586	10,467	10,977	17,719	14,500	10,932	17,100
Australia *b*	50,000	38,000	30,000	22,000	50,000	68,000	66,000
Other countries	*a* 1,000	....	600	2,000	1,300	2,200	3,000
Total	624,077	675,591	688,157	730,715	801,789	794,646	826,070

a Estimated. *b* Exclusive of that part of product not exported to Europe and America.

In these statistics the output of Great Britain includes the lead obtained from smelting foreign ores and material.

Only the lead exported to Europe and America is accounted for in the production credited to Australia. The total production was 87,100 tons in 1900, 87,600 tons in 1899, and about 67,000 tons in 1898. In 1900 the exports of lead from Australia to eastern Asia amounted to 12,500 tons, not included in the figures given in the table. Nor is the domestic consumption reckoned.

THE WORLD'S CONSUMPTION.

The Metallgesellschaft, of Frankfort on the Main, figures the consumption of lead in the world as follows:

World's consumption of lead, 1891 to 1900.

[Metric tons.]

Country.	1891.	1892.	1893.	1894.	1895.
Germany	88,268	89,595	94,571	100,678	111,652
Great Britain	174,621	172,839	178,415	161,847	170,130
France	70,664	73,545	77,065	86,160	64,657
Austria-Hungary	14,011	16,600	15,604	18,442	19,276
Italy	22,552	22,787	19,985	19,942	18,747
Switzerland	1,738	1,922	1,941	1,412	1,837
Belgium	19,834	13,779	23,088	22,478	17,094
Netherlands	*a* 5,000	*a* 5,000	*a* 5,000	*a* 5,000	*a* 5,000
Russia	16,900	22,000	24,500	26,700	21,400
Other European countries	2,300	2,700	1,500	1,700	1,600
United States	181,842	191,728	179,163	173,413	218,007
All other countries	19,300	18,800	14,700	12,300	10,600
Total	617,030	631,295	635,532	630,072	660,000

a Estimated.

World's consumption of lead, 1891 to 1900—Continued.

[Metric tons.]

Country.	1896.	1897.	1898.	1899.	1900.
Germany	121,980	129,898	155,372	160,369	172,940
Great Britain	196,200	182,334	212,163	205,444	202,355
France	77,776	86,938	91,432	92,351	97,106
Austria-Hungary	18,814	18,038	22,038	20,605	20,605
Italy	20,533	20,796	20,104	22,036	22,287
Switzerland	2,485	2,640	3,441	2,700	3,170
Belgium	20,645	23,610	23,244	22,622	23,500
Netherlands	*a*5,000	*a*5,000	*a*5,000	*a*5,000	*a*5,000
Russia	20,300	24,750	22,650	23,300	20,300
Other European countries	2,100	2,300	3,800	2,100	2,300
United States	179,801	207,617	218,628	215,746	239,407
All other countries	12,100	9,400	8,500	6,500	4,500
Total	677,734	713,321	786,372	778,773	813,470

a Estimated.

ZINC.

By Charles Kirchhoff.

PRODUCTION.

During the year 1900 the production of spelter in the United States receded from the high point which it reached in 1899. The year 1900 was one of restricted consumption, the galvanizing trade in particular having suffered.

For a series of years the production of spelter has been as follows:

Production of spelter in the United States.

Year.	Quantity.	Year.	Quantity.
	Short tons.		*Short tons.*
1873	7,343	1890	63,683
1875	15,833	1891	80,873
1880	23,239	1892	87,260
1882	33,765	1893	78,832
1883	36,872	1894	75,328
1884	38,544	1895	89,686
1885	40,688	1896	81,499
1886	42,641	1897	99,980
1887	50,340	1898	115,399
1888	55,903	1899	129,051
1889	58,860	1900	123,886

In the different States the production has been as follows:

Production of spelter in the United States, by States.

Year.	Eastern and Southern States.	Illinois.	Kansas.	Missouri.	Total.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
1882	5,698	18,201	7,366	2,500	33,765
1883	5,340	16,792	9,010	5,730	36,872
1884	7,861	17,594	7,859	5,230	38,544
1885	8,082	19,427	8,502	4,677	40,688
1886	6,762	21,077	8,932	5,870	42,641
1887	7,446	22,279	11,955	8,660	50,340
1888	9,561	22,445	10,432	13,465	55,903
1889	10,265	23,860	13,658	11,077	58,860
1890	9,114	26,243	15,199	13,127	63,683
1891	*a* 8,945 *b* 4,217	28,711	22,747	16,253	80,873
1892	*a* 9,582 *b* 4,913	*c* 31,383	24,715	16,667	87,260
1893	*a* 8,802 *b* 3,882	*c* 29,596	22,815	13,737	78,832

a Eastern. *b* Southern. *c* Including Indiana.

Production of spelter in the United States, by States—Continued.

Year.	Eastern and Southern States.	Illinois.	Kansas.	Missouri.	Total.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
1894	*a* 7,400 *b* 1,376	*c* 28,972	25,588	11,992	75,328
1895	*a* 9,484 *b* 3,697	*c* 35,732	25,775	14,998	89,686
1896	*a* 8,139 *b* 2,427	*c* 36,173	20,759	14,001	81,499
1897	*a* 7,218 *b* 3,365	*c* 37,876	33,396	18,125	99,980
1898	8,631	*c* 47,103	40,132	19,533	115,399
1899	8,805	*c* 50,118	52,021	18,107	129,051
1900	8,259	38,750	62,136	14,741	123,886

a Eastern. *b* Southern. *c* Including Indiana.

For semiannual periods the production of spelter has been as follows:

Production of spelter in the United States, by semiannual periods.

State.	First half 1892.	Second half 1892.	First half 1893.	Second half 1893.	First half 1894.	Second half 1894.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Eastern Southern	6,901	7,594	7,380	5,304	5,064	3,712
Illinois and Indiana	15,483	15,900	16,427	16,169	13,392	15,580
Kansas	14,161	10,554	13,269	9,546	11,250	14,338
Missouri	8,954	7,713	8,718	5,019	6,458	5,534
Total	45,499	41,761	45,794	36,038	36,164	39,164

State.	First half 1896.	Second half 1896.	First half 1897.	Second half 1897.	First half 1898.	Second half 1898.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Eastern	4,517	3,622	3,866	3,352	2,955	3,981
Southern	1,200	1,227	1,305	2,060	1,695	
Illinois and Indiana	16,305	19,868	18,054	19,822	22,129	24,974
Kansas	11,351	9,408	15,722	17,674	21,464	18,668
Missouri	5,548	8,453	7,956	10,169	10,371	9,162
Total	38,921	42,578	46,903	53,077	58,614	56,785

For 1899 and 1900 the production of spelter was as follows:

Production of spelter in the United States in 1899 and 1900.

State.	First half 1899.	Second half 1899.	First half 1900.	Second half 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
Illinois and Indiana	26,595	23,523	23,543	15,207
Kansas	25,972	26,049	29,379	32,757
Missouri	9,376	8,731	7,109	7,632
East and South	4,620	4,185	4,621	3,638
Total	66,563	62,488	64,652	59,234

These figures show that the production of Illinois declined very heavily during the second half of 1900, which was due largely to strikes. Kansas is gaining rapidly, while the Eastern and Southern States have declined. The energetic development of the mining and concentrating operations of the New Jersey Zinc Company and the building of a large new reduction plant promise, however, a considerable increase from that quarter.

Among those who have recently increased their capacity for production are: George E. Nicholson, of Iola, Kans.; the Prime Western Spelter Company, of Iola, Kans.; and the Illinois Zinc Company, of Peru, Ill. There has been some discussion of the question of additions to the plant on the part of the Lanyon Zinc Company, of Iola, and a new plant of 1,800 retorts at the same locality is being considered by R. Ziesing. The works of the Bruce Mining and Smelting Company, at Bruce, Kans., were idle during the whole of the year, and the plant of the Cherokee Smelting Company was closed down in October. Production ceased in June on the part of the Empire Zinc Company, at Joplin, Mo., but, on the other hand, the Rich Hill Works, at Rich Hill, Mo., long idle, were started and ran in 1900. The Humphrey Spelter Company, at Upland, Ind., which did not produce spelter in 1900, has been reorganized under the title of the Vulcan Spelter Company. The American Smelting and Refining Company is building a plant in Colorado with a capacity of 60 tons per day.

During the early part of the year the American Sheet Steel Company assumed control of the Girard Works, at Girard, Kans. Since the American Steel and Wire Company, another of the constituent companies of the United States Steel Corporation, owns the two works of the Edgar Zinc Company, at Cherryvale, Kans., and at Carondelet, near St. Louis, the corporation is the second largest producer of spelter in the country, the Lanyon Spelter Company being the largest. In 1900 the plants controlled by the United States Steel Corporation made nearly 25,000 short tons of spelter, or one-fifth of the total output of the country. That corporation controls the largest part of the wire and sheet plants in the United States, and in that manner does nearly all the galvanizing of staple iron products in the country.

The production of sheet zinc absorbs a large share of the output of the Illinois smelters, the quantity being about 18,000 to 20,000 short tons per annum.

The exports having been 22,000 short tons, there are thus accounted for 65,000 to 67,000 short tons out of a total production of 124,000 short tons, or more than one-half. The additional purchases of the steel corporation, the requirements of outside galvanizers, the consumptive requirements of the brass trade, and the small tonnage called for by the lead desilverizers, which together represent what is taken in the open market, are less than one-half of the output of 1900.

On the basis of actual maximum product, during the two halves of the year 1900, of the plants which produced any spelter in that year the capacity for production is as follows:

Capacity for production of spelter plants at end of year 1900.

State.	Amount.
	Short tons.
Illinois and Indiana	45,750
Kansas	68,000
Missouri	17,750
East and South	10,000
Total	141,500

Of course the increase in the capacity of the works is partly due to the shifting of the center of production to the Kansas gas belt, so that it is only under extraordinary conditions that the full capacity becomes really available.

The capacity for the production of sheet zinc will be considerably enlarged. The New Jersey Zinc Company is building a rolling mill and the Lanyon Zinc Company has just broken ground for a plant at La Harpe, Kans.

The New Jersey Zinc Company has begun the erection at Canon City, Colo., of a plant for concentrating the complex zinc ores of the Leadville district.

ZINC MINING IN THE GALENA-JOPLIN DISTRICT.

For the great zinc-ore mining district of Joplin-Galena the year 1900 was fairly prosperous, although the high prices of the previous year were far from being realized.

Local statistics, which closely reflect the output, considering the fact that it is derived from so many sources, show that the production fell somewhat below that of the banner year 1899. The following figures of output by camps are taken from the annual summary of the Joplin Mining News:

Production of zinc and lead ore in the Galena-Joplin district in 1900.

Camp.	Zinc ore.		Lead ore.		Total value.
	Quantity.	Value.	Quantity.	Value.	
	Short tons.		*Short tons.*		
Galena, Kans	45,043	$1,202,054	5,059	$245,905	$1,447,959
Joplin, Mo	54,876	1,536,374	11,489	557,643	2,094,017
Carterville	39,146	1,052,143	7,265	351,681	1,403,824
Aurora	22,197	545,820	705	31,221	577,041
Oronogo	18,473	511,873	159	7,291	519,164
Webb City	12,643	344,480	1,151	55,646	400,126
Zincite	9,386	283,751	180	8,810	292,561
Granby	7,838	182,213	499	22,560	204,773
Duenweg	5,147	124,268	823	36,268	160,536
Neck City	4,086	120,443	19	936	121,379
Central City	3,955	103,981	229	11,241	115,222
Stotts City	3,716	110,587	91	4,322	114,909
Cave Springs	3,882	103,530	234	9,994	113,524
Roaring Springs	3,578	90,890	350	17,586	108,476
Carthage	3,287	85,775	23	1,012	86,787
Carl Junction	2,883	79,805	2	143	79,948
Miscellaneous	4,493	105,957	898	40,419	146,376
Totals, 1900	244,629	6,583,944	29,176	1,402,678	7,986,622
Totals, 1899	255,088	....	23,888	....	10,715,307

The heavy decline in the gross revenue from nearly equal quantities of zinc ore produced is notable.

For previous years the production of the district has been as follows, according to the Joplin Mining News:

Production of zinc and lead ore in the Joplin-Galena district.

Year.	Zinc ore.	Lead ore.	Total value both ores.
	Short tons.	*Short tons.*	
1894	147,310	32,199	$3,535,736
1895	144,487	31,294	3,775,929
1896	155,333	27,721	3,857,355
1897	177,976	30,105	4,726,302
1898	234,455	26,687	7,119,867
1899	255,088	23,888	10,715,307
1900	244,629	29,176	7,986,622

The average base prices from month to month for ores in the district during 1900 have been as follows:

Average base prices of zinc and lead ores in 1900.

Month.	Zinc, per short ton.	Lead, per 1,000 pounds.	Month.	Zinc, per short ton.	Lead, per 1,000 pounds.
January	$30.23	$28.00	November	$24.45	$22.80
February	29.36	27.50	December	25.40	22.19
March	28.45	26.50	Average realized price, 1900	26.50	24.16
April	28.42	26.86	Average, 1899	38.50	27.23
May	26.92	24.50	Average, 1898	28.44	....
June	25.00	21.80	Average, 1897	22.28	....
July	24.23	21.36	Average, 1896	22.33	....
August	25.67	23.00			
September	24.55	23.00			
October	24.25	22.71			

CONSUMPTION.

During 1900 the home consumption of spelter was small and an unprecedented quantity of the metal was forced upon the world's markets.

The following estimate may be presented, coupled with the statement, however, that the reports of the stocks from the producers are only partial, and are therefore in reality considerably larger. In a degree, however, the figures reflect the fluctuations in the stocks, and thus possess some value as indicating the relative position from year to year:

Estimated consumption of spelter from 1895 to 1900.

Source, etc.	1895.	1896.	1897.	1898.	1899.	1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Production	89,686	81,499	99,980	115,399	129,051	123,886
Imports	432	428	1,279	1,303	1,392	1,007
Stocks at beginning of year	4,911	5,802	7,477	5,709	3,695	2,798
Total supply	95,029	87,729	108,736	122,411	134,138	127,691
Deduct—						
Exports of foreign	....	4	....	18	....	23
Exports of domestic	1,530	10,130	14,245	10,499	6,755	22,410
Stock at end of year	5,802	7,477	5,709	3,695	2,798	5,813
Total	7,332	17,611	19,954	14,212	9,553	28,246
Apparent home consumption	87,697	70,118	88,782	108,199	124,585	99,445

IMPORTS AND EXPORTS.

In 1900 the United States, for the first time, became a really important contributor to the world's markets of zinc, as an exporter of both metal and ore. Those who are conversant with the industry at home and abroad express the conviction that we shall witness in the zinc industry the same phenomena which have characterized other branches of the metal trades at large. We may for some years continue to export the raw material in the form of ore, and may even go beyond recent records in quantity, but with cheap fuel and with improved methods of reduction the export of metal will take the place of shipments of ore. This is being recognized clearly by some of the European leaders of the industry, who have learned to count with the prospective developments in this country, which only a few years since were waived aside as worthy of little consideration.

For a series of years the imports have been as follows:

Zinc imported and entered for consumption in the United States, 1867 to 1900.

Year ending—	Block or pigs.		Sheets.	
	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*	
1867	5,752,611	$256,366	5,142,417	$311,767
1868	9,327,968	417,273	3,557,448	203,883
1869	13,211,575	590,332	8,306,723	478,646
1870	9,221,121	415,497	9,542,687	509,860
1871	11,159,040	508,355	7,646,821	409,243
1872	11,802,247	522,524	10,704,944	593,885
1873	6,839,897	331,399	11,122,143	715,706
1874	3,593,570	203,479	6,016,835	424,504
1875	2,034,252	101,766	7,320,713	444,539
1876	947,322	56,082	4,611,360	298,308
1877	1,266,894	63,250	1,341,333	81,815
1878	1,270,184	57,753	1,255,620	69,381
1879	1,419,791	53,294	1,111,225	53,050
1880	8,092,620	371,920	4,069,310	210,230
1881	2,859,216	125,457	2,727,324	129,158
1882	18,408,391	736,964	4,413,042	207,032
1883	17,067,211	655,503	3,309,239	141,823
1884	5,869,738	208,852	952,253	36,120
1885	3,515,840	113,268	1,839,860	64,781
December 31—				
1886	4,300,830	136,138	1,092,400	40,320
1887	8,387,647	276,122	926,150	32,526
1888	3,825,947	146,156	295,287	12,558
1889	2,052,559	77,845	1,014,873	43,356
1890	1,997,524	101,335	781,366	43,495
1891	808,094	41,199	21,948	1,460
1892	297,969	16,520	27,272	2,216
1893	425,183	22,790	28,913	1,985
1894	387,788	13,788	39,947	2,061
1895	744,301	26,782	42,513	2,773
1896	1,040,719	32,096	27,321	1,358
1897	2,905,451	109,520	15,971	786
1898	2,605,028	104,669	39,712	2,724
1899	2,783,329	143,557	86,878	6,354
1900	1,767,756	86,653	155,144	10,801

Zinc imported and entered for consumption in the United States, 1867 to 1900—Cont'd.

Year ending—	Old.		Value of manufactures.	Total value.
	Quantity.	Value.		
June 30—	*Pounds.*			
1867	....	....	$1,835	$569,968
1868	....	....	1,623	622,779
1869	....	....	2,083	1,071,061
1870	....	....	21,696	947,053
1871	....	....	26,366	943,964
1872	....	....	58,668	1,175,077
1873	....	....	56,813	1,103,918
1874	....	....	48,304	676,287
1875	....	....	26,330	572,635
1876	....	....	18,427	372,817
1877	....	....	2,496	147,561
1878	....	....	4,892	132,026
1879	....	....	3,374	109,718
1880	....	....	3,571	585,721
1881	....	....	7,603	262,218
1882	....	....	4,940	948,936
1883	....	....	5,606	802,932
1884	....	....	4,795	249,767
1885	....	....	2,054	180,103
December 31—				
1886	....	....	9,162	185,620
1887	....	....	11,329	319,977
1888	....	....	12,080	170,794
1889	....	....	19,580	140,781
1890	....	....	9,740	154,570
1891	....	....	....	42,659
1892	115,203	$6,556	20,677	45,969
1893	265	21	16,479	41,275
1894	27,754	530	11,816	28,195
1895	64,398	899	9,953	40,407
1896	14,855	267	9,800	43,521
1897	41,643	886	11,459	122,651
1898	96,899	3,417	11,211	122,021
1899	167,954	6,932	8,824	165,667
1900	155,670	6,379	24,257	128,090

Imports of zinc oxide from 1885 to 1900.

Year ending—	Dry.	In oil.	Year ending—	Dry.	In oil.
	Pounds.	*Pounds.*	December 31—	*Pounds.*	*Pounds.*
June 30, 1885	2,233,128	98,566	1893	3,900,749	254,807
December 31—			1894	3,371,292	59,291
1886	3,526,289	79,788	1895	4,546,049	129,343
1887	4,961,080	123,216	1896	4,572,781	311,023
1888	1,401,342	51,985	1897	5,564,763	502,357
1889	2,686,861	66,240	1898	3,342,235	27,050
1890	2,631,458	102,298	1899	3,012,709	41,699
1891	2,839,351	128,140	1900	2,618,808	38,706
1892	2,442,014	111,190			

Since 1864 the exports have been as follows:

Exports of zinc and zinc ore of domestic production from 1864 to 1900.

Year ending—	Ore or oxide.		Plates, sheets, pigs, or bars.		Value of manufactures.	Total value.
	Quantity.	Value.	Quantity.	Value.		
June 30—	*Cwt.*		*Pounds.*			
1864	14,810	$116,431	95,738	$12,269	....	$128,700
1865	99,371	114,149	184,183	22,740	....	136,889
1866	4,485	25,091	140,798	13,290	....	38,381
1867	3,676	32,041	312,227	30,587	....	62,628
1868	8,344	74,706	1,022,699	68,214	....	142,920
1869	....	65,411	....	....	....	65,411
1870	15,286	81,487	110,157	10,672	....	92,159
1871	9,621	48,292	76,380	7,823	....	56,115
1872	3,686	20,880	62,919	5,726	....	26,606
1873	234	2,304	73,953	4,656	....	6,960
1874	2,550	20,037	43,566	3,612	....	23,649
1875	3,083	20,659	38,090	4,245	$1,000	25,904
1876	10,178	66,259	134,542	11,651	4,333	82,243
1877	6,428	34,468	1,419,922	115,122	1,118	150,708
1878	16,050	83,831	2,545,320	216,580	567	300,978
1879	10,660	40,399	2,132,949	170,654	....	211,053
1880	13,024	42,036	1,368,302	119,264	....	161,300
1881	11,390	16,405	1,491,786	132,805	168	149,378
1882	10,904	13,736	1,489,552	124,638	....	138,374
1883	3,045	11,509	852,333	70,981	734	83,224
1884	4,780	16,685	126,043	9,576	4,666	30,927
1885	6,840	22,824	101,685	7,270	4,991	35,085
December 31—						
1886	26,620	49,455	917,229	75,192	13,526	138,173
1887	4,700	17,286	136,670	9,017	16,789	43,092
1888	4,560	18,034	62,234	4,270	19,098	41,402
1889	26,760	73,802	879,785	44,049	35,732	153,583
1890	77,360	195,113	3,295,584	126,291	23,587	344,991
1891	115,820	149,435	4,294,656	278,182	38,921	466,538
1892	18,380	41,186	12,494,335	669,549	166,794	877,529
1893	980	1,271	7,446,934	413,673	224,787	639,731
1894	....	5	3,607,050	144,074	99,406	243,485
1895	480	1,008	3,060,805	153,175	50,051	204,234
1896	41,500	47,408	20,260,169	1,013,620	51,001	1,112,029
1897	165,200	211,350	28,490,662	1,356,538	71,021	1,638,909
1898	210,400	299,870	20,998,413	1,033,959	138,165	1,471,994
1899	503,940	725,944	13,509,316	742,521	143,232	1,611,697
1900	751,100	1,133,663	44,820,915	2,217,693	99,288	3,450,644

An analysis of the exports of metal and of ore during the years 1899 and 1900 by ports of shipment and by countries of destination is of interest.

Exports of zinc ore by customs districts during 1899 and 1900.

Customs district.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
New York	14,075	$400,159	15,187	$445,622
Philadelphia	3,760	109,750	10,209	300,850
Galveston	5,847	197,840	2,273	70,844
New Orleans	439	15,365	9,150	294,684
Newport News	22	550		
Puget Sound	54	2,280		
Detroit			349	10,300
Huron			364	10,713
All other districts			23	650
Total	24,197	725,944	37,555	1,133,663

Two important groups may be distinguished, that of the Atlantic coast ports, from which the high-grade ores of New Jersey are shipped, and that of the Gulf ports, from which zinc ore, mined in the Joplin Galena district and in Colorado, is forwarded to foreign smelters. Both groups display an important increase in 1900.

The following table shows the destination of the ore exports:

Exports of zinc ore by countries during 1899 and 1900.

Country.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
Belgium	5,636	$189,672	11,280	$361,323
Netherlands	18,047	516,724	25,375	745,750
Germany	10	339		
United Kingdom	450	16,929	161	4,830
Canada	54	2,280	736	21,663
Mexico			3	97
Total	24,197	725,944	37,555	1,133,663

It will be observed by a comparison of these figures with those presented in the table of exports of ore by customs districts that practically all the ore exported from Atlantic ports went to the Netherlands, of course in transit to Germany and Belgium, and that the ore shipped from Gulf ports went to Belgium.

The exports of spelter by customs districts and by countries of destination are exhibited in the following tables:

Exports of zinc by customs districts during 1899 and 1900.

Customs district.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*	
New York	939,462	$61,438	1,897,004	$109,910
Philadelphia			5,017	315
Norfolk and Newport News			768,213	45,593
Baltimore			2,354,186	121,113
Galveston	5,466,725	318,192	19,761,628	1,011,694
New Orleans	6,624,532	336,591	17,918,915	834,457
Detroit	302,390	16,176	317,972	16,945
Huron	148,375	8,280	416,447	19,114
All other districts	27,832	1,844	1,363,195	58,552
Total	13,509,316	742,521	44,802,577	2,217,693

Nearly all of the zinc exported from Atlantic ports is the high-grade spelter of New Jersey, Pennsylvania, and Virginia, as is shown by the valuations. The Western spelter is shipped via Gulf ports, a small quantity going via Detroit and Huron to the Canadian market.

The destination of the exports of zinc is shown in the following table:

Exports of zinc, by countries, during the calendar years 1899 and 1900.

Country.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*	
Belgium	226,500	$11,325	4,195,509	$189,838
France	932,166	46,858	5,712,129	279,215
Germany	12,249	702	65,669	3,543
Netherlands	12,560	806	615,003	31,723
Russia, Baltic and White Seas	224,000	13,440		
United Kingdom	11,541,072	636,636	33,378,240	1,669,950
Canada	458,140	24,978	746,744	36,824
All other countries	102,629	7,776	89,283	6,600
Total	13,509,316	742,521	44,802,577	2,217,693

The United Kingdom takes the bulk of our spelter, being at all times the heaviest consumer of foreign zinc.

PRICES.

In January the market opened easy, under the influence of pressure of spelter in second hands, the price being 4.50 cents. After relief had come values rose to 4.70 to 4.75 cents, the fact that smelters were holding meetings aiding the movement. February, however, brought some weakness and somewhat irregular fluctuations, due to the purchases for export and their sympathetic effect upon the European markets, the price touching 4.55 cents. Additional purchases for Europe early in March relieved our markets and caused a recovery to 4.70 cents. Again a decline followed, checked by additional exports.

The dullness early in April showed a disposition to pass away when the staggering blow to the iron industry by the heavy drop in the prices of wire in the middle of the month put a stop to all trading in spelter. May was exceedingly dull, the closing of the La Salle works through a strike having no strengthening effect on the market. The condition of the industry again induced unsuccessful efforts to bring the smelters together, but the decline would not be stayed and prices receded to 4.15 cents, New York. July brought a slight hardening, followed by renewed weakness, which threatened labor troubles at La Harpe only temporarily dispelled. August was a dull month, the price falling off steadily. Efforts to consolidate the zinc-smelting interests continued, and in September options had been secured on all but two of the Western plants. The approaching Presidential election caused general apathy in the spelter trade, but in October purchasing on quite a large scale developed, which, in the first part of November, became general, and lifted prices to 4.30 cents, New York. Europe, however, did not respond, and values crumbled during December, returning close to the old basis of 4 cents, New York, for good Western brands.

The following table summarizes the prices of spelter since 1875:

Price of common Western spelter in New York City, 1875 to 1900.

[Cents per pound; figures in parentheses are combination prices.]

Year.	January.		February.		March.		April.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1875	6.75	6.37	6.67	6.25	6.50	6.20	(7)	6.50
1876	(7.60)	7.40	(7.75)	7.50	(7.75)	7.62	(8)	7.60
1877	6.50	6.25	6.62	6.50	6.50	6.37	6.37	6.25
1878	5.75	5.50	5.62	5.25	5.62	5.25	5.25	5
1879	4.50	4.25	4.62	4.40	4.62	4.37	4.75	4.25
1880	6.50	5.87	6.75	6.37	6.75	6.50	6.50	6.12
1881	5.25	4.87	5.25	5.12	5	4.87	5.12	4.75
1882	6	5.75	5.75	5.62	5.62	5.37	5.50	5.25
1883	4.62	4.50	4.62	4.50	4.75	4.62	4.75	4.60
1884	4.37	4.20	4.40	4.25	4.60	4.40	4.65	4.50
1885	4.50	4.12	4.30	4.25	4.30	4.12	4.30	4.12
1886	4.50	4.30	4.55	4.30	4.60	4.50	4.60	4.50
1887	4.60	4.50	4.60	4.40	4.60	4.40	4.65	4.45
1888	5.37	5.20	5.35	5.25	5.25	4.87	4.87	4.60
1889	5	5	5	4.90	4.87	4.70	4.65	4.65
1890	5.45	5.35	5.35	4.20	5.20	5	5	4.90
1891	6	5.25	5.25	5	5.10	5	5.10	4.90
1892	4.70	4.60	4.60	4.55	4.60	4.50	4.80	4.60
1893	4.35	4.30	4.30	4.25	4.25	4.20	4.50	4.30
1894	3.60	3.50	4	3.60	3.85	3.80	3.75	3.50
1895	3.35	3.20	3.20	3.10	3.20	3.15	3.30	3.25
1896	4.05	4	4.15	4	4.15	4.10	4.20	4.05
1897	4.10	3.90	4.10	4	4.15	4.10	4.15	4.10
1898	4	3.90	4.10	3.90	4.25	4.15	4.30	4.15
1899	5.70	5.15	6.50	5.70	6.50	6.25	6.80	6.20
1900	4.75	4.50	4.75	4.55	4.70	4.50	4.75	4.55

Price of common Western spelter in New York City, 1875 to 1900—Continued.

Year.	May.		June.		July.		August.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1875	(7.25)	7.15	(7.25)	7.15	(7.35)	7.25	(7.25)	7.10
1876	(8)	7.75	(8)	7.25	7.25	7.12	7.25	7
1877	6.25	6	6.12	5.87	5.87	5.62	5.90	5.80
1878	5	4.62	4.62	4.25	4.75	4.50	4.87	4.50
1879	4.50	4.25	4.37	4.12	4.75	4.37	5.62	4.80
1880	6	4.62	5.50	5.12	5	4.87	5.25	4.87
1881	5	4.87	5	4.75	5	4.75	5.12	5
1882	5.62	5.25	5.37	5.25	5.37	5.12	5.50	5.12
1883	4.75	4.50	4.62	4.37	4.50	4.30	4.40	4.30
1884	4.60	4.45	4.60	4.45	4.55	4.45	4.62	4.52
1885	4.25	4.10	4.10	4	4.40	4.10	4.60	4.40
1886	4.60	4.40	4.40	4.35	4.40	4.30	4.40	4.30
1887	4.65	4.45	4.65	4.50	4.50	4.50	4.60	4.55
1888	4.65	4.60	4.60	4.50	4.55	4.50	4.87	4.50
1889	4.85	4.62	5	5	5.10	5	5.20	5.15
1890	5.45	5	5.60	5.35	5.60	5.40	5.55	5.40
1891	4.90	4.85	5.10	4.90	5.10	5.05	5.10	5
1892	4.90	4.80	4.90	4.80	4.85	4.70	4.70	4.65
1893	4.40	4.20	4.25	4.15	4.15	3.90	3.90	3.55
1894	3.55	3.45	3.50	3.40	3.50	3.45	3.45	3.40
1895	3.65	3.30	3.75	3.30	3.85	3.70	4.20	4
1896	4.15	4	4.15	4	4.10	3.90	3.90	3.65
1897	4.20	4.10	4.25	4.15	4.30	4.20	4.35	4.25
1898	4.30	4.10	5.15	4.30	4.80	4.45	4.75	4.45
1899	7	6.75	6.75	6.15	6.25	6	6	5.30
1900	4.55	4.50	4.40	4.15	4.25	4.15	4.15	4.10

Year.	September.		October.		November.		December.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1875	(7.25)	7.10	(7.40)	7.15	(7.40)	7.15	(7.40)	7.15
1876	7.12	6.80	6.75	6.62	6.62	6.37	6.50	6.37
1877	5.87	5.75	5.90	5.70	5.87	5.62	5.75	5.50
1878	4.87	4.75	4.82	4.50	4.75	4.50	4.37	4.25
1879	6	5.62	6.37	6	6.25	5.87	6.25	6
1880	5.12	4.75	5	4.87	4.90	4.65	4.75	4.65
1881	5.25	5	5.37	5.25	5.87	5.50	6	5.87
1882	5.37	5.12	5.37	5.12	5.12	4.87	4.87	4.50
1883	4.50	4.40	4.45	4.35	4.40	4.37	4.37	4.35
1884	4.62	4.50	4.55	4.40	4.40	4.30	4.25	4
1885	4.62	4.50	4.62	4.50	4.60	4.45	4.60	4.45
1886	4.40	4.25	4.30	4.25	4.30	4.25	4.50	4.35
1887	4.65	4.60	4.65	4.50	4.80	4.52	5.87	5
1888	5.12	4.75	5.12	4.87	5.12	4.87	5.12	4.87
1889	5.15	5.10	5.15	5.10	5.25	5.05	5.35	5.30
1890	5.65	5.50	6	5.65	6.10	5.90	6	5.90
1891	5	4.85	5.15	4.95	4.90	4.75	4.75	4.65
1892	4.65	4.50	4.50	4.35	4.40	4.35	4.40	4.35
1893	3.75	3.65	3.70	3.55	3.85	3.60	3.80	3.70
1894	3.50	3.40	3.50	3.37	3.40	3.35	3.35	3.25
1895	4.35	4.15	4.20	3.90	3.80	3.45	3.50	3.40
1896	3.70	3.60	3.75	3.65	4.25	3.75	4.25	4.15
1897	4.35	4.25	4.30	4.15	4.25	3.90	3.90	3.75
1898	4.82½	4.70	5.15	4.82½	5.25	5.15	5.30	4.90
1899	5.75	5.20	5.50	5.15	5	4.50	4.70	4.55
1900	4.10	4.05	4.15	4.05	4.30	4.10	4.25	4.05

THE WORLD'S PRODUCTION.

Messrs. Henry R. Merton & Co., Limited, of London, on the basis of detailed reports, make the production of spelter in Europe as follows:

Production of zinc in Europe from 1894 to 1900.

[Long tons.]

Country or district.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Rhine, Belgium, and Holland.	152,420	172,135	179,730	184,455	188,815	189,955	186,320
Silesia	91,145	94,015	95,875	94,045	97,670	98,590	100,705
Great Britain	32,065	29,495	24,880	23,550	27,940	31,715	29,830
Austria	8,580	8,355	9,255	8,185	7,115	7,190	6,975
France and Spain	21,245	22,895	28,450	32,120	32,135	32,955	30,620
Poland	5,015	4,960	6,165	5,760	5,575	6,225	5,875
Total	310,470	331,855	344,355	348,115	359,250	366,630	360,325
United States	67,257	80,076	72,767	89,268	103,061	115,224	110,612
Total world's production.	377,727	411,931	417,122	437,383	462,311	481,854	470,937
United States percentage of world's production	17.8	19.4	17.4	20.4	22.3	23.9	23.5

The large producers of spelter in Europe are the following, with the product named, in long tons: Vieille-Montagne, 68,815 tons, Stolberg Company, 17,975 tons, and Société Prayon, 10,600 tons, in the Rhine-Belgian district—Schlesische Actien-Gesellschaft, 26,920 tons; G. von Giesche's Erben, 24,430 tons; Fürst Hohenlohe, 22,200 tons; and Graf H. Henckel von Donnersmarck, 15,860 tons, in Silesia, and the Société Asturienne, 23,300 tons, in Spain and France.

The condition of the zinc industry of Europe is well reflected in the annual report of the Société Anonyme des Mines et Fonderies de Zinc de la Vieille-Montagne, of Angleur, Belgium, which produces more than one-sixth of all the spelter made in Europe. The general manager, Saint-Paul de Sincay, calls attention to two striking developments of the year 1900—that of the increase in the importations of American spelter and that of the extraordinary rise in the price of coal in Belgium.

On the former point he says: "The importations of American spelter were, on an average, 5,200 metric tons per annum during the last ten years, and 9,000 tons per annum during the last four years, while in 1900 they reached 20,326 metric tons. This is the cause of the stocks which depress values and of the uneasiness in the European markets. Let it be hoped that the steps taken by the European smelters to reach an agreement similar to that which has governed the production for ten years may lead to success some day, and that the American smelters will make such arrangements possible by meeting our views with confidence.

"It has been sufficiently proven by the statistics that both markets are absolutely interdependent, and that a decline in the European market can not be started without inconvenience to the American market.

"Thanks to the relations marked by courtesy and friendship created during his recent voyage to the United States, and thanks to the conviction secured that it is possible to treat with serious and enlightened parties, the general manager hopes to follow out the negotiations whose aim it is to guard the general interests of the industry."

On the second point—the high price of coal—the following figures are submitted. During 1896 the consumption of all the plants was 430,491 tons, which, at an average price of 10.52 francs per ton, cost 4,529,087 francs. In 1900 the consumption was 494,945 tons, which, at an average price of 17.11 francs, cost 8,469,377 francs. The increase in the cost of coal over 1899 was 2,055,211 francs, while the total share capital is only 9,000,000 francs. The Belgian plants suffered most. From 1896 to 1900, the average cost of coal at the smelter rose from 9.96 francs to 18.19 francs per metric ton. At the German works of the company the increase was from 10.13 francs to 12.41 francs, while at the French plant it advanced from 9.62 francs to 11.63 francs. It appears that some of the contracts for coal renewed at the end of 1900 were even on the basis of 22 francs, or $4.25 per metric ton.

The average price of spelter was 503.20 francs per ton in 1900, as compared with 616.50 francs in 1899. The Vieille-Montagne Company produced 69,846 tons of spelter, the sheet mills making 66,122 tons, while the zinc-white plants made 9,111 tons.

The annual report shows that there were distributed in dividends 3,375,000 francs; there were paid in the form of bonus to the management 427,890 francs, and to the directors 106,972 francs.

The Escombrera-Bleyberg Company, which has mines in Spain and smelting plants in that country and in Belgium, in the year 1900 produced 4,992 tons of spelter, 313 tons of zinc dust, 8,304 tons of lead, and 10,402 kilograms of silver. The gross profit was 1,695,085 francs, out of which were paid 50 francs per share, or 1,000,000 francs, in dividends. In the previous year the gross profits were 493,662 francs larger.

ZINC WHITE.

The production of zinc white from the ore increased from 40,146 short tons in 1899 to 48,840 short tons in 1900.

ALUMINUM AND BAUXITE.

By Joseph Hyde Pratt.

ALUMINUM.

PRODUCTION.

The entire production of aluminum in the United States is by the Pittsburg Reduction Company, which controls the Hall patents in the United States, and it is all obtained from the mineral bauxite. Although the demand for aluminum is greater than the supply, this is one of the exceptional cases where the price has not been increased, but, on the contrary, there has been a slight reduction. The production in 1900 was about 6,000,000 pounds, as compared with 5,200,000 in 1899, this increase being due to the enlargement of the plant of the Pittsburg Reduction Company. In the following table is shown the production of aluminum in the United States for each year since the beginning of the industry in 1883.

Production of aluminum in the United States from 1883 to 1900.

Year.	Quantity.	Year.	Quantity.
	Pounds.		*Pounds.*
1883	83	1893	333,629
1884	150	1894	550,000
1885	283	1895	920,000
1886	3,000	1896	1,300,000
1887	18,000	1897	4,000,000
1888	19,000	1898	5,200,000
1889	47,468	1899	5,200,000
1890	61,281	1900	6,000,000
1891	150,000	Total	24,062,779
1892	259,885		

IMPORTS.

In the first table below are given the amounts and value of the aluminum imported into the United States from 1870 to 1890, and in the second table are given the value and amounts of crude and manufactured aluminum which has been imported from 1891 to 1900.

Aluminum imported and entered for consumption in the United States from 1870 to 1890.

Year ending—	Quantity.	Value.	Year ending—	Quantity.	Value.
June 30—	*Pounds.*		June 30—	*Pounds.*	
1870	....	$98	1881	517.10	$6,071
1871	....	341	1882	556.50	6,450
1872	....	....	1883	426.25	5,070
1873	2.00	2	1884	595.00	8,416
1874	683.00	2,125	1885	439.00	4,736
1875	434.00	1,355	Dec. 31—		
1876	139.00	1,412	1886	452.10	5,369
1877	131.00	1,551	1887	1,260.00	12,119
1878	251.00	2,978	1888	1,348.53	14,086
1879	284.44	3,423	1889	998.00	4,840
1880	340.75	4,042	1890	2,051.00	7,062

Imports of crude and manufactured aluminun from 1891 to 1900.

Calendar year.	Crude.		Leaf.		Plates, sheets, bars, and rods.		Manufactures.	Total value.
	Quantity.	Value.	Packs of 100.	Value.	Quantity.	Value.		
	Pounds.				*Pounds.*			
1891	3,922	$6,266	10,033	$1,135	....	....	$1,161	$8,562
1892	43	51	11,540	1,202	....	....	1,036	2,289
1893	7,816	4,683	18,700	1,903	....	....	1,679	8,265
1894	5,306	2,514	10,780	1,210	....	....	386	4,110
1895	25,294	7,814	6,610	646	....	....	1,841	10,301
1896	698	591	4,657	523	....	....	2,365	3,479
1897	1,822	1,082	4,260	368	4,424	$3,058	221	4,729
1898	60	30	2,000	174	18,442	8,991	4,675	13,870
1899	53,622	9,425	693	112	4,254	2,413	5,303	17,253
1900	256,559	44,455	1,103	102	4,264	2,776	3,111	50,444

BAUXITE.

Until last year there was a constant increase in the production of bauxite from the time this mineral first began to be mined in 1889, with the exception of 1893, when the amount produced dropped off slightly. In 1900 there were produced 23,184 long tons of bauxite, valued at $89,676, as compared with 35,280 long tons, valued at $125,598, in 1899, indicating a decrease in 1900 of 12,096 long tons in amount and of $35,922 in value.

The production of bauxite was confined to Georgia and Alabama until 1899, when Arkansas became one of the producing States. In the following table there is given the production and value of bauxite for each year since 1889:

Production of bauxite in the United States from 1889 to 1900, by States.

Calendar year.	Georgia.	Alabama.	Arkansas.	Total.	Value.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	
1889	728	....	....	728	$2,366
1890	1,844	....	....	1,844	6,012
1891	3,301	292	....	3,593	11,675
1892	5,110	5,408	....	10,518	34,183
1893	2,415	6,764	....	9,179	29,507
1894	2,050	9,016	....	11,066	35,818
1895	3,756	13,313	....	17,069	44,000
1896	7,313	11,051	....	18,364	47,338
1897	7,507	13,083	....	20,590	57,652
1898	....	....	....	25,149	75,437
1899	15,736	14,499	5,045	35,280	125,598
1900	*a*	*b* 19,739	3,445	23,184	89,676

a Included with Alabama. *b* Includes Georgia.

The foregoing figures for 1900 differ slightly from the statement of shipments compiled by Mr. William G. Neilson, president of the Republic Mining and Manufacturing Company. Mr. Neilson's figures show the shipments from the Georgia-Alabama district to have been 19,841 long tons, with 3,565 tons from Arkansas.

PLATINUM.

PRODUCTION.

The platinum produced in the United States during 1900 was all obtained from gold placer deposits, chiefly those in Trinity and Shasta counties, Cal., and amounted to 400 ounces, valued at $2,500. Ever since this metal began to be found in the gold placer deposits of California miners and prospectors have hoped to obtain it in quantity, but thus far it has been obtained only as a secondary product in gold mining. Since 1880, the first year in which a record was obtained, the largest amount of platinum produced in one year was in 1890, when 600 ounces, valued at $2,500, were produced. In 1898, although only 225 ounces were produced, they were valued at $3,375. This variation in the value is due to the quality of the crude grains of platinum.

The demand that arose during 1898 for the metal osmium, which was wanted for the manufacture of a new incandescent light, led to a thorough examination by Dr. David T. Day of the localities where platinum had been found or was reported to occur, this being done principally to determine whether the metal desired was contained in the crude platinum found in these localities. During this investigation samples of heavy sand were examined from placer mines in California, Oregon, Washington, Idaho, Montana, and Alaska. As a result of this examination, platinum has been shown to occur in minute quantities at many of the placer mines in California and Oregon, and at a few places in Idaho, Montana, and Alaska. It was only in the placer deposits in Plumas, Shasta, Trinity, and Siskiyou counties, Cal., that the metal was found in quantity.

It is a noteworthy fact that chromite is nearly always found associated with the platinum, and that in many of the mountain ranges in which the streams have their head there are extensive serpentine formations which contain chromite. Wherever platinum has been found in place it has been associated with chromite and disseminated through a basic magnesian rock of which serpentine is a common alteration product. It is not unreasonable to suppose that platinum will be found in California and Oregon "in situ" associated with chromite in the basic magnesian formations of these States. Again, it is not improbable that platinum will be found in the eastern part of the United States in the basic magnesian rock peridotite, which occurs extensively developed in North Carolina, Georgia, Pennsylvania, and Maryland, and which has in nearly all cases chromite associated with it. Platinum in the form of sperrylite, a platinum arsenide, has been found in minute quantities at several places in the placers of Cowee Valley and Mason Valley, Macon County, N. C. There is, however, no authenticated record of any native platinum having been found in these States. Platinum was recently reported to have been found in the mines of the gold placer deposits at Esmeraldas, Ecuador. An analysis of this platinum showed the presence of 1.54 per cent of osmiridium.

As is seen from the following table, which shows the production of platinum in the United States since 1880, there has been but little added to the world's production of this metal:

Production of platinum in the United States since 1880.

Year.	Quantity.	Value. *a*	Year.	Quantity.	Value. *a*
	Ounces.			*Ounces.*	
1880	100	$400	1891	100	$500
1881	100	400	1892	80	550
1882	200	600	1893	75	517
1883	200	600	1894	100	600
1884	150	450	1895	150	900
1885	250	187	1896	163	944
1886	50	100	1897	150	900
1887	448	1,838	1898	225	3,375
1888	500	2,000	1899	300	1,800
1889	500	2,000	1900	400	2,500
1890	600	2,500			

a The chief variations in price have been due to the quality of the crude grains.

QUICKSILVER.

PRODUCTION.

The total amount of quicksilver produced in the United States in 1900 amounted to 28,317 flasks of 76½ pounds, valued at $1,302,586, as compared with 30,454 flasks, valued at $1,452,745, in 1899. In 1899 there was a steady advance in the price of quicksilver, in both the domestic and the export trade. January, 1900, opened with the price still advanced, having reached $52 per flask for domestic delivery and $47.50 for export. There was no advance over this in 1900, and in May the price began to decline and continued to do so steadily until December, when the quotations were $48 for domestic delivery and $45 for export. The average prices for the year were $50.05 for domestic and $46.38 for export, and these are the highest average prices obtained for quicksilver since 1890. These quotations are for the metal at San Francisco.

The production of quicksilver in the United States since 1880 is given in the following table, and the total production up to 1899, with the exception of 65 flasks from Oregon in 1887, was from California. The 1899 production represents 1,000 flasks from Texas, and in the 1900 are included 1,800 flasks from Texas and 200 flasks reported from Oregon.

Amount and value of quicksilver produced in the United States from 1880 to 1900.

[Flasks of 76½ pounds, net.]

Year.	Amount.	Value.	Year.	Amount.	Value.
1880	59,926	$1,797,780	1891	22,904	$1,036,386
1881	60,851	1,764,679	1892	27,993	1,245,689
1882	52,732	1,487,042	1893	30,164	1,108,527
1883	46,725	1,253,632	1894	30,416	934,000
1884	31,913	936,327	1895	36,104	1,337,131
1885	32,073	797,189	1896	30,765	1,075,449
1886	29,981	1,060,000	1897	26,648	993,445
1887	33,825	1,429,000	1898	31,092	1,188,627
1888	33,250	1,413,125	1899	30,454	1,452,745
1889	26,484	1,190,500	1900	28,317	1,302,586
1890	22,926	1,203,615			

As California has produced nearly all the quicksilver obtained in the United States, a table is given below showing the total product in that State from 1850 to 1900. In the half century covered by this table the grand total of production has amounted to 1,857,339 flasks of 76½ pounds net, which makes an average of 36,418 flasks per year. Of this amount one mine, the New Almaden, in Santa Clara County, Cal., has produced a little over 50 per cent. The greatest activity in the quicksilver mines of California was from 1875 to 1882, when there was produced an average of 64,000 flasks per year. Since 1882 the production has averaged only a little more than 30,000 flasks per year.

Total product of quicksilver in California from 1850 to 1900.

[Flasks of 76½ pounds, net.]

Year.	Production.	Year.	Production.	Year.	Production.
1850	7,723	1868	47,728	1886	29,981
1851	27,779	1869	33,811	1887	*a* 33,825
1852	20,000	1870	30,077	1888	33,250
1853	22,284	1871	31,686	1889	26,464
1854	30,004	1872	31,621	1890	22,926
1855	33,000	1873	27,642	1891	22,904
1856	30,000	1874	27,756	1892	27,993
1857	28,204	1875	50,250	1893	30,164
1858	31,000	1876	72,716	1894	30,416
1859	13,000	1877	79,395	1895	36,067
1860	10,000	1878	63,880	1896	30,765
1861	35,000	1879	73,684	1897	26,691
1862	42,000	1880	59,926	1898	31,092
1863	40,531	1881	60,851	1899	29,454
1864	47,489	1882	52,732	1900	26,317
1865	53,000	1883	46,725	Total	1,857,339
1866	46,550	1884	31,913		
1867	47,000	1885	32,073		

a Includes 65 flasks from Oregon.

The production of quicksilver in California for 1900 is given below by counties, permission to publish the production by mines having been withheld:

Production of quicksilver in California in 1900, by counties.

[Flasks of 76½ pounds, net.]

County.	Production.	Value.
Colusa	275	$1,500
Lake	3,165	154,345
Napa	8,724	403,500
San Benito	3,990	180,000
San Luis Obispo	515	23,886
Santa Clara	5,145	241,073
Sonoma	2,209	99,500
Trinity	2,294	105,982
Total	26,317	1,209,786

IMPORTS.

The amount of quicksilver imported into the United States during the last eight years has been inconsiderable as compared with the total production in this country, and this is what would naturally be expected in view of the fact that during this time about one-half of the total production has been exported. In the last three years there has been but a few pounds of quicksilver imported into the United States.

In the following table are shown the amount and value of the imports of quicksilver from 1867 to 1900:

Quicksilver imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	Quantity.	Value.	Year ending—	Quantity.	Value.
June 30—	*Pounds.*		June 30—	*Pounds.*	
1867	....	$15,248	1885	257,659	$90,416
1868	152	68	Dec. 31—		
1869	....	11	1886	629,888	249,411
1870	239,223	107,646	1887	419,934	171,431
1871	304,965	137,332	1888	132,850	56,997
1872	370,353	189,943	1889	341,514	162,064
1873	99,898	74,146	1890	802,871	445,807
1874	51,202	52,093	1891	123,966	61,355
1875	6,870	20,957	1892	96,318	40,133
1876	78,902	50,164	1893	41,772	17,400
1877	38,250	19,558	1894	7	6
1878	294,207	135,178	1895	15,001	7,008
1879	519,125	217,707	1896	305	118
1880	116,700	48,463	1897	45,539	20,147
1881	138,517	57,733	1898	81	51
1882	597,898	233,057	1899	131	83
1883	1,552,738	593,367	1900	2,616	1,051
1884	136,615	44,035			

EXPORTS.

As has just been stated, during the last eight years nearly one-half of the total production of quicksilver in the United States has been exported. Since 1880, when the records of the exports of quicksilver were first kept, the exports have usually greatly exceeded the imports, except during the years 1886 and 1890. In the following table the amount and value of quicksilver exported from the United States are given, the quantities being expressed in flasks of 76½ pounds, net. Nearly all the quicksilver exported is shipped from San Francisco.

Exports of quicksilver from the United States since 1880.

[Flasks of 76½ pounds, net.]

Year.	Quantity.	Value.	Year.	Quantity.	Value.
1880	37,210	$1,119,952	1891	3,714	$145,502
1881	35,107	1,025,299	1892	3,518	133,626
1882	33,875	988,454	1893	16,631	542,410
1883	30,072	808,353	1894	11,408	397,528
1884	7,370	199,685	1895	15,542	482,085
1885	6,802	209,753	1896	19,944	618,437
1886	8,091	204,956	1897	13,173	394,549
1887	11,394	441,112	1898	12,830	440,587
1888	10,684	406,899	1899	16,517	609,586
1889	5,111	213,717	1900	10,172	425,812
1890	2,069	93,192			

LITHIUM.

INTRODUCTION.

During the last year or two a considerable demand has arisen for lithium minerals which can be used as a source of lithium in the manufacture of lithium carbonate. This element has been classed among the rarer elements, but it has been shown in recent years to be rather widely distributed, occurring in minute quantities in many different rocks. There are, however, but few minerals that can be classified as lithium minerals, and in these the percentage of lithia (Li_2O) is not over 10, which would make the percentage of lithium not over 4.6.

SOURCES.

The two minerals that have been used as a source of lithium are lepidolite and spodumene.

Lepidolite, or lithium mica, is in part a metasilicate of aluminum with potassium and lithium, and varying amounts of fluorine and hydroxyl. It occurs commonly in scaly, granular masses, either coarse or fine, but is sometimes in cleavable plates and in aggregates of short prismatic crystals. It has a micaceous structure and a perfect basal cleavage, similar to the other members of the mica group. It varies in hardness from 2.5 to 4, and has a specific gravity of 2.8 to 2.9. It varies in color from rose-red, pinkish, grayish-white to white, and has a pearly luster. Its usual occurrence is in granite and gneiss, but more especially in pegmatitic dikes, where it is often associated with tourmaline, spodumene, garnet, and muscovite, with which it is sometimes in parallel position.

Spodumene is a metasilicate of aluminum and lithium, generally containing a little sodium, and its chemical composition is represented by the formula $LiAl_2\ (SiO_3)$. This mineral crystallizes in the monoclinic system in prismatic crystals that are often flattened and striated and furrowed. At times they are of enormous size, from 20 to 40 feet in length. It also occurs in large cleavable masses. It has a perfect prismatic cleavage, so that usually smooth, thin plates can be split off with a knife. It is brittle and has a hardness of 6.5 to 7 and a specific gravity of 3.13 to 3.2. In color it varies rather widely, from greenish-white, grayish-white, pink, yellow, yellowish-green to emerald-green, and it has a vitreous luster except on the cleavage surfaces, which are somewhat pearly. The yellowish-green to emerald-green spodumene is known as hiddenite, and the color is probably due to the small amount of chromium that it contains. It is found in granitic veins associated with tourmaline, beryl, garnet, lepidolite, triphylite, lithiapholite, etc.

Of these two minerals, lepidolite is the one that has been the chief source of lithia, but, as is seen in the following table, spodumene contains a considerably higher percentage of lithia and, where it occurs in quantity, should be the more valuable ore. There should be no more difficulty in extracting the lithia from the spodumene than from the lepidolite.

Analyses of spodumene and lepidolite.

Constituent.	Lepidolite.		Spodumene.	
	Paris, Me. *a*	Rumford, Me. *b*	Goshen, Mass. *c*	Branchville, Conn. *d*
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
SiO_2	50.39	51.52	63.27	64.25
Al_2O_3	28.19	25.96	23.73	27.20
Fe_2O_3		.31		
FeO			1.17	.20
MgO		.18	2.02	
CaO			.11	
MnO		.20	.64	
K_2O	12.34	11.01	1.45	Trace.
Na_2O		1.06	.99	.39
Li_2O	5.08	4.90	6.89	7.62
H_2O	2.36	1.95	.36	.24
F	5.15	5.80		
Total	103.51	101.89	100.63	99.90
Specific gravity	2.855		3.19	3.193

a Dana's Mineralogy, 1892, p. 624.
b Am. Jour. Sci., 3d series, Vol. XXXII, 1886, p. 356.
c Annals New York Acad. Sci., Vol. I, 1879, p. 322.
d Am. Jour. Sci., 3d series, Vol. XX, 1880, p. 259.

OCCURRENCE.

The largest deposits of lepidolite known in the United States are near Pala, in San Diego County, Cal. These deposits are now being extensively developed, principally by W. G. Rifenburg, and, while little lepidolite was shipped in 1900, regular shipments will have begun before the end of 1901. As exposed, the mineral is found composing a seam or vein 3 to 12 feet thick.

Lepidolite has also been found in some quantity at a number of localties in Maine—Hebron, Auburn, Rumford, and Paris. No mining has been done at these places for lepidolite, although tourmalines, which are found associated with it, are produced there. Not enough work has been done to determine whether there would be a sufficient quantity of lepidolite to make it profitable to mine for this mineral.

There are a number of localities where spodumene occurs in quantity. The most noted one, and probably the only one from which this mineral has been shipped as an ore of lithia, is at the Etta mine, in the Black Hills of South Dakota. There are a number of other mines, as the Bob Ingersoll and Harney Peak tin mine, in this general vicinity that contain large quantities of spodumene. These deposits occur in pegmatitic dikes, which were formerly worked for tin. Some ore has already been shipped from the Etta and Harney Peak mines, and preparations are being made to mine this mineral in considerable quantities during the present year.

At Branchville, Conn., spodumene occurs in a pegmatitic dike, in crystals that are often of very large size, embedded in quartz. This locality was formerly developed for feldspar, but has not been worked for a number of years. The spodumene is known to occur in considerable quantity; and it is not improbable that this locality, upon further development, would show the spodumene to occur in sufficient quantity to be mined as a lithia ore.

It has also been found at Chesterfield, Sterling, Goshen, and Huntington, Mass., but it is not known in what quantity it occurs at these localities.

It is thus seen that there are some large deposits of these minerals in the United States, and it can not be doubted that proper search would reveal other deposits that would furnish these minerals in quantity.

There are a number of other minerals that contain lithium, some of which occur in considerable quantity. They may be described briefly as follows:

Petalite is a lithium-aluminum silicate in which a part of the lithium is replaced by sodium. It is a mineral crystallizing in the monoclinic system, but is usually in foliated cleavable masses, the cleavage being a perfect basal one. It is brittle and has a hardness of 6 to 6.5. In color it varies from colorless to white and gray, and it has a vitreous luster except on the cleavage face, which is pearly.

Zinnwaldite is similar to lepidolite, but contains a considerable percentage of ferrous oxide.

Triphylite and lithiophilite crystallize in the orthorhombic system, but crystals are rare and they are usually in cleavable to compact masses. They have a perfect basal cleavage and a hardness of 4.5 to 5. In chemical composition they are phosphates of lithium with iron and manganese, the triphylite containing a large percentage of ferrous oxide (FeO) and a small percentage of manganese oxide (MnO), while the lithiophilite contains a smaller percentage of ferrous oxide, but a corresponding larger percentage of manganese oxide, the composition being represented by the formulas $Li(FeMn)PO_4$ and $Li(MnFe)PO_4$, respectively. The color of these minerals varies with their composition. In the triphylite it is greenish-gray to bluish, and in the lithiophilite it is salmon color, honey yellow to light clove brown. The percentage of lithia in these minerals varies from 8 to 9.5.

At Branchville, Fairfield County, Conn., lithiophilite has been found in considerable quantity associated with spodumene in the pegmatitic vein already referred to under spodumene. Triphylite has been found at Norwich, Mass., and also with spodumene at Peru, Me.

Amblygonite is a mineral crystallizing in the triclinic system, the crystals being usually large and coarse. The mineral is more commonly in columnar to compact masses which show a perfect basal cleavage with pearly luster. It is brittle and is 6 in hardness. In color it varies from white to greenish, yellowish, bluish, and grayish-white, and it has a vitreous luster. In chemical composition it is a fluo-phosphate of aluminum and lithium represented by the formula $Li(AlF)PO_4$.

USES.

The salts of lithium and not the metal itself are used in the arts. It is on the market for the most part in the form of lithium carbonate. The principal use of the lithium salts is probably in the preparation of mineral waters, which are used extensively for medicinal purposes. There are some of these lithia waters that occur as natural springs, but a great many that are sold are artificial. A new form of lithia that has been put on the market in recent years is that of the effervescing lithia tablets.

While the separation of lithium can not be made by what is ordinarily considered a simple process, it does not offer any serious difficulties. Briefly, the operation consists of fusing the mineral with carbonates and sulphates so as to decompose them and convert the lithia into lithium sulphate. The alkali sulphates are readily dissolved and are then converted into chlorides. The lithium chloride can be easily separated from the mixed chlorides, but it is not in a pure condition, and must be purified by converting it into the carbonate.

While this process for the separation and purification of the lithium from its ores is a long and rather expensive one, the value of the lithium carbonate should make this industry a profitable one. The industry, however, is limited and the total amount of lithium carbonate used is variously estimated from less than 50,000 pounds to over 150,000 per year. Most of it is now being manufactured in Germany. The German manufacturers have had their attention called to American deposits, and nearly all, if not all, of the lepidolite and spodumene mined as ores of lithia have been shipped to Germany. The contracts on hand at the present time for these minerals from the Black Hills, S. Dak., and Pala, Cal., are with German chemical manufacturers.

Thus far the American chemical manufacturers have made little attempt to develop the industry in this country, and our lithium minerals are now being bought by the German manufacturers, who return to us the lithium carbonate, which was quoted in New York in 1900 at $4.20 per pound. The increase in the use of the lithium carbonate is probably due to the extensive manufacture of the effervescing lithia tablets. This has caused considerable inquiry as to sources of lithia minerals. It may be the means of interesting some of the American chemical manufacturers in the preparation of lithium carbonate from the lepidolite and spodumene obtainable in this country

PRODUCTION.

No definite statement can be made regarding the amount of lepidolite and spodumene produced during 1900. In San Diego County, Cal., 440 tons were mined. In addition to this a considerable amount was obtained for experimental purposes and was shipped from different places in small lots. In all there were probably between 75 and 100 tons so shipped. There is every reason to believe that there will be a considerable production during 1901.

NICKEL AND COBALT.

PRODUCTION.

The only nickel and cobalt produced in the United States during 1900 were by-products from the smelting of lead ores at Mine Lamotte, Missouri. The matte containing the nickel and cobalt was refined in New York and Camden, N. J., and from 75,220 pounds of matte there were obtained 9,715 pounds of metallic nickel and 6,471 pounds of cobalt oxide. This is a decrease of 12,826 pounds in the production of nickel as compared with that of 1899, which was 22,541 pounds, and there was also a decided falling off in the production of cobalt oxide, which was 10,230 pounds in 1899, or 3,759 pounds more than in 1900.

The nickel deposits in Oregon, which are reported to be extensive, continue to attract attention, and efforts are being made to develop them. These deposits are located in Rye Valley, about 20 miles from Baker City, Baker County, and on Dixie Creek, near the head of the John Day River, Grant County. No actual mining has been done at the mines, although in addition to the development work being carried on experiments looking for the best method for extracting the nickel from the ores are being made. Nickel has been found near Sedro and Woolley, Wash., but no work has been done to determine whether or not it exists in quantity. A nickeliferous pyrrhotite has been found about 15 miles southeast of Mount Idaho, in Idaho County, Idaho, and preparations are being made to develop the property in order to determine the extent of the deposit and whether it can be profitably mined. It is reported that the old nickel mine near Columbia, Lancaster County, Pa., is to be reopened. This mine formerly produced considerable nickel, the ore being a nickeliferous pyrrhotite.

In the following table are given the production and value of nickel from 1887 to 1900. The value of the nickel continues to be high, and the metal is reported scarce at 60 cents per pound for ton lots.

Production of nickel from domestic ores in the United States during the years 1887 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Pounds.			*Pounds.*	
1887	205,566	$133,200	1894	9,616	$3,269
1888	204,328	127,632	1895	10,302	3,091
1889	252,663	151,598	1896	17,170	4,464
1890	223,488	134,093	1897	23,707	7,823
1891	118,498	71,099	1898	11,145	3,956
1892	92,252	50,739	1899	22,541	8,566
1893	49,399	22,197	1900	9,715	3,886

In the table below is given the production of cobalt oxide in the United States from domestic ores from 1869 to 1900:

Production of cobalt oxide in the United States, 1869 to 1900.

[Pounds.]

Year.	Quantity.	Year.	Quantity.	Year.	Quantity.
1869	811	1880	7,251	1891	7,200
1870	3,854	1881	8,280	1892	7,869
1871	5,086	1882	11,653	1893	8,422
1872	5,749	1883	1,096	1894	6,763
1873	5,128	1884	2,000	1895	14,458
1874	4,145	1885	8,423	1896	10,700
1875	3,441	1886	8,689	1897	19,520
1876	5,162	1887	*a* 18,340	1898	6,247
1877	7,328	1888	8,491	1899	10,230
1878	4,508	1889	13,955	1900	6,471
1879	4,376	1890	6,788		

a Including cobalt oxide in ore and matte.

If the recent act passed by the Parliament of the Dominion of Canada (chapter 17 of 60–61 Victoria) giving the Governor-General the power to levy an export duty on copper-nickel products in Ontario is enforced, it will greatly react in favor of the development of the nickel deposits in the United States, for this country looks to Sudbury, Ontario, for the greater part of its supply of nickel. The export duty as passed by Parliament was as follows:

On nickel contained in matte or in the ore or in any crude or partially manufactured state, and upon copper contained in any matte or ore which also contains nickel, when exported from Canada, upon such nickel an export duty not exceeding 10 cents per pound, and upon such copper an export duty not exceeding 2 cents per pound.

Thus far no proclamation has ever been issued by the Governor-General bringing this law into force, and consequently its provisions are not yet in effect.

The legislature of Ontario passed an act amending the mines act (chapter 13 of 63 Victoria) and providing for the imposition of export duties, as follows:

For ores of copper, $2 per ton, or $25 per ton of metal contents if partly treated or reduced; for ores of nickel, $10 per ton, or $60 per ton of nickel contents if partly treated or reduced; for ores of copper and nickel, $7 per ton, or $20 and $50, respectively, per ton of metal contents of copper and nickel if partly treated or reduced.

These duties were not to go into force until proclaimed by the lieutenant-governor in council, but as no such proclamation has been issued they are still of no effect.

This action of Parliament was due to the fact that all the nickel-copper matte from the Sudbury mines was exported to the United States, where it was refined, and it was expected that this act would force the refining of the matte in Canada. There are, however, many unfavorable conditions existing which will practically prevent the refining of this matte in Canada. Elaborate experiments to this end have been made by the Canadian Copper Company, but no practical way has been found.

IMPORTS AND EXPORTS.

In the tables below are given the amount and value of cobalt oxide and nickel imported into the United States since 1868:

Cobalt oxide imported and entered for consumption in the United States, 1868 to 1900.

Year ending—	Oxide.		Year ending—	Oxide.	
	Quantity.	Value.		Quantity.	Value.
June 30—	*Pounds.*		Dec. 31—	*Pounds.*	
1868		$7,208	1886	19,366	$29,543
1869		2,330	1887	26,882	39,396
1870		5,019	1888	27,446	46,211
1871		2,766	1889	41,455	82,332
1872		4,920	1890	33,338	63,202
1873	1,480	4,714	1891	23,643	43,188
1874	1,404	5,500	1892	32,833	60,067
1875	678	2,604	1893	28,884	42,694
1876	4,440	11,180	1894	24,020	29,857
1877	19,752	11,056	1895	36,155	39,839
1878	2,860	8,693	1896	27,180	36,212
1879	7,531	15,208	1897	24,771	34,773
1880	9,819	18,457	1898	33,731	49,245
1881	21,844	13,837	1899	46,791	68,847
1882	17,758	12,764	1900	54,073	88,651
1883	13,067	22,323			
1884	25,963	43,611			
1885	16,162	28,138			

Nickel imported and entered for consumption in the United States from 1868 to 1900.

Year ending—	Nickel.		Nickel oxide, alloy of nickel with copper, and nickel matte.		Total value.
	Quantity.	Value.	Quantity.	Value.	
June 30—	*Pounds.*		*Pounds.*		
1868		$118,058			$118,058
1869		134,327			134,327
1870		99,111			99,111
1871	17,701	48,133	4,438	$3,911	52,044
1872	26,140	27,144			27,144
1873	2,842	4,717			4,717
1874	3,172	5,883			5,883
1875	1,255	3,157	12	36	3,193
1876			156	10	10
1877	5,978	9,522	716	824	10,346
1878	7,486	8,837	8,518	7,847	16,684
1879	10,496	7,829	8,314	5,570	13,399
1880	38,276	25,758	61,869	40,311	66,069
1881	17,933	14,503	135,744	107,627	122,130
1882	22,906	17,924	177,822	125,736	143,660
1883	19,015	13,098	161,159	119,386	132,484
1884			*a* 194,711	129,733	129,733
1885			105,603	64,166	64,166
Dec. 31—					
1886			277,112	141,546	*b* 141,546
1887			439,037	205,232	*c* 205,232
1888			316,895	138,290	*d* 138,290
1889			367,288	156,331	*e* 156,331
1890	*f* 566,571	260,665	247,299	115,614	376,279
1891	355,455	172,476	*g* 10,245,200	148,687	321,163
1892			*h* 4,487,890	428,062	428,062
1893			*h* 12,427,986	386,740	386,740
1894			*h* 9,286,733	310,581	310,581
1895			*h* 20,355,749	629,910	629,910
1896			*h* 23,718,411	620,425	620,425
1897			*h* 27,821,232	781,483	781,483
1898			*h* 60,090,240	1,534,262	1,534,262
1899			*h* 44,479,841	1,216,253	1,216,253
1900			*i* 51,340,000	1,183,884	1,183,884

a Including metallic nickel.

b Including $465 worth of manufactured nickel.

c Including $879 worth of manufactured nickel.

d Including $2,281 worth of manufactured nickel.

e Including $131 worth of manufactured nickel.

f Classified as nickel, nickel oxide, alloy of any kind in which nickel is the element or material of chief value.

g Classified as nickel and nickel matte.

h Includes all nickel imports except manufactures; nearly all of this is nickel in matte from Canada, containing about 20 per cent nickel.

i Ore and matte; in addition 455,188 pounds of nickel, nickel oxide, etc., were imported, valued at $139,786.

Considering that the greater part of the nickel matte produced at the Sudbury, Canada, mines is sent to this country to be refined, it is only natural that there should be considerable nickel exported from the United States. In the following table are given the amount and value of the nickel exported from the United States since 1894:

Exports of nickel oxide and matte from the United States from 1894 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Pounds.			*Pounds.*	
1894 *a*	1,235,588	$247,568	1898	5,657,620	$1,359,609
1895	1,061,285	239,897	1899	5,004,377	1,151,454
1896	2,756,604	606,833	1900	5,869,906	1,382,727
1897	4,255,558	997,391			

a Latter six months; not separately classified prior to July 1, 1894.

FOREIGN PRODUCTION.

In case the act of the Ontario Parliament, already referred to, should be enforced, the United States would have to look to other sources for her supply of nickel. Although it would be produced to some extent in this country, still, at first, it would have to be obtained, in part at least, from outside. In the table below is given the production of nickel in Canada, France, and Germany (which are the principal producers) from 1889 to 1900. In comparing this table of production with that of the nickel imported into the United States, it should be remembered that in the latter table the quantity of nickel matte is given.

Production of nickel in Canada, France, and Germany from 1889 to 1899.

Year.	Canada.		France.		Germany.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Metric tons.*		*Metric tons.*	
1889	830,477	$498,286	330	$324,900	282	$279,680
1890	1,435,742	933,232	330	317,300	434	436,430
1891	4,626,627	2,775,976	330	319,200	594	644,480
1892	2,413,717	1,399,956	1,244	1,174,580	747	698,630
1893	3,992,982	2,076,351	2,045	1,175,720	893	774,630
1894	4,907,430	2,061,120	1,545	1,175,720	522	449,350
1895	3,888,525	1,360,984	1,545	1,033,220	698	575,890
1896	3,397,113	1,188,990	1,545	875,330	822	666,900
1897	3,997,746	1,399,137	1,245	704,425	898	710,980
1898	5,517,690	1,820,838	1,540	887,800	1,108	670,482
1899	5,744,000	2,067,840	1,740	1,003,600	1,115	669,517

ANTIMONY.

By Joseph Hyde Pratt.

INTRODUCTION.

The common ore of antimony, and the only one from which this metal is obtained in the United States, is the mineral stibnite, an antimony sulphide (Sb_2S_3). There are a number of other minerals containing antimony that occur in many of the Western States, but nowhere in sufficient quantity to become a source of this metal. Native antimony has also been sparingly found.

USES.

The uses of antimony are somewhat limited. It is chiefly of value in making alloys with other metals. One of the most important of these alloys is that of antimony and lead, which is used very extensively in the manufacture of type metal. It gives to the alloy hardness and—what is more important—the property of expanding at the moment of solidifying, thus giving to the type a clean, sharp face. There is from 10 to 16 per cent of antimony in britannia metal and 7 per cent in pewter. Another use is in the manufacture of babbitt metal, an antifriction alloy used in the journals of railroad locomotives and cars and other rapidly moving machinery. An alloy has also been made of this metal with aluminum, to which it gives hardness and elasticity. While antimony makes valuable alloys with some metals, upon others it has very injurious effects, particularly copper. An almost inappreciable amount (one part in a thousand) of antimony present in copper will destroy all of its good qualities. It is also used to some extent in medicine, the most common preparation being tartar emetic, a tartrate of antimony and potassium, and a less common one, the trisulphide. This sulphide has been used to a considerable extent as a pigment, especially by the ancients.

PRODUCTION.

The amount of antimony obtained from ores of domestic production in 1900 was 151 short tons, valued at $27,180, as compared with 234 short tons, valued at $43,600, in 1899. While this is a decrease from the production of 1899, it is but a small proportion of the amount of antimony that is consumed in the United States. There is a great deal of foreign antimony ores that are smelted in the United States, and if this product is added to that obtained from domestic ores the total amount of antimony produced in this country from ore in 1900 is estimated at 1,750 short tons, valued at $346,980, as compared with 1,275 short tons, valued at $251,875, in 1899. This is about one-half of the total amount of antimony that is consumed in the United States, the rest being imported as crude antimony or regulus and amounted to 1,827 short tons, valued at $287,937, this value being at shipping port, exclusive of freight and import duties. This makes the total domestic consumption of antimony in 1900 approximately 3,577 short tons, valued at $634,917, this value being based on the average price for the year. While the prices of antimony averaged about 2 cents per pound higher in 1899 than in 1898, there was a slight falling off in price in 1900.

The annual production of antimony in the United States since 1880 is shown in the following table:

Production of antimony in the United States since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	50	$10,000	1892:		
1881	50	10,000	Metallic	150	$56,466
1882	60	12,000	Ore	380	
1883	60	12,000	1893	250	45,000
1884	60	12,000	1894	200	36,000
1885	50	10,000	1895	*a* 450	68,000
1886	35	7,000	1896	*a* 601	84,290
1887	75	15,000	1897	*a* 844	121,944
1888	100	20,000	1898	*a* 1,120	184,050
1889	115	28,000	1899	*a* 1,275	251,875
1890	129	40,756	1900	*a* 1,750	346,980
1891	278	47,007			

a Principally from imported ores, and includes antimony contained in antimonial lead.

CONSUMPTION.

The total consumption of antimony in the United States since 1880 is given in the following table, the imported ore being estimated to contain 52½ per cent metallic antimony, and the crude and regulus being taken to be equivalent to the metal.

Estimated consumption of antimony in the United States since 1880.

Year.	From domestic ores.	From imported ores.	Imported crude or regulus.	Total.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
1880	50	7	1,010	1,067
1881	50	221	904	1,175
1882	60	292	1,263	1,615
1883	60	183	1,532	1,775
1884	60	61	890	1,011
1885	50	57	1,290	1,397
1886	35	58	1,499	1,592
1887	75	95	1,277	1,447
1888	100	18	1,407	1,525
1889	115	38	1,338	1,491
1890	129	160	1,658	1,947
1891	278	377	1,309	1,964
1892	150	50	1,975	2,175
1893	250	30	1,390	1,670
1894	200	100	1,327	1,627
1895	*a*275	*a*175	1,750	2,200
1896	*a*291	*a*310	1,288	1,889
1897	*a*245	*a*599	1,141	1,985
1898	*a*250	*a*870	1,052	2,172
1899	234	1,041	1,495	2,770
1900	151	1,599	1,827	3,577

a Separation estimated. All antimony smelted, whether from domestic or foreign ores, was reported as of domestic production.

As is seen from the above table, there has been a constantly increasing amount of antimony obtained from foreign ores since 1893, and this has probably been due to the removal of the principal smelting works from San Francisco to Staten Island. This removal took place in 1894, and was caused by the lack of a regular supply of ore from the deposits of the Western States.

IMPORTS.

The following table shows the amount and value of metallic antimony and antimony ore imported into the United States from 1867 to 1900, the statistics having been obtained from the Bureau of Statistics of the Treasury Department. It will be seen from this table that since 1894, when the principal smelting works were removed from San

Francisco to Staten Island, the amount of ore imported has increased from 116,495 pounds in 1893 to 6,089,134 pounds in 1900.

Antimony and antimony ore imported and entered for consumption in the United States, from 1867 to 1900.

Year ending—	Crude and regulus.		Ore.		Total value.
	Quantity.	Value.	Quantity.	Value.	
	Pounds.		*Pounds.*		
June 30, 1867	....	$63,919	....	....	$63,919
1868	1,033,336	83,822	....	....	83,822
1869	1,345,921	129,918	....	....	129,918
1870	1,227,429	164,179	....	....	164,179
1871	1,015,039	148,264	....	$2,364	150,628
1872	1,933,306	237,536	....	3,031	240,567
1873	1,166,321	184,498	....	2,941	187,439
1874	1,253,814	148,409	....	203	148,612
1875	1,238,223	131,360	6,460	609	131,969
1876	946,809	119,441	8,321	700	120,141
1877	1,115,124	135,317	20,001	2,314	137,631
1878	1,256,624	130,950	20,351	1,259	132,209
1879	1,380,212	143,099	34,542	2,341	145,440
1880	2,019,389	265,773	25,150	2,349	268,122
1881	1,808,945	253,054	841,730	18,199	271,253
1882	2,525,838	294,234	1,114,699	18,019	312,253
1883	3,064,050	286,892	697,244	11,254	298,146
1884	1,779,337	150,435	231,360	6,489	156,924
1885	2,579,840	207,215	215,913	7,497	214,712
Dec. 31, 1886	2,997,985	202,563	218,366	9,761	212,324
1887	2,553,284	169,747	362,761	8,785	178,532
1888	2,814,044	248,015	68,040	2,178	250,193
1889	2,676,130	304,711	146,309	5,568	310,279
1890	3,315,659	411,960	611,140	29,878	441,838
1891	2,618,941	327,307	1,433,531	36,232	363,539
1892	3,950,864	392,761	192,344	7,338	400,099
1893	2,780,432	243,341	116,495	5,253	248,594
1894	2,653,487	193,988	375,468	*a* 18,805	212,793
1895	3,499,901	223,968	668,610	14,718	238,686
1896	2,576,371	158,975	1,180,828	21,402	180,377
1897	2,282,245	143,370	3,719,186	55,400	198,770
1898	2,103,599	148,671	3,749,222	50,256	198,927
1899	2,990,915	241,685	3,968,654	47,427	289,112
1900	3,654,822	287,937	6,089,134	75,866	363,803

a Includes $737, value of ground antimony for which no quantity was given.

PRICES.

From 1892 to July, 1897, there was a steady decline in the price of antimony, it dropping from 16 cents per pound for Cookson's brand to 7 cents. Beginning with August, 1897, the price began to advance, and in May, 1899, it reached 12 cents per pound, and then remained nearly constant throughout the rest of the year. During 1900 there was a slight falling off in price, and the year closed with Cookson's at 10.5 cents per pound. The tables below show, by months and years, the ruling prices of the several brands of antimony, as reported to The Iron Age, from 1892 to 1900, inclusive:

Prices of antimony at New York since 1892, by months.

[Cents per pound.]

Month.	1892.			1893.			1894.		
	Cookson's.	L. X.	Hallett's.	Cookson's.	L. X.	Hallett's.	Cookson's.	L. X.	Hallett's.
January	15½ to 16	12 to 15	12¼ to 12½	11	10½	10¼	10¼	9⅛	9½
February	15 to 15½	12 to 14	11¼	10¾	10½	9⅞ to 10	10	8⅞	9⅜
March	14¾ to 15	11¾ to 13	10¾ to 11⅛	10¾	10 to 12	10	10⅛	8⅞	9½
April	14¼ to 15½	12¼ to 12½	10⅞ to 11	10¾	10⅜	10	10⅛	8⅞	9⅜
May	15	12¾	11½	10½	10¼	10	10⅛	8¾	9¼
June	14½	12¾	11¼	10½	10¼	9⅞	9¾	8⅝	9⅛
July	13¼	12¼	10⅞	10⅜	10⅛	9⅞	10	8⅜	8¾
August	12	11½	10¾	10¼	10	9¾	10	8¼	8⅞
September	11½ to 11¾	11 to 11¼	10 to 10¼	10¼	10	9¾	9½	7⅝	8⅞
October	12	11¼	10⅝ to 10¾	10¼	10	9¾	9⅝	7½	8¼
November	11¾	11	10½	10	9¾	9⅜	8½	7⅜	8¼
December	11¼	11	10¼ to 10⅜	10⅛ to 10¼	9½ to 9⅝	9⅛ to 9¼	8⅜	7⅜	8⅛

Month.	1895.			1896.			1897.		
	Cookson's.	Hallett's.	Japanese.	Cookson's.	Hallett's.	Japanese.	Cookson's.	Hallett's.	Japanese.
January	8½ to 8⅝	7⅛ to 7¼	....	8¼	7¼ to 7½	7	7¼ to 7½	6½ to 6¾	6⅜ to 6⅝
February	8¼ to 8½	7⅛ to 7¼	....	8¼	7½	7	7¼ to 7½	6⅝ to 6⅞	6½ to 6¾
March	8¼	7⅛ to 7¼	....	8¼	7½	7	7¼ to 7½	6¾ to 7⅛	6⅝ to 7
April	7⅞ to 8⅛	7 to 7⅛	6⅞ to 7	8¼	7½	7	7¼ to 7½	7 to 7⅛	7 to 7⅛
May	7⅞ to 8	7	6⅞	8 to 8¼	7¼ to 7½	6⅞ to 7	7¼ to 7⅝	7 to 7¼	6¾ to 7¼
June	7⅞ to 8	7 to 7⅛	6⅞	8	7¼	6⅞ to 7	7¼ to 7½	6½ to 7	6½ to 6¾
July	8 to 8⅛	7⅛ to 7¼	7	8	7¼	6⅞ to 7	7 to 7¾	6⅞ to 7½	6¾
August	8	7⅛	7	8	7¼	6⅞ to 7	7 to 8¼	7⅜ to 7½	6¾ to 7
September	8	7⅛	6⅞ to 7	8	7¼	6⅞ to 7	8 to 8¼	7¼ to 7½	7 to 7¼
October	7¾ to 8	7 to 7⅛	6⅞	7¼ to 7⅜	6½	6⅜	8 to 8½	7¼ to 7½	7 to 7⅛
November	7¾ to 7⅞	7	6¾ to 6⅞	7⅛ to 7⅜	6⅜ to 6½	6¼ to 6⅜	8 to 8½	7¼ to 7½	7 to 7¼
December	7¾ to 7⅞	6⅞ to 7	6¾ to 6⅞	7¼ to 7½	6½	6⅜	8 to 8¼	7¼ to 7⅜	7 to 7¼

Month.	1898.			1899.			1900.	
	Cookson's.	Hallett's.	Japanese.	Cookson's.	Hallett's.	United States.	Cookson's.	Hallett's.
January	8 to 8¼	7⅛ to 7¼	7⅛ to 7¼	10 to 10⅝	9½ to 9¾	9½	10½ to 11	9¾ to 9⅞
February	8 to 8¼	7¼ to 7½	....	10¼ to 10¾	9½ to 10¼	9½ to 9¾	10½ to 11	9¾ to 10
March	8 to 8⅛	7⅝ to 7¾	....	11½ to 12	10½ to 10¾	10¼ to 10¾	10½ to 11	9¾ to 10
April	8⅛ to 9	7¾ to 8	....	11½ to 12	10½ to 10¾	10¼ to 10¾	11	9¾
May	9¼ to 9½	8⅜ to 8¾	8¾	11½ to 12	10½ to 10¾	10¼ to 10½	11	9¾
June	9¼ to 9¾	8¾ to 9	8¾ to 9	11½	10½	10¼	11	9⅝
July	9⅝ to 9¾	9	9	11½	10½	10¼	10½ to 11	9½ to 9⅝
August	9⅝ to 9¾	9	9	11½	10½	10¾ to 11	10½	9½
September	9⅝ to 9¾	9	9	11½	10½	10¾ to 11	10½	9½
October	9⅝ to 9¾	9	9	11½	10½	10¼	10½	9½
November	9⅝ to 9¾	9	8⅞ to 9	11¼ to 11½	10¼ to 10½	10 to 10½	10½	9½
December	9⅝ to 9¾	8¾ to 9	8¾ to 8⅞	11¼ to 11½	10¼ to 10½	10 to 10¼	10½	9½

TUNGSTEN, MOLYBDENUM, URANIUM, AND VANADIUM.[1]

By Joseph Hyde Pratt.

TUNGSTEN.

INTRODUCTION.

The minerals from which tungsten is derived are wolframite, a tungstate of iron and manganese, which is the commonest; hübnerite, essentially manganese tungstate, and scheelite, a calcium tungstate.

Wolframite is usually found in metallic veins carrying the sulphides pyrite, galena, sphalerite, etc., and is also found associated with tin ores. It frequently accompanies scheelite in the crystalline rocks and is embedded in quartz. It is widely distributed in nature, but is found in quantity at only a few localities. The occurrences of hübnerite are similar to those just mentioned. Scheelite, however, is more commonly found associated with the crystalline rocks and embedded in quartz, and it is in occurrences of this type that this mineral is found in quantity. In the metallic veins scheelite occurs sparingly as an associate with wolframite and hübnerite.

OCCURRENCES.

By far the greater number of localities where these minerals have been discovered are in the Western States, principally Arizona, Nevada, and Colorado. It has also been found in Oregon, Washington, Idaho, Montana, New Mexico, South Dakota, and in the Eastern States, Connecticut, and North Carolina.

At the hübnerite locality, in the Dragoon Mountains, 13 miles from Benson and 6 miles north of Dragoon, Cochise County, Ariz., considerable development work and some mining have been carried on and as much as 50 tons of first-class ore have been taken from this property in one year.

During 1900 the wolframite deposit located about 12 miles south of Osceola, White Pine County, Nev., described by Mr. F. B. Weeks,[2] in the foothills of the west slope of the Snake Mountains and near the

[1] The minerals containing these metals, their occurrence and distribution, have been described by the writer in detail in the Twenty-first Annual Report of the United States Geological Survey, Part VI, pp. 299–318. Their uses and relative value in the arts were also discussed.

[2] Twenty-first Ann. Rept. U. S. Geol. Survey, Part VI, pp. 319–320.

base of Wheeler Peak, has been developed by a tunnel driven in at the lowest outcrop of the vein. The vein widened as the work was continued, till at the head of the tunnel it has a width of 4 feet, the wolframite occurring in bunches across the entire vein. There has not been sufficient work done to determine how extensive this deposit is, but the indications are that it can produce tungsten minerals in quantity.

Tungsten ores have been found in a number of counties in Colorado, but only within the last year or two have they been shown to exist in commercial quantities. They have now been found at a number of localities in San Juan, Boulder, Gilpin, Ouray, and Lake counties. While perhaps no systematic mining has been carried on during the last year in this State for tungsten minerals, yet from a number of mines in San Juan and Boulder counties about 91,000 pounds[1] were mined and shipped as follows: San Juan County, 5,000 pounds, 71 per cent tungstic acid, and 6,000 pounds, 68 per cent tungstic acid; Boulder County, 80,000 pounds, 63 per cent tungstic acid. All this ore was shipped to Eastern cities, where it is reported to have been worth from $2 to $3.50 per unit of tungstic acid.

At the scheelite mine of the American Tungsten Milling and Mining Company near Long Hill, Fairfield County, Conn., mining was carried on throughout nearly the entire year, and although a large quantity of ore was taken out none has yet been put on the market, for the reason that in its cleaning process the company has not obtained as pure a product as it desired; but experiments that are being made indicate that this company will be able to put a very pure product on the market.

The ore contains approximately 5 per cent of scheelite, which is the average run of the vein as determined from actual mill tests. Assays of the concentrates of scheelite gave values of tungstic oxide (WO_3) varying from 67 to 70 per cent and of wolframite varying from 55 to 60 per cent.

USES.

The uses of tungsten are varied. The principal ones are in the manufacture of the alloy, ferrotungsten, and in the form of the powdered metal, of which the desired amount is added directly to the molten steel or is melted together with the steel without first making an alloy. Alloys are also made of tungsten with aluminum and copper, the latter being used in the manufacture of propeller blades. Another use of tungsten is for coloring glass. Until recent years about the only use of tungsten was in the preparation of salts used to make colored cotton goods fast, or washable, and to make clothes used for theatrical and other purposes noninflammable. It has also been used to a certain extent in the manufacture of stained and other papers.

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[1] From the report of the Commissioner of Mines for Colorado, 1900.

PRODUCTION.

As there is a limited demand for tungsten, the production can readily become greater than the market requires. Then, again, many of the deposits could not be worked if the price should drop much below that at the present time. The price of tungsten ores has varied widely in the past three or four years, fluctuating from $6 to $2 per unit of tungstic acid. Quotations that are now made range from $1 to $2 per unit of tungstic acid. While there is a growing demand for this metal to be used in the manufacture of tungsten steels, yet the total amount consumed will not be very large. Then, again, the other metals, molybdenum, uranium, and vanadium, are also used in the manufacture of certain steels and give to them definite beneficial properties; and while these properties may be distinct from those of tungsten and from one another, they will limit somewhat the consumption of tungsten.

The information obtainable indicates that there is more than a sufficient supply of tungsten ores now known which are available.

MOLYBDENUM.

As was stated in the report for 1899, there has been considerable discussion in the last few years as to the actual commercial value of molybdenum and the purposes for which it can be used. At the present time the market for the mineral molybdenite, which is the chief source of this metal, is limited, the consumption being only about 50 tons per year, and the reduction of the ore is confined to a few plants. They demand an ore which will carry, when concentrated, 50 per cent or over of molybdenum and which must be free from copper. The recent use of molybdenum in the manufacture of certain steels has led to an increased demand for supplies of this mineral, and in some respects new deposits of molybdenum ores are in greater demand than new deposits of tungsten ores, for the reason that there is more than a sufficient supply known of the latter ore, which is not true at the present time of the former. The principal use of molybdenum is in the manufacture of certain chemical reagents, especially of ammonium molybdate, which is used in the determination of phosphoric acid. It is also used in the preparation of "blue carmine" for the coloring of porcelain.

URANIUM AND VANADIUM.

These metals have been attracting the attention of steel manufacturers in regard to the beneficial results that a small percentage of either of them produces in steel. Experiments have shown that a certain amount of a ferrouranium alloy added to a fluid steel increases its tensile strength and toughness to a remarkable degree, while the vanadium alloy increases the tensile strength and ductility. Although these metals are not yet used to any considerable extent in the manufacture of these steels for actual use, yet the amount of these metals consumed in experimental tests has greatly increased their demand. This has led to prospecting for minerals containing these metals, with the result that some interesting ores have been discovered.

Of these, the one that has attracted most attention is the mineral carnotite,[1] which was discovered in Montrose County, Colo. It occurs as a yellow to reddish-yellow crystalline powder, or in loosely cohering masses that are easily separated by the fingers and leave traces on whatever touches them. When first tested the mineral was found to contain vanadium, and analysis showed it to be composed mainly of a hydrous vanadate of uranium and potassium.[2] The purer varieties contain about 52 per cent of uranic oxide (UO_3), about 18 per cent of vanadium pentoxide (V_2O_5), and about 5.5 per cent of potash.

The following more recent complete analyses of carnotite have been made by Dr. W. F. Hillebrand[3] on material from (I) the Copper Prince claim, Roc Creek, and (II) Yellow Boy claim, La Sal Creek, both in Montrose County, Colo.

Analyses of carnotite from Colorado.

Constituent.	I.			II.	
	A.	B.	C.	A.	B.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Insol	7.10	8.34	19.00	10.33	....
UO_3	54.89	52.25	47.42	54.00	52.28
V_2O_5	18.49	18.35	15.76	18.05	17.50
P_2O_5	.80	.35	.40	.05	Tr.
As_2O_5	Tr.	.25	None.	None.	None.
Al_2O_3	.09	(?)	.08	.29	(?)
Fe_2O_3	.21	1.77	.72	.42	3.36
CaO	3.34	2.85	2.57	1.86	1.85
SrO	.02	(?)	(?)	Tr.	Tr.
BaO	.90	.72	.65	2.83	3.21
MgO	.22	.20	.24	.14	.17
K_2O	6.52	6.73	6.57	5.46	5.11
Na_2O	.14	.09	.07	.13	.02?

[1] Am. Jour. Sci., Vol. X, 1900, p. 120, and Bull. Soc. chimique, Paris, 3d series, Vol. XXI, 1899, p. 328.

[2] Bull. Soc. chimique, Paris, 3d series, Vol. XXI, 1899, p. 328; Bull. Soc. franç. Min., Vol. XXII, 1899, p. 26; Comptes rendus Acad. sci., Paris, Vol. CXXVIII, 1899, p. 532, and Am. Jour. Sci., 4th series, Vol. X, 1900, p. 120.

[3] Am. Jour. Sci., 4th series, Vol. X, 1900, p. 138.

Analyses of carnotite from Colorado—Continued.

Constituent.	I.			II.	
	A.	B.	C.	A.	B.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Li_2O	Tr.	(?)	(?)	Tr.	(?)
H_2O 105°	2.43	2.59	1.85	3.16	*a* 4.52
H_2O 350°	2.11	3.06	2.79	2.21	*a* 3.49
H_2O +350°	None.	None.	None.	None.	....
PbO	.13	.25	.18	.07	....
CuO	.15	.20	.22	Tr.	....
SO_3	None.	.12	.18	None.	....
MoO_3	.18	.23	.18	.05	....
SiO_2	.15	.06	.13	.20	....
TiO_2	.03	.10	(?)	(?)	....
CO_2	.56	.33	None.	None.	....
	98.46	98.84	99.01	99.25	....

a Total H_2O in ore.

Dr. Hillebrand, in discussing the results of his analyses and comparing them with those of Messrs. Friedel and Cumenge, who stated that the mineral was a simple hydrous vanadate of uranium and potassium, represented by the formula, $2UO_3.V_2O_5.K_2O.3H_2O$, has drawn the following conclusions:

"The body called carnotite is probably a mixture of minerals of which analysis fails to reveal the exact nature. Instead of being the pure uranyl-potassium vanadate, it is, to a large extent, made up of calcium and barium compounds. Intimately mixed with and entirely obscured by it is an amorphous substance—a silicate or mixture of silicates—containing vanadium in the trivalent state, probably replacing aluminum."

According to Ransome,[1] the carnotite deposits of La Sal Creek occur southwest of Paradox, Montrose County, and about 6 miles up La Sal Creek from Cashin. They are on the south side of the creek and about 700 feet above the stream. The carnotite occurs as irregular bunchy pockets in a massive bed of nearly white sandstone. Some of the ore is between the sandstone and underlying light-gray shale. "The ore bodies are usually flat-lying streaks but a few inches thick, which grade above and below into the common light-buff sandstone, and which die out and disappear when followed into the hillside. In tunnels running but a few feet underground the yellow impregnation of carnotite can be seen to gradually die out, to be succeeded by light-colored sandstone showing no apparent trace of the mineral."[2]

The Roc Creek deposits are on the north side of Roc Creek, 3 or 4 miles above its mouth, and near the foot of the Miller trail to Paradox. The sandstone at this locality in which the carnotite occurs is nearly

[1] Am. Jour. Sci., 4th series, Vol. X, 1900, p. 127.
[2] Ibid., p. 128.

horizontal, and is cut by an east-west fault, the fault plane dipping about 75° N. "The carnotite occurs in the hanging wall of the fissure as small, irregular branches in a loose mass of crushed sandstone, and also as an impregnation of some of the firmer portions of the bed."[1] The principal claim in this vicinity is the Copper Prince, owned by Mr. J. R. Duling.

The impregnation of the carnotite in the sandstones, as in the La Sal Creek district, has taken place along bedding planes, and also along surfaces of minor and superficial movement in the rocks. In the Roc Creek district it is the well-defined fault that has provided a zone of crushed and porous rock in the hanging wall which made it possible for the impregnation of the carnotite.

Carnotite has also been found in Gypsum Valley, in what is known as the Disappointment district.

About a mile northeast of Placerville, San Miguel County, and about 1,000 feet above the San Miguel River, are found La Plata sandstones, which are divided into two heavy beds of light-colored sandstones, separated by a much thinner bed of dark limestone. The upper part of the lower bed of this sandstone is more or less impregnated with what is probably roscoelite, a vanadium mica. The normal coloring of this sandstone is light buff, but when impregnated with roscoelite it becomes a light to dark olive green. The roscoelite sometimes makes up more than 20 per cent of the vanadiferous sandstone, and this band of the sandstone varies in thickness from a few inches up to 5 or 6 feet, extending along the sandstone cliffs for a distance of about 2,000 feet. Carnotite occurs sparingly in this rock as minute yellow specks in the sandstone, and particularly as thin horizontal seams or streaks near the bottom of the vanadiferous bands.

About a foot below the seam of limestone the sandstone shows numerous yellow specks of carnotite and contains traces of vanadium. Through the next 2 feet the sandstone is pinkish in color, and no roscoelite or carnotite was observed; but just below this, yellow and green specks become visible. The latter become more and more numerous and larger until at from 3 to 4 feet below the limestone the sandstone has a decided green tint, which deepens toward the bottom of the vanadiferous band, where it is rich in roscoelite, and shows but few specks of carnotite. This is regarded as a first-class ore of vanadium. While in the upper part of the sandstone the grains of quartz are cemented by calcite, in this dark-green band no effervescence with acids was observed, the quartz grains being cemented or held together by roscoelite.

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[1] Am. Jour. Sci., 4th series, Vol. X, 1900, p. 128.

These deposits of carnotite and roscoelite were formed subsequently to the deposition of the sandstone, and, as stated by Ransome, it may be present in very small amounts in the bulk of the sandstone, these deposits representing a concentration of this material under favorable conditions of solution and redeposition.

Regarding the extent of these deposits, Ransome says:[1] "There is no apparent reason why a mass of sandstone, impregnated with roscoelite which is continuously exposed for several hundred feet along a cliff, should not extend for a considerable distance inward from the cliff face. The carnotite, on the other hand, appears to be a much more superficial occurrence, and, in fact, to have a not yet fully understood connection with the present surface of the ground. This would indicate that the carnotite results from a local concentration of material already existent in the sandstone and the deposition of this material in the form of carnotite under conditions determined by proximity to the surface, and probably partly dependent upon a semiarid climate."

This vanadiferous sandstone has been analyzed by Dr. Hillebrand, with the following results:[2]

Analysis of vanadiferous sandstone from Colorado.

Constituent.	Per cent.	Constituent.	Per cent.
Soluble in nitric acid:		Soluble in nitric acid:	
SiO_2	12.56	H_2O above 300°	.97
TiO_2	.02	UO_3	.05
V_2O_3	3.50	PbO	.06
Al_2O_3	6.15	V_2O_5	.05
Fe_2O_3	.20	Insoluble in nitric acid:	
CaO	.12	Quartz, etc	72.24
BaO	.37	H_2O at 105°	.04
MgO	.25	H_2O above 105°	.20
K_2O	2.41	Total	99.93
Na_2O	.06	Traces of Li, Cu, Mo, Bi, Cl, SO_3, or P_2O_5.	
H_2O at 105°	.54		
H_2O 105°–300°	0.14		

The green micaceous mineral which acts as the cementing bond of the sandstone was separated from the quartz and analyzed, by Dr. Hillebrand, with the results given below. For comparison an analysis

[1] Am. Jour. Sci., 4th series, Vol. X, 1900, p. 130.
[2] Ibid., p. 133.

of roscoelite from near Lotus, Eldorado County, Cal., is also included in the table:

Analyses of roscoelite, a vanadium mica.

Constituent.	Vanadium mica from Placerville, Colo.	Roscoelite from Eldorado County, Cal.
	Per cent.	*Per cent.*
SiO_2	46.06	45.17
TiO_2	....	.78
V_2O_3	12.84	24.01
Al_2O_3	22.55	11.54
Fe_2O_3	.73	(FeO) 1.60
CaO	.44	....
BaO	1.35	....
MgO	.92	1.64
K_2O	8.84	10.37
Na_2O	.22	Trace.
H_2O at 105°	1.98	*a* .40
H_2O at 105°–300°	.51	*b* .17
H_2O above 300°	3.56	*c* 4.12
Total	100.00	99.80

a At 100°. *b* At 180°. *c* Above 180°.

As seen from the above the two analyses are very similar, but with the percentage proportions of Al_2O_3 and V_2O_3 reversed. As noted by Dr. Hillebrand, it is a peculiar coincidence that the only two known localities for this mineral should bear the name of Placerville.

This vanadium mica constitutes at times over 20 per cent of the sandstone and, as seen from the above, contains nearly 13 per cent of V_2O_3. The maximum amount of this vanadium oxide observed in the sandstone was 3.5 per cent. If this sandstone occurs as abundantly as is supposed, it should become an ore of some importance for vanadium.

Dr. Johly,[1] in a recent article on the commercial treatment of uranium and vanadium ores, makes the statement—which is based upon practical tests made by him or others on the commercial extraction of uranium and vanadium from these ores—that even when these ores contain but a small per cent of these oxides (4 per cent of UO_3 and 1 per cent of V_2O_5) they can be worked at a very large profit. He estimates that these oxides can be extracted from the ore at an expense of from $10 to $12 per ton, which, with the cost of the ore at $10 per unit of uranium oxide, or $40 per ton, would make a total cost of $50 to $52. From this ton of ore would be obtained 80 pounds of uranium oxide, which is quoted at $2 per pound, and 20 pounds of vanadium oxide, which is quoted at $9 per pound. This will leave a very large margin for profit.

The mineral which was practically the only ore of uranium until the discovery of carnotite, and which still continues to be a source of this

[1] Min. and Met., Vol. XXIV, 1901, p. 228.

metal, is uraninite, or, as it is more commonly known, pitchblende, a mineral of a velvety black appearance and high specific gravity, being 8. This mineral suffers alteration readily, going over the hydrated mineral gummite, which looks something like gum and which, in turn, is further altered to uranophane or uranotil. Thus, usually, instead of the ore appearing black or dark colored, it is yellow or reddish, due to coatings of alteration products. Both of these ores are generally contaminated to a considerable degree by the admixture of other minerals. This is especially true of the carnotite ore.

The principal source of supply of vanadium has been from certain slags found at Creusot, France. It has also been found in the ash of certain coals of the Argentine Republic and Peru, which have been described in the report for 1899, and these may become a source of this metal.

There are many other minerals known that contain uranium or vanadium, but they have not been found in sufficient quantity to be a source of either of these metals.

PRODUCTION.

The production of uranium has been confined to Colorado, which, according to the information received, has furnished 306,655 pounds of ore, carrying from 5 to 16 per cent of uranium oxide, which was obtained from Gilpin and Montrose counties. This production has been reported by the Commissioner of Mines for Colorado as follows:[1]

Production of uranium in Colorado in 1900.

County.	Pounds.	Average percentage of uranium oxide.
Gilpin	13,155	16
Montrose	2,000	16
Do	1,500	15
Do	140,000	5
Do	60,000	6
Do	30,000	10
Do	60,000	10
Total	306,655	

Some of this ore was carnotite and some uraninite, but the exact proportion of these two ores is not known. The prices quoted for uranium ores increase with the percentage of uranium oxide. An 8 to 10 per cent ore is quoted at $17.50 per unit, a 10 to 15 per cent ore at $18, a 15 to 20 per cent ore at $19, and a 20 per cent and over at $20 per unit.

[1] Report of the Commissioner of Mines for Colorado, 1900.

AN OCCURRENCE OF STREAM TIN IN THE YORK REGION, ALASKA.[1]

By Alfred H. Brooks.

INTRODUCTION.

During the summer of 1900 the writer was engaged in a study of the geology and mineral resources of the southern part of the Seward Peninsula. The early part of the season was spent in the region lying east of Port Clarence, and about the middle of September the work was extended westward to include the York gold field. There ten days were spent in a hasty reconnaissance and topographic survey of about 100 square miles of an area embracing the western extremity of the Seward Peninsula.[2]

A small settlement named York, situated at the mouth of the Anikovik River, is the distributing point for this region. It is 45 miles west of Port Clarence and 85 miles west of Nome. At York there is no harbor, landings being made on the beach, and during southerly storms these are often impossible. York possesses a post-office, and during the summer has fortnightly steamer connection with Nome. The region is well adapted for the use of pack animals, for which pasture can usually be found during the summer months. The beach offers a limited supply of driftwood, but in the interior the prospector is dependent on the stunted willow for fuel supply.

While studying the gold placers at York the writer's attention was called to the presence of stream tin in association with the gold. As this is a new locality for this mineral, and as there is a possibility of its being found in the region in commercial quantities it has been deemed advisable to present a brief summary of the facts of its occurrence.[3]

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[1] Attention has been called to this occurrence by the writer in a note entitled A New Occurrence of Cassiterite in Alaska, published in Science, N. S., Vol. XIII, No. 328, p. 593, April 12, 1901.

[2] The Seward Peninsula is that land mass which, stretching out from the northwestern part of Alaska, reaches within 60 miles of the Siberian coast. It is bounded on the north by the Arctic Ocean, on the west by Bering Strait, on the south by Bering Sea, and on the east by the mainland of Alaska.

[3] The facts contained in this report are extracted from one now in press entitled A Reconnaissance of the Cape Nome and Adjacent Gold Fields of the Seward Peninsula, Alaska, where a more comprehensive description of the region will be found.

GEOGRAPHY.

The placer field, which is usually called the York[1] region by the miners, includes about 120 square miles, and is bounded on the east by the York Mountains, on the north by the Arctic Ocean, on the west by Bering Strait, and on the south by Bering Sea. This area is occupied for the most part by a plateau having an elevation of about 600 feet, which on the southern side ends in a rather abrupt escarpment. This falls off to a bench, about 400 feet in altitude, and a quarter to a half mile in width. A second escarpment bounds this bench, and a narrow coastal plain 50 feet in height lies between it and Bering Sea. To the north the plateau seems to slope off more gently to the Arctic Ocean, but this part of it was only seen by the writer from a distance.

To the east the York Mountains rise rather abruptly from the plateau. Their highest peaks reach altitudes of about 2,500 feet and their topography is rugged in general character. A number of isolated hills rise above the plateau level. These usually have flat tops or are benched at elevations of about a thousand feet. The largest of these is Cape Mountain, which lies at the western extremity of the peninsula and forms Cape Prince of Wales.

The drainage within the York Mountains is of a torrential character. In the plateau region the southward drainage is carried to Bering Sea by a number of streams and rivers which have trenched sharply into the plateau surface. The minor tributaries flow in small but typical canyons. The rivers flowing northward to the Arctic have broad valleys with more gentle slopes. The remarkable evenness and level character of the plateau is very striking. By avoiding the larger waterways and making detours around the smaller canyons a horse and wagon can be driven nearly anywhere on this plateau surface almost as well as on a good roadway.

GEOLOGY.

The succession of rocks, as far as determined, is as follows: The oldest sediments are limestones, which are white and usually quite crystalline. They are often beautifully banded, and occasionally have intercalated bands of mica-schist. This belt of limestones lies near the coast and is about half a mile in width.

Cape Mountain is made up of a mass of granite which has been intruded into the limestones. Along the crest of the mountain pillars and pinnacles of the granitic rock are common and are due to the existence of a double system of jointing. The granite, except for this jointing, is entirely massive and is usually coarsely crystalline. Near the margin of the mass it contains large crystals of feldspar. Under

[1] This area lies within the Port Clarence recording district. The United States commissioner has his headquarters at Teller, Port Clarence, Alaska.

the microscope it is seen to consist of microcline, quartz, and biotite as the essential minerals.

To the north of the limestone a belt of slates and siliceous schists about 5 miles in width has been mapped, which are regarded as overlying the limestones conformably. The evidence of conformity is that the strikes have a general parallelism to those of the limestones, and the dips are variable, suggesting about the same amount of folding as has taken place in the limestone belt. The slates, and especially the schists, are usually traversed by numerous joint planes, by which they are split up into rhombohedral forms. These beds are occasionally calcareous and more often graphitic.

With the slate series greenstones of various descriptions are frequently found. These greenstones are usually massive, though they have suffered some jointing like that found in the slates. Only a few fresh specimens of these rocks were obtained; they are apparently largely of a diabase character.

To the northeast of this slate series, and overlying it, there was found a belt of earthy limestone with some slates. These rocks seem to be less altered than the slate series, though they are apparently conformable. Only a few exposures of this rock were studied, however, and no details can be given.

Numerous inquiries among the prospectors elicited the information that still farther to the northeast there exists a body of slates similar to those found at York, and beyond that a belt of white limestone, and beyond that granite. If such are the facts, they indicate that there is in the York region a broad syncline which possibly includes the York Mountains. The oldest rock of the series is the white limestone, which is reported to be cut by granite on both margins of the syncline, while above it lie the slate series and the younger limestones. Until further investigations have been made this explanation of the structure must be regarded as purely hypothetical.

The unconsolidated deposits of the region can be classified as (1) river and stream gravels and (2) bench gravels. The first include the gravels and sands of the flood plains of the streams and rivers. The bench gravels comprise a thin layer of semirounded material which mantles the plateau, and also other gravels which make up the lowest terrace along the coast. The latter have a thickness of 50 feet or more. The bench gravels are marine deposits, which were laid down during epochs of submergence. Most of the stream valleys have benches along their slopes, which were undoubtedly formed during the same period of subsidence. The pebbles of the gravel are identical lithologically with the bed rock of the region. As far as the observations of the writer go, these gravels can always be traced to a local source.

The shattered condition of the graphitic quartz-schist series has already been noted. In these schists small veins and belts of quartz and calcite are not uncommon. These often contain pyrite and sometimes gold. The bed rock itself is sometimes mineralized, and not infrequently carries pyrite. It seems probable that gold also occurs in the mineralized schist, though its presence was not definitely established except in the veins and blebs.

STREAM TIN.

The cassiterite which occurs as stream tin was found at two localities in the region. The first is on Buhner Creek, which is a westerly tributary of the Anikovik River. The mouth of Buhner Creek is about 3 miles from Bering Sea. The occurrence is perhaps best located by stating that it lies about 10 miles east of Cape Prince of Wales, and hence very near the northwestern extremity of the continent. On Buhner Creek 2 to 3 feet of gravel overlies the bed rock, which consists of arenaceous schists, often graphitic, together with some graphitic slates. This is part of the schist series which has been described. The bed rock is much jointed, the schists being broken up into pencil-shaped fragments. They strike nearly at right angles to the course of the stream and offer natural riffles for the concentration of heavier material. A hasty reconnaissance of the drainage basin of this stream, which includes not more than a square mile of area, showed the same series of rocks throughout its extent. At a few localities some deeply weathered, dark-green intrusives were found, which, on examination by the microscope, were found to consist almost entirely of secondary minerals. In some cases, however, a little plagioclase was still unaltered and a suggestion of ophitic structure remained, so that these are probably of a diabasic character. The slates and schists are everywhere penetrated by small veins, consisting usually of quartz with some calcite, and frequently carrying pyrite and sometimes gold. These veins are very irregular, often widening out to form blebs, and again contracting so as not to be easily traceable.

The stream tin is concentrated on the bed rock with other heavy minerals, and was found by the miners in the sluice boxes. A sample of the concentrate in one of the sluice boxes was examined by Mr. Arthur J. Collier, and yielded the following minerals: Cassiterite, magnetite, ilmenite, limonite, pyrite, fluorite, garnets, and gold. The determination of percentage by weight was as follows: 90 per cent tin-stone; 5 per cent magnetite; other minerals, 5 per cent. The cassiterite occurs in grains and pebbles, from those microscopic in size to those half an inch in diameter; they have subrounded and rounded forms. In some cases there is a suggestion of pyramidal and prismatic crystal forms. The cassiterite varies in color from a light brown to a lustrous black.

A second locality of this mineral was found on the Anikovik River about half a mile below the mouth of Buhner Creek. Here the cassiterite was also found with the concentrates from the mining operations. One pebble of stream tin obtained from this locality was about 2 inches in diameter.

It will be necessary to make a more detailed examination of this region to determine where this mineral occurs in the bed rock. The facts obtained by the writer point toward the conclusion that its source was in the quartz and calcite veins in which the gold was found. No cassiterite was, however, found in this vein material.

No evidence was found that this cassiterite is in any way connected with acid intrusions, which is its usual association in other regions. As far as known there are no intrusives of acid rocks within the drainage basins of streams where the tin was found. The nearest known granitic rock is the biotite-granite stock which forms the promontory of Cape Prince of Wales and which is at least 10 miles distant.

This discovery of stream tin has scientific rather than commercial interest. No developments have been made which would warrant the conclusion that valuable tin deposits exist in the York district. It is worth while, however, for the prospectors who visit this region to familiarize themselves with the physical properties of the minerals, so as to be able to recognize it if found. By this means deposits carrying values may be discovered, and in any event the cassiterite will probably be traced to its source in the bed rock.

COAL.

By Edward W. Parker.

INTRODUCTION.

SPECIAL FEATURES.

The statistics presented in the following pages deal primarily with the production of coal in the United States during 1900, and have been prepared in a manner uniform with the preceding reports of this series. They show that in the last year of the nineteenth century the United States as a coal producer exceeded all previous records in her history and maintained the supremacy which was attained in 1899.

In 1899 the production of coal in the United States exceeded for the first time that of Great Britain, and in 1900, with an increased output of 16,141,835 short tons over the preceding year, the lead over the output of Great Britain was almost exactly doubled, Great Britain's production in 1900 being about equal to that of the United States in 1899. Next to this the most interesting feature connected with the production in 1900 was the marked increase in value as compared with the increase in tonnage. The amount produced in 1900 showed an increase over the preceding year of a little more than 6 per cent, whereas the value of the product increased about 16 per cent, the average price realized during 1900 being the highest since 1893. With the exception of the strike which occurred in the anthracite region of Pennsylvania in the summer and fall of last year and one in the Cumberland region of Maryland during the summer, the coal-mining industry was comparatively free from labor troubles throughout 1900. The effect of these two strikes is exhibited in the decreased production of 2,723,294 long tons of anthracite coal and of about 700,000 long tons in Maryland's production. There has been a notable increase in the percentage of American coal exported to foreign countries, but the amount is still small as compared with the production, being equivalent to less than 4 per cent of the total output.

The tables of production in the United States have been compiled from direct returns from the producers to the Survey or its agents, with a very few minor exceptions. In these few instances, where operators failed to report their production to the Survey, the statements were obtained from State mine inspectors or other reliable sources of information, or the production was estimated upon the records of the preceding three or four years. The production actually reported to the Survey during 1900 amounted to 269,444,859 tons, so that the proportion estimated upon was less than 0.2 per cent of the total. In no case was the production for unreported mines placed at a higher figure than the output reported for 1899.

The difficulty encountered in 1899 in obtaining statistics from mines which had changed hands during the year was not so pronounced in 1900, and it is gratifying to note that one of the effects of the combination of a large number of coal mines under central control has been to facilitate the collection of statistics. This is particularly noticeable in regard to the mines in the Pittsburg district. Most of the river mines have been acquired by the Monongahela River Consolidated Coal and Coke Company, and the railroad shipping mines by the Pittsburg Coal Company.

ACKNOWLEDGMENTS.

The plan of cooperating with the statistical work of the State geological surveys has been carried out as much as possible in the preparation of this report, and acknowledgments are especially due to Prof. William B. Clark and Mr. Edward B. Mathews, of the Maryland geological survey; Mr. S. W. Beyer, of the Iowa geological survey; Mr. Charles G. Yale, of the State mining bureau of California, and Mr. David Ross, secretary of the bureau of labor statistics of Illinois. The statistical tables have been, as usual, prepared by Mr. Theodore H. Johnson, of the Geological Survey, who has for several years had charge of this important feature of the work. The writer desires particularly to express his appreciation of the uniform courtesy with which his requests for information have been treated by the producers themselves. The report on the statistics of the production of anthracite coal in Pennsylvania has been, as usual, prepared by Mr. William W. Ruley, chief of the bureau of anthracite coal statistics, of Philadelphia, who acts in this capacity as special agent of the Geological Survey. The reviews of the coal trade in the important centers and shipping points have been contributed by the secretaries of boards of trade and other competent authorities, whose services are acknowledged in connection with their contributions.

UNIT OF MEASUREMENT.

In the anthracite region of Pennsylvania the long ton of 2,240 pounds is uniformly used as the unit of measurement, and any coal shipped to the eastern seaboard from Pennsylvania, the Cumberland region of Maryland, and the tide-water shipping districts of Virginia and West Virginia is also measured by the long ton. In nearly every other instance the short ton of 2,000 pounds is used as the unit of measurement. In the general tables of production the amounts have been reduced uniformly to the short ton of 2,000 pounds, and it is considered the standard in this report. The tables of shipments from the anthracite region of Pennsylvania and from the Cumberland and Upper Potomac region of West Virginia are, however, stated in long tons, to avoid confusion when comparing these statements with those published in other reports.

COAL FIELDS OF UNITED STATES.

For convenience the coal areas of the United States are divided into two great classes—the anthracite and the bituminous.

In a commercial sense, particularly in the East, when the anthracite fields are mentioned the fields of Pennsylvania are considered, though Colorado and New Mexico are now supplying anthracite coal of good quality to the Rocky Mountain region, and small amounts are mined annually in Virginia. This small quantity from Virginia and a semi-anthracite product from Arkansas are considered with the bituminous output. In previous years some coal which was classed as anthracite has been mined and sold in New England. The productive area was confined to the eastern part of Rhode Island and the counties of Bristol and Plymouth, in Massachusetts. The classing of this product as anthracite coal was erroneous. The original beds have been metamorphosed into graphite or graphitic coal, and the product requires such a high degree of heat for combustion that it can be used only with other combustible material or under a heavy draft. It is, therefore, not an economical practice to use this product for fuel in competition with the anthracite coal from Pennsylvania or the bituminous coals from the New River and Pocahontas fields, which are now sent in large quantities to New England points, and its mining for fuel purposes has been abandoned.

The bituminous division includes the following coal fields: (1) The Triassic field, embracing the coal beds of the Triassic or New Red Sandstone formation in the Richmond Basin in Virginia and in the coal basins along the Deep and Dan rivers in North Carolina; (2) the Appalachian field, which extends from the State of New York on the north to the State of Alabama on the south, having a length northeast and southwest of over 900 miles, and a width ranging from 30 to 180 miles; (3) the northern field, which is confined exclusively to the central part of Michigan; (4) the central field, embracing the coal areas in Indiana, Illinois, and western Kentucky; (5) the western field, including the coal areas west of the Mississippi River, south of the forty-third parallel of north latitude, and east of the Rocky Mountains; (6) the Rocky Mountain field, containing the coal areas in the States and Territories lying along the Rocky Mountains; (7) the Pacific coast field, embracing the coal districts of Washington, Oregon, and California.

Special reports on the coal fields of the United States, which will summarize all the present knowledge of our coal resources, are in preparation and will be published in Part I of the Twenty-second Annual Report of the Survey.

The following table contains the approximate areas of the coal fields in the various States, grouped according to the divisions mentioned, with the total output from each from 1887 to 1900:

Classification of the coal fields of the United States.

	Area.	Product in—			
		1887.	1888.	1889.	1890.
Anthracite.	*Sq. miles.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
New England (Rhode Island and Massachusetts)	500	6,000	4,000	2,000	....
Pennsylvania	480	39,506,255	43,922,897	45,544,970	46,468,641
Colorado and New Mexico	15	36,000	44,791	53,517	(*a*)
	995	39,548 255	43,971,688	45,600,487	46,468,641
Bituminous. (*b*)					
Triassic:					
Virginia	180	30,000	33,000	49,411	19,346
North Carolina	2,700	....	....	222	10,262
Appalachian:					
Pennsylvania	9,000	31,516,856	30,796,727	36,174,089	42,302,173
Ohio	10,000	10,301,708	10,910,951	9,976,787	11,494,506
Maryland	550	3,278,023	3,479,470	2,939,715	3,357,813
Virginia	2,000	795,263	1,040,000	816,375	764,665
West Virginia	16,000	4,881,620	5,498,800	6,231,880	7,394,494
Eastern Kentucky	11,180	950,903	1,193,000	1,108,770	1,206,120
Tennessee	5,100	1,900,000	1,967,297	1,925,689	2,169,585
Georgia	200	313,715	180,000	225,934	228,337
Alabama	8,660	1,950,000	2,900,000	3,572,983	4,090,409
	62,690	55,888,088	60,966,245	62,972,222	73,008,102
Northern:					
Michigan	6,700	71,461	81,407	67,431	74,977
Central:					
Indiana	6,450	3,217,711	3,140,979	2,845,057	3,305,737
Western Kentucky	4,500	982,282	1,377,000	1,290,985	1,495,376
Illinois	36,800	10,278,890	14,655,188	12,104,272	15,274,727
	47,750	14,478,883	19,173,167	16,240,314	20,075,840
Western:					
Iowa	18,000	4,473,828	4,952,440	4,045,358	4,021,739
Missouri	26,700	3,209,916	3,909,967	2,557,823	2,735,221
Nebraska	3,200	1,500	1,500	2,222,543	2,259,922
Kansas	17,000	1,596,879	1,850,000		
Arkansas	9,100	129,600	276,871	279,584	399,888
Indian Territory	20,000	685,911	761,986	752,832	869,229
Texas	4,500	75,000	90,000	128,216	184,440
	98,500	10,172,634	11,842,764	10,036,356	10,470,439

a Included in bituminous product.

b Including lignite, brown coal, and scattering lots of anthracite.

Classification of the coal fields of the United States—Continued.

	Area.	Product in— 1887.	1888.	1889.	1890.
Bituminous. (*a*)—Continued.	*Sq. miles.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Rocky Mountain, etc.:					
Dakota	....	21,470	34,000	28,907	30,000
Montana	....	10,202	41,467	363,301	517,477
Idaho	....	500	400	....	1,870,366
Wyoming	....	1,170,318	1,481,540	1,388,947	318,159
Utah	....	180,021	258,961	236,651	3,094,003
Colorado	2,913	1,755,735	2,140,686	2,544,144	375,777
New Mexico	....	508,034	626,665	486,463	....
	....	3,646,280	4,583,719	5,048,413	6,205,782
Pacific coast:					
Washington	....	772,612	1,215,750	1,030,578	1,263,689
Oregon	....	31,696	75,000	64,359	61,514
California	....	50,000	95,000	119,820	110,711
	....	854,308	1,385,750	1,214,757	1,435,914
Total product sold	....	124,689,909	142,037,740	....	....
Colliery consumption	....	5,960,302	6,621,667	....	....
Total product, including colliery consumption	....	130,650,211	148,659,407	141,229,613	157,770,963

	Product in— 1891.	1892.	1893.	1894.	1895.
Anthracite.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
New England (Rhode Island and Massachusetts)	500	....	....	....	....
Pennsylvania	50,665,431	52,472,504	53,967,543	51,921,121	57,999,337
Colorado and New Mexico	(*b*)	64,963	93,578	71,550	67,179
	50,665,931	52,537,467	54,061,121	51,992,671	58,066,516
Bituminous. (*a*)					
Triassic:					
Virginia	17,290	37,219	19,878	52,079	57,782
North Carolina	20,355	6,679	17,000	16,900	24,900
Appalachian:					
Pennsylvania	42,788,490	46,694,576	44,070,724	39,912,463	50,217,228
Ohio	12,868,683	13,562,927	13,253,646	11,909,856	13,355,806
Maryland	3,820,239	3,419,962	3,716,041	3,501,428	3,915,585
Virginia	719,109	637,986	800,461	1,177,004	1,310,542
West Virginia	9,220,665	9,738,755	10,708,578	11,627,757	11,387,961
Eastern Kentucky	1,222,918	1,231,110	1,245,785	1,218,072	1,490,057
Tennessee	2,413,678	2,092,064	1,902,258	2,180,879	2,535,644
Georgia	171,000	215,498	372,740	354,111	260,998
Alabama	4,759,781	5,529,312	5,136,935	4,397,178	5,693,775
	77,984,563	83,122,190	81,207,168	76,278,748	90,167,596
Northern:					
Michigan	80,307	77,990	45,979	70,002	112,322

a Including lignite, brown coal, and scattering lots of anthracite.
b Included in bituminous product.

Classification of the coal fields of the United States—Continued.

	Product in—				
	1891.	1892.	1893.	1894.	1895.
Bituminous. (*a*)—Continued.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Central:					
Indiana	2,973,474	3,345,174	3,791,851	3,423,921	3,995,892
Western Kentucky	1,693,151	1,794,203	1,761,394	1,893,120	1,867,713
Illinois	15,660,698	17,862,276	19,949,564	17,113,576	17,735,864
	20,327,323	23,001,653	25,502,809	22,430,617	23,599,469
Western:					
Iowa	3,825,495	3,918,491	3,972,229	3,967,253	4,156,074
Missouri	2,674,606	2,733,949	2,897,442	2,245,039	2,372,393
Nebraska	1,500	1,500	....	....	....
Kansas	2,716,705	3,007,276	2,652,546	3,388,251	2,926,870
Arkansas	542,379	535,558	574,763	512,626	598,322
Indian Territory	1,091,032	1,192,721	1,252,110	969,606	1,211,185
Texas	172,100	245,690	302,206	420,848	484,959
	11,023,817	11,635,185	11,651,296	11,503,623	11,749,803
Rocky Mountain, etc.:					
Dakota	30,000	40,725	49,630	42,015	39,197
Montana	541,861	564,648	892,309	927,395	1,504,193
Wyoming	2,327,841	2,503,839	2,439,311	2,417,463	2,246,911
Utah	371,045	361,013	413,205	431,550	471,836
Colorado	3,512,632	3,447,967	4,018,793	2,776,817	3,027,327
New Mexico	462,328	659,230	655,112	580,238	709,130
Nevada	....	....	....	150	....
	7,245,707	7,577,422	8,468,360	7,175,628	7,998,594
Pacific coast:					
Washington	1,056,249	1,213,427	1,264,877	1,106,470	1,191,410
Oregon	51,826	34,661	41,683	47,521	73,685
California	93,301	85,178	72,603	67,247	75,453
	1,201,376	1,333,266	1,379,163	1,221,238	1,340,548
Total product, including colliery consumption	168,566,669	179,329,071	182,352,774	170,741,526	193,117,530

	Product in—				
	1896.	1897.	1898.	1899.	1900.
Anthracite.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
New England (Rhode Island and Massachusetts)	....	....	....	....	....
Pennsylvania	54,346,081	52,611,680	53,382,644	60,418,005	57,367,915
Colorado and New Mexico	79,492	69,076	47,095	96,196	98,404
	54,425,573	52,680,756	53,429,739	60,514,201	57,466,319
Bituminous. (*a*)					
Triassic:					
Virginia	95,670	95,670	38,938	28,353	57,912
North Carolina	7,813	21,280			

a Including lignite, brown coal, and scattering lots of anthracite.

Classification of the coal fields of the United States—Continued.

	Product in—				
	1896.	1897.	1898.	1899.	1900.
Bituminous. (*a*)—Continued.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Appalachian:					
Pennsylvania	49,557,453	54,417,974	65,165,133	74,150,175	79,842,326
Ohio	12,875,202	12,196,942	14,516,867	16,500,270	18,988,150
Maryland	4,143,936	4,442,128	4,674,884	4,807,396	4,024,688
Virginia	1,159,053	1,432,632	1,787,831	2,104,334	2,353,576
West Virginia	12,876,296	14,248,159	16,700,999	19,252,995	22,647,207
Eastern Kentucky	1,486,016	1,411,897	1,591,076	1,871,550	2,222,867
Tennessee	2,663,106	2,888,849	3,022,896	3,330,659	3,708,562
Georgia	238,546	195,869	244,187	233,111	315,557
Alabama	5,748,697	5,893,770	6,535,283	7,593,416	8,394,275
	90,748,305	97,128,220	114,239,156	129,843,906	142,497,208
Northern:					
Michigan	92,882	223,592	315,722	624,708	849,475
Central:					
Indiana	3,905,779	4,151,169	4,920,743	6,006,523	6,484,086
Western Kentucky	1,847,462	2,190,200	2,296,832	2,735,705	3,106,097
Illinois	19,786,626	20,072,758	18,599,299	24,439,019	25,767,981
	25,539,867	26,414,127	25,816,874	33,181,247	35,358,164
Western:					
Iowa	3,954,028	4,611,865	4,618,842	5,177,479	5,202,939
Missouri	2,331,542	2,665,626	2,688,321	3,025,814	3,540,103
Nebraska	3,560	645	....	....	....
Kansas	2,884,801	3,054,012	3,406,555	3,852,267	4,467,870
Arkansas	675,374	856,190	1,205,479	843,554	1,447,945
Indian Territory	1,366,646	1,336,380	1,381,466	1,537,427	1,922,298
Texas	544,015	639,341	686,734	883,832	968,373
	11,759,966	13,164,059	13,988,436	15,320,393	17,549,528
Rocky Mountain, etc.:					
North Dakota	*b* 78,050	77,246	83,895	98,809	129,883
Montana	1,543,445	1,647,882	1,479,803	1,496,451	1,661,775
Wyoming	2,229,624	2,597,886	2,863,812	3,837,392	4,014,602
Utah	418,627	521,560	593,709	786,049	1,147,027
Colorado	3,054,711	3,307,644	4,053,210	4,718,590	5,182,176
New Mexico	600,823	701,964	968,330	1,012,152	1,263,083
Idaho	....	....	1,039	20	10
Nevada	....	....	....	....	....
	7,925,280	8,854,182	10,042,759	11,949,463	13,398,556
Pacific coast:					
Washington	1,195,504	1,434,112	1,884,571	2,029,881	2,474,093
Oregon	101,721	101,755	58,184	86,888	58,864
California	*c* 93,776	*c* 103,912	*c* 160,288	*c* 160,972	171,708
	1,391,001	1,639,779	2,103,043	2,277,741	2,704,665
Total product, including colliery consumption	191,986,357	200,221,665	219,974,667	253,739,992	269,881,827

a Including lignite, brown coal, and scattering lots of anthracite.
b Includes South Dakota. *c* Includes Alaska.

RELATIVE IMPORTANCE OF THE VARIOUS FIELDS.

In point of production, the most important of the coal fields of the United States are those contained in the Appalachian region, extending from Pennsylvania on the north to Alabama on the south. The proportion contributed to the total coal product of the United States by the areas included in the Appalachian region has varied between 60 and 70 per cent. In 1900 the percentage of the total contributed by the Appalachian coal field was 67.1, as compared with 67.2 in 1899 and 68.6 in 1898. The next in producing importance is the central coal field, which includes the coal-producing areas of Illinois, Indiana, and western Kentucky. This region produced, in 1900, 16.6 per cent of the total coal product of the United States. The western coal field, which embraces the areas contained in the States of Iowa, Kansas, Missouri, Indian Territory, Arkansas, and Texas, is the largest of the coal fields in point of area, having a total extent of nearly 100,000 square miles underlain by coal, whereas the Appalachian field, second in area, contains, including the anthracite region of Pennsylvania, a little over 63,000 square miles. The central field contains 47,750 square miles. Notwithstanding the comparatively large area contained in the western coal field, the production from these States aggregates only 8.3 per cent of the total product, one-half of the proportion contributed by the central coal field and about one-eighth of that contributed by the Appalachian field. The States contained in the Rocky Mountain region produced, in 1900, 6.3 per cent of the total product.

In the following statement is shown the total production of the different fields in 1887, 1899, and 1900, together with the increases in 1900 over 1899, and also over 1887. The largest gains in point of tonnage were made by the Appalachian field, which shows an increase of 12,653,302 short tons, or 9.7 per cent, over 1899, and of 87,304,174 tons, or 158 per cent, over 1887. The next largest increase in 1900 over 1899 was in the central field, which increased 2,176,917 short tons, or 6.6 per cent, over the preceding year. From 1887 to 1900 the central field has increased from 14,478,883 to 35,358,164 tons, a gain of 20,879,281 tons, or 144 per cent. The western field increased 2,129,135 short tons, or 14 per cent, over 1899. As compared with 1887, however, the western field has not shown the amount or percentage of increase exhibited by the central and Rocky Mountain fields. The Rocky Mountain States have increased in the same time from 3,646,280 to 13,398,556 short tons, or 267 per cent. So far as the ratio of increase is concerned, however, both of these regions fall into insignificance when compared with that of the northern field, which embraces the coal-producing area of Michigan. This field in 1887 produced only 71,461 short tons. During the last three or four years extensive developments have been in progress, and in 1900 the output reached 849,475 tons, a gain of 778,014 tons, or 1,089 per cent. These statistics are shown in detail in the following table:

Production of the six principal bituminous coal fields in 1887, 1899, and 1900 compared.

Field.	1887.		1899.		1900.	
	Product.	Per cent of total.	Product.	Per cent of total.	Product.	Per cent of total.
	Short tons.		*Short tons.*		*Short tons.*	
Appalachian	55,193,034	63.0	129,843,906	67.2	142,497,208	67.1
Central	14,478,883	16.5	33,181,247	17.2	35,358,164	16.6
Western	10,193,034	11.6	15,320,393	8.0	17,549,528	8.3
Northern	71,461	.08	624,708	.32	849,475	.4
Rocky Mountain	3,646,280	4.15	11,949,443	6.2	13,398,556	6.3
Pacific coast	854,308	1.0	2,277,741	1.18	2,704,665	1.27

Field.	Increase in 1900 over 1899.		Increase in 1900 over 1887.	
	Amount.	Per cent.	Amount.	Per cent.
	Short tons.		*Short tons.*	
Appalachian	12,653,302	9.7	87,304,174	158.2
Central	2,176,917	6.6	20,879,281	144.2
Western	2,129,135	14.0	7,356,494	71.0
Northern	224,767	36.0	778,014	1,089.0
Rocky Mountain	1,449,113	12.0	9,752,276	267.0
Pacific coast	426,924	18.7	1,850,357	216.5

PRODUCTION.

The aggregate production of anthracite and bituminous coal in 1900 amounted to 240,965,917 long tons, equivalent to 269,881,827 short tons, with a value of $306,891,364, as compared with 226,553,564 long tons, or 253,739,992 short tons, in 1899, valued at $256,077,434. The increase in 1900 over the preceding year was 14,412,353 long tons, or 16,141,835 short tons, in amount, and $50,813,930 in value.

The output of anthracite coal in Pennsylvania amounted to 51,221,353 long tons, or 57,367,915 short tons, valued at $85,757,851, against 53,944,647 long tons, or 60,418,005 short tons, in 1899, valued at $88,142,130. The decrease in the production of anthracite amounted to 2,723,294 long tons, or 3,050,090 short tons, in amount, and $2,384,279 in value, and was due entirely to the protracted labor troubles, which practically suspended mining operations in the anthracite regions during the summer and early fall of 1900.

The total product of bituminous coal, which includes lignite or brown coal, cannel, splint, semianthracite, and semibituminous, and the small anthracite product of Colorado and New Mexico, amounted to 189,744,564 long tons, or 212,513,912 short tons, valued at $221,133,513, as compared with 172,608,917 long tons, or 193,321,987 short tons, in 1899, valued at $167,935,304, showing an increase in the bituminous product of 17,135,647 long tons, or 19,191,925 short tons, in amount, and $53,198,209 in value.

The most notable feature in connection with the coal-mining industry of the United States in 1900 was the comparatively large increase in the value of the product, which was principally noticeable in the production of bituminous coal. The total increase in product was 16,141,835 short tons, or 6.4 per cent, while the value increased $50,813,930, or 19.8 per cent. This increase in value in 1900 was nearly $2,800,000 more than the increase in value from 1898 to 1899, when the product increased 33,765,325 tons, or more than double the increase of 1900 over 1899. There were only three States in which the average price per ton realized in 1900 was less than that obtained in 1899. These were Arkansas, New Mexico, and Utah, all of which had a largely increased production in 1900. Arkansas's output in 1900 was 75 per cent more than in 1899, the production in 1899 being greatly reduced by reason of labor troubles which affected the Arkansas and Indian Territory region in that year. The scarcity of fuel caused by the strike is responsible for advanced prices in 1899, and the decline in the prices in 1900 for Arkansas is not surprising. Utah's production in 1900 was 45.9 per cent more than in 1899. New Mexico's output increased 23.7 per cent, and the slight decline in price in these two States was due to the largely augmented product. It will thus be seen that the coal-mining industry throughout the United States received the benefit of the generally prosperous conditions which prevailed during that year. The statistics for 1899 showed that there had been an advance in prices for the coal produced in that year, but in a number of cases, notwithstanding an increased value, the coal-mine operators were no better off than they had been two or three years before. This was due to the fact that, taking advantage of the increased demand for coal in 1899, wages were sharply advanced, and operators, in order to fill their contracts, were compelled to meet the demands of their employees, whereas the product had been sold on contracts made on prices ruling during 1898. Consequently, 1900 may be considered the most prosperous year that the coal-mining industry has known for a long time, possibly even in the entire history of the trade.

The statistics regarding the use of mining machines, which are presented in detail in another portion of this report, show that the undercutting of bituminous coal by mechanical means continues to increase. In 1900, 52,790,523 tons, or 24.65 per cent of the total bituminous product, was undercut by machines. The total product of bituminous coal in 1900 increased a little less than 10 per cent over 1899, while the machine product increased over 20 per cent.

The total number of men employed in all the coal mines of the United States in 1900 was 448,706, who made an average of two hundred and twelve working days, as compared with 410,635 men for an average of two hundred and fourteen days in 1899, and 401,221 men for one hundred and ninety days in 1898.

In considering the coal product, these reports include not only the coal marketed, either by shipment to distant points or sold locally, but also that consumed by mine employees and by the mine operators themselves in locomotives and for other purposes in connection with the operation of the mines. This latter factor is usually considered as colliery consumption. There are occasional exceptions where operators use only slack, or a product which would otherwise be wasted, and of which no record is kept, it not appearing in the product or being considered in the wages of the miner. These exceptions are few, and the amount was comparatively so small as not materially to affect the total. The coal consumed in the manufacture of coke is also considered in this report. The amount of coal made into coke at the mines in 1900 was 27,238,340 tons. The coal shipped, sold to local trade and employees, and used in the manufacture of coke is considered a marketable product. The colliery consumption in the anthracite region, which is not considered in the value of the anthracite product, ranges from 8 to 10 per cent of the total anthracite output. The colliery consumption at the bituminous mines averages about 1½ per cent of the total bituminous product. Deducting the colliery consumption from the total for 1900, the marketable product is shown to have been 260,689,081 short tons, as compared with 244,612,654 short tons in 1899.

ANTHRACITE.

The production of anthracite coal in Pennsylvania in 1900 amounted to 51,221,353 long tons, or 57,367,915 short tons, valued at the mines at $85,757,851, against 53,944,647 long tons, or 60,418,005 short tons, worth $88,142,130, in 1899, and 47,663,076 long tons, or 53,382,644 short tons, worth $75,414,537, in 1898.

Compared with that in 1899, the anthracite product in 1900 shows a decrease of 2,723,294 long tons, or 3,050,090 short tons, in amount and of $2,384,279 in value. This decrease was due to labor troubles which practically suspended operations in the anthracite field for nearly forty days. Notwithstanding this decrease from the output in 1899, the product in 1900 was larger than in any year preceding 1899, with the exception of 1895, when the output was something over 500,000 tons larger than last year. The causes of the strike and its effect upon the anthracite trade are fully discussed in the report on the anthracite production, by Mr. William W. Ruley, which appears in another portion of this chapter.

In addition to the anthracite product of Pennsylvania, a small amount of coal which is true anthracite is mined in Colorado and New Mexico. The amount produced, however, is comparatively insignificant, amounting to only 98,404 short tons in 1900 and 96,196 short tons in 1899. It has been customary to include this small factor in the bituminous product except in the preceding tables giving the production by fields. With this exception, reference to anthracite production throughout this and previous reports considers that of Pennsylvania only.

BITUMINOUS.

It has been customary in the preparation of these reports to include in the bituminous product all grades of coal produced in the United States outside of the anthracite fields of Pennsylvania. The product consequently embraces, in addition to strictly bituminous coals, those classed as semianthracite, semibituminous, splint, block, cannel, and lignite or brown coals, as well as the anthracite coal of Colorado and New Mexico. An exception is noted in the case of the semianthracite coal of the Bernice Basin, in Sullivan County, Pa., which is included in the anthracite product.

The aggregate of all the coals treated as bituminous amounted in 1900 to 212,513,912 short tons, valued at $221,133,513, as compared with 193,321,987 short tons, valued at $167,934,304, in 1899, and 166,592,023 short tons, worth $132,586,313, in 1898. The production in 1900 shows an increase over the preceding year of 19,191,925 short tons, or a little less than 10 per cent in quantity and of $53,198,209 in value. The increased production, and particularly the much larger comparative increase in value, were due to the abnormal activity which prevailed in nearly every branch of the manufacturing industries of the United States. The advance in value was something unprecedented in the history of coal mining in the United States, the average price per ton having risen from 87 cents in 1899 to $1.04 in 1900. The price obtained in 1900 was the highest in thirteen years. From 1887 to 1898 had been a period of continually declining prices, the extremes being $1.12 in 1887 and 80 cents in 1898. The statistics for 1899 showed an advance to 87 cents, which was followed in 1900 by a further advance of nearly 20 per cent over that figure.

The statistics of production in 1899 and 1900, by States, are shown in the following tables:

Coal product of the United States in 1899 by States.

State.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
Alabama	4,701,612	79,994	155,514	2,656,296
Arkansas	811,366	10,296	21,892	....
California and Alaska	151,265	5,275	4,432	....
Colorado	3,681,341	118,153	106,988	869,742
Georgia and North Carolina	174,080	926	8,434	76,567
Idaho	....	20	....	....
Illinois	21,871,930	1,936,515	630,574	....
Indiana	5,465,609	376,574	160,621	3,719
Indian Territory	1,444,063	12,280	54,222	26,862
Iowa	4,479,743	622,401	75,335	....
Kansas	3,524,497	276,918	50,852	....
Kentucky	4,139,199	282,736	67,136	118,184
Maryland	4,716,581	68,750	22,065	....
Michigan	574,280	34,191	16,237	....
Missouri	2,691,433	289,826	44,555	....
Montana	1,294,614	29,686	34,249	137,902
New Mexico	1,021,801	14,128	14,785	....
North Dakota	77,731	20,788	290	....
Ohio	14,880,893	1,393,025	211,992	14,360
Oregon	78,608	6,656	1,624	....
Pennsylvania	53,671,963	1,525,772	972,692	17,979,748
Tennessee	2,444,655	86,351	55,675	743,978
Texas	839,166	34,690	9,976	....
Utah	753,881	13,303	13,046	5,819
Virginia	1,175,504	23,634	19,004	887,649
Washington	1,897,962	20,281	61,443	50,195
West Virginia	15,044,272	476,996	87,022	3,644,705
Wyoming	3,584,667	32,429	188,196	32,100
Total bituminous	155,192,716	7,792,594	3,088,851	27,247,826
Pennsylvania anthracite	53,562,030	1,281,962	5,574,013	....
Grand total	208,754,746	9,074,556	8,662,864	27,247,826

Coal product of the United States in 1899 by States—Continued.

State.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.				
Alabama	7,593,416	$8,256,462	$1.09	238	13,481
Arkansas	843,554	989,383	1.17	156	2,313
California and Alaska	160,972	430,636	2.68	287	369
Colorado	4,776,224	5,363,667	1.12	246	7,166
Georgia and North Carolina	260,007	268,309	1.03	291	637
Idaho	20	100	5.00	....	....
Illinois	24,439,019	20,744,553	.85	228	36,756
Indiana	6,006,523	5,285,018	.82	218	9,712
Indian Territory	1,537,427	2,199,785	1.43	212	4,084
Iowa	5,177,479	6,397,338	1.24	229	10,971
Kansas	3,852,267	4,478,112	1.16	226	8,000
Kentucky	4,607,255	3,618,222	.79	224	7,461
Maryland	4,807,396	3,667,056	.76	275	4,624
Michigan	624,908	870,152	1.39	232	1,291
Missouri	3,025,814	3,591,945	1.20	212	7,136
Montana	1,496,451	2,347,757	1.57	238	2,378
New Mexico	1,050,714	1,461,865	1.39	257	1,750
North Dakota	98,809	117,500	1.19	154	210
Ohio	16,500,270	14,361,903	.87	200	26,038
Oregon	86,888	260,917	3.00	238	124
Pennsylvania	74,150,175	56,247,791	.76	245	82,812
Tennessee	3,330,659	2,940,644	.88	252	6,949
Texas	883,832	1,334,895	1.51	256	2,410
Utah	786,049	997,271	1.27	265	743
Virginia	2,105,791	1,304,241	.62	252	1,960
Washington	2,029,881	3,603,989	1.78	259	3,330
West Virginia	19,252,995	12,053,268	.63	242	23,625
Wyoming	3,837,392	4,742,525	1.24	261	4,697
Total bituminous	193,321,987	167,935,304	.87	234	271,027
Pennsylvania anthracite	60,418,005	88,142,130	1.46	173	139,608
Grand total	253,739,992	256,077,434	1.01	214	410,635

Coal product of the United States in 1900, by States.

State.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
Alabama	6,108,011	146,591	189,474	1,950,199
Arkansas	1,396,674	10,950	40,321	....
California	160,508	4,550	6,650	....
Colorado	4,027,872	106,917	139,085	970,490
Georgia and North Carolina	175,646	1,797	9,380	146,468
Idaho	....	10	....	....
Illinois	22,955,737	2,002,884	809,360	....
Indiana	5,947,462	372,948	161,071	2,605
Indian Territory	1,796,422	14,786	54,137	56,953
Iowa	4,389,344	696,472	117,123	....
Kansas	4,128,892	286,080	52,898	....
Kentucky	4,783,062	286,518	92,123	167,261
Maryland	3,949,539	51,565	23,584	....
Michigan	792,679	40,258	16,538	....
Missouri	3,187,194	293,229	59,680	....
Montana	1,445,456	26,814	55,854	133,651
New Mexico	1,198,289	15,574	58,103	27,333
North Dakota	106,584	21,729	1,570	....
Ohio	17,347,472	1,292,264	277,188	71,226
Oregon	48,160	9,590	1,114	....
Pennsylvania	58,696,100	1,506,778	1,067,942	18,571,506
Tennessee	2,808,253	66,320	52,451	781,538
Texas	954,521	4,318	9,534	....
Utah	1,082,723	17,355	18,650	28,299
Virginia	1,334,659	45,705	40,639	972,751
Washington	2,318,897	26,120	69,788	59,288
West Virginia	18,348,162	494,051	142,071	3,662,923
Wyoming	3,776,954	28,419	176,769	32,460
Total bituminous	173,265,272	7,870,592	3,743,097	27,634,951
Pennsylvania anthracite	50,709,816	1,208,450	5,449,649	....
Grand total	223,975,088	9,079,042	9,192,746	27,634,951

Coal product of the United States in 1900, by States—Continued.

State.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.				
Alabama	8,394,275	$9,793,785	$1.17	257	13,967
Arkansas	1,447,945	1,653,618	1.14	219	2,800
California	171,708	523,231	3.05	309	378
Colorado	5,244,364	5,858,036	1.12	264	7,459
Georgia and North Carolina	333,291	393,469	1.18	262	681
Idaho	10	50	5.00	....	....
Illinois	25,767,981	26,927,185	1.04	226	39,101
Indiana	6,484,086	6,687,137	1.03	199	11,720
Indian Territory	1,922,298	2,788,124	1.45	228	4,525
Iowa	5,202,939	7,155,341	1.38	228	11,608
Kansas	4,467,870	5,454,691	1.22	232	8,459
Kentucky	5,328,964	4,881,577	.92	227	9,680
Maryland	4,024,688	3,927,381	.98	203	5,319
Michigan	849,475	1,259,683	1.48	261	1,704
Missouri	3,540,103	4,280,328	1.21	214	8,180
Montana	1,661,775	2,713,707	1.63	252	2,376
New Mexico	1,299,299	1,776,170	1.37	261	2,037
North Dakota	129,883	158,348	1.22	142	326
Ohio	18,988,150	19,292,246	1.02	215	27,628
Oregon	58,864	220,001	3.74	273	141
Pennsylvania	79,842,326	77,438,545	.97	242	92,692
Tennessee	3,708,562	4,223,082	1.14	240	8,246
Texas	968,373	1,581,914	1.63	246	2,844
Utah	1,147,027	1,447,750	1.26	248	1,308
Virginia	2,393,754	2,123,222	.89	239	3,631
Washington	2,474,093	4,700,068	1.90	289	3,670
West Virginia	22,647,207	18,416,871	.81	231	29,163
Wyoming	4,014,602	5,457,953	1.36	266	5,332
Total bituminous	212,513,912	221,133,513	1.04	234	304,975
Pennsylvania anthracite	57,367,915	85,757,851	1.49	166	144,206
Grand total	269,881,827	306,891,364	1.14	212	449,181

PRODUCTION IN PREVIOUS YEARS.

In the following table is presented a statement of the annual production of anthracite and bituminous coal in the United States since 1880, a period of twenty-one years. By this it will be seen that the output of anthracite coal in Pennsylvania in 1900 was almost exactly double that of 1880, both in amount and in value. The bituminous product, on the other hand, has increased in the same time nearly five-fold in point of tonnage and a little over four-fold in value. During this period the combined product of anthracite and bituminous coal has increased from 63,820,830 long tons, or 71,481,569 short tons, valued at $95,640,396, to 240,965,917 long tons, or 269,881,827 short tons, with an aggregate value of nearly $307,000,000. The total value of the coal product of the United States in 1900 was equal to 80 per cent of the total mineral product of the country in 1880.

Annual production of coal in the United States since 1880.

Year.	Pennsylvania anthracite.			Bituminous coal.		
	Long tons of 2,240 pounds.	Short tons of 2,000 pounds.	Value.	Long tons of 2,240 pounds.	Short tons of 2,000 pounds.	Value.
1880	25,580,189	28,649,811	$42,196,678	38,242,641	42,831,758	$53,443,718
1881	28,500,016	31,920,018	64,125,036	48,365,341	53,961,012	60,224,344
1882	31,358,264	35,121,256	70,556,094	60,861,190	68,164,533	76,076,487
1883	34,336,469	38,456,845	77,257,055	68,531,500	76,755,280	82,237,800
1884	33,175,756	37,156,847	66,351,512	73,730,539	82,578,204	77,417,066
1885	34,228,548	38,335,974	76,671,948	64,840,668	72,621,548	82,347,648
1886	34,853,077	39,035,446	76,119,120	66,646,947	74,644,581	78,481,056
1887	37,578,747	42,088,197	84,552,181	79,073,227	88,562,014	98,004,656
1888	41,624,611	46,619,564	89,020,483	91,107,002	102,039,843	101,860,529
1889	40,665,152	45,544,970	65,721,578	85,432,717	95,684,643	94,504,745
1890	41,489,858	46,468,641	66,383,772	99,377,073	111,302,322	110,420,801
1891	45,236,992	50,665,431	73,944,735	105,268,962	117,901,237	117,188,400
1892	46,850,450	52,472,504	82,442,000	113,264,792	126,856,567	125,124,381
1893	48,185,306	53,967,543	85,687,078	114,629,671	128,385,231	122,751,618
1894	46,358,144	51,921,121	78,488,063	106,089,647	118,820,405	107,653,501
1895	51,785,122	57,999,337	82,019,272	120,641,244	135,118,193	115,779,771
1896	48,523,287	54,346,081	81,748,651	122,893,104	137,640,276	114,891,515
1897	46,974,714	52,611,680	79,301,954	131,794,630	147,609,985	119,567,224
1898	47,663,076	53,382,644	75,414,537	148,742,878	166,592,023	132,586,313
1899	53,944,647	60,418,005	88,142,130	172,608,917	193,321,987	167,935,304
1900	51,221,353	57,367,915	85,757,851	189,744,564	212,513,912	221,133,513

Year.	Total.		
	Long tons.	Short tons.	Value.
1880	63,822,830	71,481,569	$95,640,396
1881	76,865,357	85,881,030	124,349,380
1882	92,219,454	103,285,789	146,632,581
1883	102,867,969	115,212,125	159,494,855
1884	106,906,295	119,735,051	143,768,578
1885	99,069,216	110,957,522	159,019,596
1886	101,500,024	113,680,027	154,600,176
1887	116,651,974	130,650,211	182,498,737
1888	132,731,613	148,659,407	190,881,012
1889	126,097,869	141,229,613	160,226,323
1890	140,866,931	157,770,963	176,804,573
1891	150,505,954	168,566,668	191,133,135
1892	160,115,242	179,329,071	207,566,381
1893	162,814,977	182,352,774	208,438,696
1894	152,447,791	170,741,526	186,141,564
1895	172,426,366	193,117,530	197,799,043
1896	171,416,390	191,986,357	196,640,166
1897	178,769,344	200,221,665	198,869,178
1898	196,405,953	219,974,667	208,000,850
1899	226,553,564	253,739,992	256,077,434
1900	240,965,917	269,881,827	306,891,364

The statistics of the production by States since 1886, the first year for which the information was collected by the United States Geological Survey, to the close of 1900 are shown in the following table. The increases and decreases in each State, both in amount and in value, are shown at the end of the table:

Amount and value of coal produced in the United States, by States and Territories, from 1886 to 1900.

State or Territory.	1886.		1887.		1888.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Alabama	1,800,000	$2,574,000	1,950,000	$2,535,000	2,900,000	$3,335,000
Arkansas	125,000	200,000	129,600	194,400	276,871	415,306
California	100,000	300,000	50,000	150,000	95,000	380,000
Colorado	1,368,338	3,215,594	1,791,735	3,941,817	2,185,477	4,808,049
Georgia	223,000	334,500	313,715	470,573	180,000	270,000
Idaho	1,500	6,000	500	2,000	400	1,800
Illinois	9,246,435	10,263,543	10,278,890	11,152,596	14,655,188	16,413,811
Indiana	3,000,000	3,450,000	3,217,711	4,324,604	3,140,979	4,397,370
Indian Territory	534,580	855,328	685,911	1,286,692	761,986	1,432,072
Iowa	4,315,779	5,391,151	4,473,828	5,991,735	4,952,440	6,438,172
Kansas	1,400,000	1,680,000	1,596,879	2,235,631	1,850,000	2,775,000
Kentucky	1,550,000	1,782,500	1,933,185	2,223,163	2,570,000	3,084,000
Maryland	2,517,577	2,391,698	3,278,023	3,114,122	3,479,470	3,293,070
Michigan	60,434	90,651	71,461	107,191	81,407	135,221
Missouri	1,800,000	2,340,000	3,209,916	4,298,994	3,909,967	8,650,800
Montana	49,846	174,460	10,202	35,707	41,467	145,135
Nebraska	....	....	1,500	3,000	1,500	3,375
New Mexico	271,285	813,855	508,034	1,524,102	626,665	1,879,995
North Dakota	25,955	41,277	21,470	32,205	34,000	119,000
Ohio	8,435,211	8,013,450	10,301,708	9,096,848	10,910,951	10,147,180
Oregon	45,000	112,500	31,696	70,000	75,000	225,000
Pennsylvania:						
Anthracite	36,696,475	71,558,126	39,506,255	79,365,244	43,922,897	85,649,649
Bituminous	27,094,501	21,016,235	31,516,856	27,806,941	33,796,727	32,106,891
Rhode Island	....	....	6,000	16,250	4,000	11,000
Tennessee	1,714,290	1,971,434	1,900,000	2,470,000	1,967,297	2,164,026
Texas	100,000	185,000	75,000	150,000	90,000	184,500
Utah	200,000	420,000	180,021	360,042	258,961	543,818
Virginia	684,951	684,951	825,263	773,360	1,073,000	1,073,000
Washington	423,525	952,931	772,612	1,699,746	1,215,750	3,647,250
West Virginia	4,005,796	3,805,506	4,881,620	4,594,979	5,498,800	6,048,680
Wyoming	829,355	2,488,065	1,170,318	3,510,954	1,481,540	4,444,620
Total product sold	108,618,833	147,112,755	124,689,909	173,537,896	142,037,740	204,222,790
Colliery consumption	5,061,194	....	5,960,302	8,960,841	6,621,667	7,295,834
Total	113,680,027	147,112,755	130,650,211	182,498,737	148,659,407	211,518,624

Amount and value of coal produced in the United States, etc.—Continued.

State or Territory.	1889.		1890.		1891.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Alabama	3,572,983	$3,961,491	4,090,409	$4,202,469	4,759,781	$5,087,596
Arkansas	279,584	395,836	399,888	514,595	542,379	647,560
California	184,179	434,382	110,711	283,019	93,301	204,902
Colorado	2,544,144	3,843,992	3,094,003	4,344,196	3,512,632	4,800,000
Georgia	226,156	339,382	228,337	238,315	171,000	256,500
Illinois	12,104,272	11,755,203	15,274,727	14,171,230	15,660,698	14,237,074
Indiana	2,845,057	2,887,852	3,305,737	3,259,233	2,973,474	3,070,918
Indian Territory	752,832	1,323,807	869,229	1,579,188	1,091,032	1,897,037
Iowa	4,095,358	5,426,509	4,021,739	4,995,739	3,825,495	4,807,999
Kansas	2,221,043	3,297,288	2,259,922	2,947,517	2,716,705	3,557,303
Kentucky	2,399,755	2,374,339	2,701,496	2,472,119	2,916,069	2,715,600
Maryland	2,939,715	2,517,474	3,357,813	2,899,572	3,820,239	3,082,515
Michigan	67,431	115,011	74,977	149,195	80,307	133,387
Missouri	2,557,823	3,479,057	2,735,221	3,382,858	2,674,606	3,283,242
Montana	363,301	880,773	517,477	1,252,492	541,861	1,228,630
Nebraska	1,500	4,500	1,500	4,500	1,500	4,500
New Mexico	486,463	870,468	375,777	504,390	462,328	779,018
North Carolina	(*a*)	....	10,262	17,864	20,355	39,365
North Dakota	28,907	41,431	30,000	42,000	30,000	42,000
Ohio	9,976,787	9,355,400	11,494,506	10,783,171	12,868,683	12,106,115
Oregon	(*b*)	....	61,514	177,875	51,826	155,478
Pennsylvania:						
Anthracite	*c*45,598,487	65,873,514	46,468,641	66,383,772	50,665,431	73,944,735
Bituminous	36,174,089	27,953,315	42,302,173	35,376,916	42,788,490	37,271,053
Rhode Island	2,000	6,000	....	....	500	10,000
Tennessee	1,925,689	2,338,309	2,169,585	2,395,746	2,413,678	2,668,188
Texas	128,216	340,620	184,440	465,900	172,100	412,360
Utah	236,651	377,456	318,159	552,390	371,045	666,045
Virginia	865,786	804,475	784,011	589,925	736,399	611,654
Washington	1,030,578	2,393,238	1,263,689	3,426,590	1,056,249	2,437,270
West Virginia	6,231,880	5,086,584	7,394,654	6,208,128	9,220,665	7,359,816
Wyoming	1,388,947	1,748,617	1,870,366	3,183,669	2,327,841	3,555,275
Total	141,229,613	160,226,323	57,770,963	176,804,573	168,566,669	191,133,135

a Product included in Georgia.
b Product included in California.
c Includes product of anthracite in Colorado and New Mexico.

Amount and value of coal produced in the United States, etc.—Continued.

State or Territory.	1892.		1893.		1894.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Alabama	5,529,312	$5,788,898	5,136,935	$5,096,792	4,397,178	$4,085,535
Arkansas	535,558	666,230	574,763	773,347	512,626	631,988
California	85,178	209,711	72,603	167,555	67,247	155,620
Colorado	3,510,830	5,685,112	4,102,389	5,104,602	2,831,409	3,516,340
Georgia	215,498	212,761	372,740	365,972	354,111	299,290
Illinois	17,862,276	16,243,645	19,949,564	17,827,595	17,113,576	15,282,111
Indiana	3,345,174	3,620,582	3,791,851	4,055,372	3,423,921	3,295,034
Indian Territory	1,192,721	2,043,479	1,252,110	2,235,209	969,606	1,541,293
Iowa	3,918,491	5,175,060	3,972,229	5,110,460	3,967,253	4,997,939
Kansas	3,007,276	3,955,595	2,652,546	3,375,740	3,388,251	4,178,998
Kentucky	3,025,313	2,771,238	3,007,179	2,613,569	3,111,192	2,749,932
Maryland	3,419,962	3,063,580	3,716,041	3,267,317	3,501,428	2,687,270
Michigan	77,990	121,314	45,979	82,462	70,022	103,049
Missouri	2,733,949	3,369,659	2,897,442	3,562,757	2,245,039	3,634,564
Montana	564,648	1,330,847	892,309	1,772,116	927,395	1,887,390
Nebraska	1,500	4,500	....	....	150	475
New Mexico	661,330	1,074,601	665,094	979,044	597,196	935,857
North Carolina	6,679	9,599	17,000	25,500	16,900	29,675
North Dakota	40,725	39,250	49,630	56,250	42,015	47,049
Ohio	13,562,927	12,722,745	13,253,646	12,351,139	11,909,856	9,841,723
Oregon	34,661	148,546	41,683	164,500	47,521	183,914
Pennsylvania:						
Anthracite	52,472,504	82,442,000	53,967,543	85,687,078	51,921,121	78,488,063
Bituminous	46,694,576	39,017,164	44,070,724	35,260,674	39,912,463	29,479,820
Tennessee	2,092,064	2,355,441	1,902,258	2,048,449	2,180,879	2,119,481
Texas	245,690	569,333	302,206	688,407	420,848	976,458
Utah	361,013	562,625	413,205	611,092	431,550	603,479
Virginia	675,205	578,429	820,339	692,748	1,229,083	933,576
Washington	1,213,427	2,763,547	1,264,877	2,920,876	1,106,470	2,578,441
West Virginia	9,738,755	7,852,114	10,708,578	8,251,170	11,627,757	8,706,808
Wyoming	2,503,839	3,168,776	2,439,311	3,290,904	2,417,463	3,170,392
Total	179,329,071	207,566,381	182,352,774	208,438,696	170,741,526	186,141,564

Amount and value of coal produced in the United States, etc.—Continued.

State or Territory.	1895.		1896.		1897.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Alabama	5,693,775	$5,126,822	5,748,697	$5,174,135	5,893,770	$5,192,085
Arkansas	598,322	751,156	675,374	755,577	856,190	903,993
California	75,453	175 778	*a* 93,776	220,523	*a* 103,912	265,236
Colorado	3,082,982	3,675,185	3,112,400	3,606,642	3,361,703	3,947,186
Georgia	260,998	215 863	*b* 246,359	179,770	*b* 217,149	167,466
Idaho	....	....	....	....	645	2,150
Illinois	17,735,864	14,239,157	19,786,626	15,809,736	20,072,758	14,472,529
Indiana	3,995,892	3,642,623	3,905,779	3,261,737	4,151,169	3,472,348
Indian Territory	1,211,185	1,737,254	1,366,646	1,918,115	1,336,380	1,787,358
Iowa	4,156,074	4,982,102	3,954,028	4,628,022	4,611,865	5,219,503
Kansas	2,926,870	3,481,981	2,884,801	3,295,032	3,054,012	3,602,326
Kentucky	3,357,770	2,890,247	3,333,478	2,684,306	3,602,097	2,828 329
Maryland	3,915,585	3,160,592	4,143,936	3,299,928	4,442,128	3,363,996
Michigan	112,322	180,016	92,882	150,631	223,592	325,416
Missouri	2,372,393	2,651,612	2,331,542	2,518,194	2,665,626	2,887,884
Montana	1,504,193	2,850,906	1,543,445	2,279,672	1,647,882	2,897,408
Nebraska	....	....	(*c*)	(*c*)	(*d*)	(*d*)
New Mexico	720,654	1,072,520	622,626	930,381	716,981	991,611
North Carolina	24,900	41,350	(*e*)	(*e*)	(*e*)	(*e*)
North Dakota	*f* 39,197	*f* 42,046	78,050	84,908	77,246	83,803
Ohio	13,355,806	10,618,477	12,875,202	10,253,461	12,196,942	9,535,409
Oregon	73,685	247,901	101,721	294,564	101,755	313,890
Pennsylvania:						
Anthracite	57,999,337	82,019,272	54,346,081	81,748,651	52,611,680	79,301,954
Bituminous	50,217,228	35,980,357	49,557,453	35,368,249	54,417,974	37,463,519
Tennessee	2,535,644	2,349,032	2,663,106	2,281,295	2,888,849	2,329,534
Texas	484,959	913,138	544,015	896,251	639,341	972,323
Utah	471,836	617,349	418,627	500,547	521,560	618,230
Virginia	1,368,324	869,873	1,254,723	848,851	1,528,302	1,021,918
Washington	1,191,410	2,577,958	1,195,504	2,396,078	1,434,112	2,777,687
West Virginia	11,387,961	7,710,575	12,876,296	8,336,685	14,248,159	8,987,393
Wyoming	2,246,911	2,977,901	*g* 2,233,184	2,918,225	2,597,886	3,136,694
Total	193,117,530	197,799,043	191,986,357	196,640,166	200,221,665	198,869,178

a Includes Alaska.
b Includes North Carolina.
c Included in Wyoming.
d Included in Idaho.
e Included in Georgia.
f Includes South Dakota.
g Includes Nebraska

Amount and value of coal produced in the United States, etc.—Continued.

State or Territory.	1898.		1899.		1900.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Alabama	6,535,283	$4,932,776	7,593,416	$8,256,462	8,394,275	$9,793,785
Arkansas	1,205,479	1,238,778	843,554	989,383	1,447,945	1,653,618
California	*a* 160,288	405,915	160,972	430,636	171,708	523,231
Colorado	4,076,347	4,686,081	4,776,224	5,363,667	5,244,364	5,858,036
Georgia	*b* 255,682	212,537	*b* 260,007	268,309	*b* 333,291	393,469
Idaho	1,039	2,675	20	100	10	50
Illinois	18,599,299	14,567,598	24,439,019	20,744,553	25,767,981	26,927,185
Indiana	4,920,743	3,994,918	6,006,523	5,285,018	6,484,086	6,687,137
Indian Territory	1,381,466	1,827,638	1,537,427	2,199,785	1,922,298	2,788,124
Iowa	4,618,842	5,260,716	5,177,479	6,397,338	5,202,939	7,155,341
Kansas	3,406,555	3,703,014	3,852,267	4,478,112	4,467,870	5,454,691
Kentucky	3,887,908	3,084,551	4,607,255	3,618,222	5,328,964	4,881,577
Maryland	4,674,884	3,532,257	4,807,396	3,667,056	4,024,688	3,927,381
Michigan	315,722	462,711	624,708	870,152	849,475	1,259,683
Missouri	2,688,321	2,871,296	3,025,814	3,591,945	3,540,103	4,280,328
Montana	1,479,803	2,324,207	1,496,451	2,347,757	1,661,775	2,713,707
New Mexico	992,288	1,344,750	1,050,714	1,461,865	1,299,299	1,776,170
North Carolina	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)
North Dakota	83,895	93,591	98,809	117,500	129,883	158,348
Ohio	14,516,867	12,027,336	16,500,270	14,361,903	18,988,150	19,292,246
Oregon	58,184	212,184	86,888	260,917	58,864	220,001
Pennsylvania:						
Anthracite	53,382,644	75,414,537	60,418,005	88,142,130	57,367,915	85,757,851
Bituminous	65,165,133	43,352,588	74,150,175	56,247,791	79,842,326	77,438,545
Tennessee	3,022,896	2,337,512	3,330,659	2,940,644	3,708,562	4,223,082
Texas	686,734	1,139,763	883,832	1,334,895	968,373	1,581,914
Utah	593,709	752,252	786,049	997,271	1,147,027	1,447,750
Virginia	1,815,274	1,070,417	2,105,791	1,304,241	2,393,754	2,123,222
Washington	1,884,571	3,352,798	2,029,881	3,603,989	2,474,093	4,700,068
West Virginia	16,700,999	10,131,264	19,252,995	12,053,268	22,647,207	18,416,871
Wyoming	2,863,812	3,664,190	3,837,392	4,742,525	4,014,602	5,457,953
Total	219,974,667	208,000,850	253,739,992	256,077,434	269,881,827	306,891,364

a Includes Alaska. *b* Includes North Carolina. *c* Included in Georgia.

Amount and value of coal produced in the United States, etc.—Continued.

State or Territory.	Increase, 1900.		Per cent of increase.	
	Product.	Value.	Product.	Value.
	Short tons.			
Alabama	800,859	$1,537,323	10.5	18.6
Arkansas	604,391	664,235	75.0	66.6
California	10,736	92,595	7.0	22.0
Colorado	468,140	494,369	9.8	9.2
Georgia	73,284	125,160	28.2	46.6
Idaho	*a* 10	*a* 50	*a* 50.0	*a* 50.0
Illinois	1,328,962	6,182,632	5.4	29.8
Indiana	477,563	1,402,119	7.9	26.5
Indian Territory	384,871	588,339	25.0	26.7
Iowa	25,460	758,003	0.5	11.8
Kansas	615,603	976,579	16.0	22.0
Kentucky	721,709	1,263,355	15.4	34.9
Maryland	*a* 782,708	260,325	*a* 16.0	7.1
Michigan	224,767	389,531	36.0	44.0
Missouri	514,289	688,383	17.0	19.0
Montana	165,324	365,950	11.0	15.5
New Mexico	248,585	314,305	23.7	21.5
North Carolina	(*b*)	(*b*)	(*b*)	(*b*)
North Dakota	31,074	40,848	31.5	34.8
Ohio	2,487,880	4,930,343	15.0	34.0
Oregon	*a* 28,024	*a* 40,916	*a* 32.0	*a* 15.7
Pennsylvania:				
Anthracite	*a* 3,050,090	*a* 2,384,279	5.0	2.7
Bituminous	5,692,151	21,190,754	7.7	37.9
Tennessee	377,903	1,282,438	11.3	43.6
Texas	84,541	247,019	9.5	18.5
Utah	360,978	450,479	45.9	45.0
Virginia	287,963	818,981	13.7	62.8
Washington	444,212	1,096,079	21.9	30.4
West Virginia	3,394,212	6,363,603	17.6	52.8
Wyoming	177,210	715,428	4.6	15.0
Total	16,141,835	50,813,930	6.4	19.8

a Decrease. *b* Included in Georgia.

From the foregoing statement it is seen that the largest increase in production in 1900 was in the output of Pennsylvania bituminous coal, the production in 1900 being 5,692,151 short tons, or 7.7 per cent more than that of 1899. This was partly offset by a decrease of 3,050,090 short tons in the output of Pennsylvania anthracite, which made the net increase of the State 2,642,061 short tons. On account of this decrease in the production of anthracite, West Virginia is entitled to the distinction of having the largest net increase in production. The product of West Virginia for 1900 exceeded that of 1899 by 3,394,212 short tons. Next to West Virginia comes Ohio, with an increase of 2,487,880 short tons, followed by Illinois, with an increased production of 1,328,962 short tons. Decreases are shown in only three States—Idaho, Maryland, and Oregon—and in one of these, Maryland, the decreased product was accompanied by an increase in value, so that the operators in that State have no reason to complain of the business for the year. It is interesting to observe in almost every case that there was an increase in value in considerably larger proportion than the increase in product. The three exceptions to this were Arkansas, New Mexico, and Utah, where there was a slight decline in the average price per ton. Arkansas enjoys the distinction of the largest percentage of increase, with 75 per cent gain over 1899 in the amount of the product and 66.6 per cent gain in the value. This increase was principally due to the restricted production in 1899, which was brought about by the prolonged strikes in that region during the year. Utah is credited with a gain of 45.9 per cent in product and of 45 per cent in value. Michigan gained 36 per cent in product and 44 per cent in value. Georgia increased 35 per cent in amount and 54 per cent in value. One of the most remarkable instances was the increase of 52.8 per cent in the value of West Virginia's product, as compared with an increase of 17.6 per cent in its output, and in that of Virginia which gained 13.7 per cent in tonnage and 62.8 per cent in value.

The distribution of the product for consumption, the value, and the statistics of labor employed for a period of twelve years is shown in the following table:

Production of coal in the United States from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Manufactured into coke.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
1889	113,776,701	8,508,699	5,382,265	13,561,848
1890	128,383,658	9,009,285	5,063,953	15,331,760
1891	92,615,738	7,816,891	1,750,169	15,718,440
1892	146,372,098	9,704,678	6,210,767	17,041,528
1893	152,941,890	9,728,815	6,712,284	12,969,785
1894	142,833,319	8,764,538	6,307,296	12,836,373
1895	158,380,289	9,655,505	6,677,539	18,404,197
1896	159,176,155	9,502,927	7,184,832	16,122,443
1897	165,603,626	9,914,742	6,941,419	17,761,878
1898	180,960,111	8,925,914	7,921,289	22,167,353
1899	208,754,746	9,074,556	8,662,864	27,247,826
1900	223,975,088	9,079,042	9,192,746	27,634,951

Production of coal in the United States from 1889 to 1900—Continued.

Year.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.				
1889	141,229,513	$160,226,323	$1.13	....	....
1890	157,788,656	176,804,573	1.12	216	318,204
1891	117,901,238	117,188,400	.994	223	205,803
1892	179,329,071	207,566,381	1.16	212	341,943
1893	182,352,774	208,438,696	1.14	201	363,309
1894	170,741,526	186,141,564	1.09	178	376,206
1895	193,117,530	197,799,043	1.02	195	382,879
1896	191,986,357	196,640,166	1.02	185	386,656
1897	200,221,665	198,869,178	.99	179	397,701
1898	219,974,667	208,000,850	.95	190	401,221
1899	253,739,992	256,077,434	1.01	214	410,635
1900	269,881,827	306,891,364	1.14	212	449,181

RANK OF COAL-PRODUCING STATES.

In the following tables, which extend over a period of three years, the coal-producing States are arranged according to rank, first in amount of production and then in the value of the product, with the percentage of both amount and value contributed by each State. Pennsylvania, of course, ranks first in both particulars, with Illinois second. West Virginia is third in amount of coal produced, but fourth in value of product, followed by Ohio in the one respect and preceded by Ohio in the other. Alabama ranks fifth both in amount and value. Indiana holds sixth place in amount of production, but is displaced in value by Iowa, which State ranks eighth in point of production in 1900. Colorado advanced from ninth place in 1899 to seventh place in 1900, but also falls behind Iowa in value of product. Changes in the standing of each of the other States have occurred nearly every year, without, however, exercising much effect upon the total nor altering materially the percentage contributed by each.

Rank of coal-producing States in 1898, with amount and value of product, and percentage of each.

Production.				Value.			
Rank.	State or Territory.	Amount.	Per cent of total product.	Rank.	State or Territory.	Value.	Per cent of total value.
	Pennsylvania:	*Short tons.*			Pennsylvania:		
1	Anthracite	53,382,644	24.3	1	Anthracite	$75,414,537	36.3
	Bituminous	65,165,133	29.6		Bituminous	43,352,588	20.8
2	Illinois	18,599,299	8.5	2	Illinois	14,567,598	7.0
3	West Virginia	16,700,999	7.6	3	Ohio	12,027,336	5.8
4	Ohio	14,516,867	6.6	4	West Virginia	10,131,264	4.9
5	Alabama	6,535,283	3.0	5	Iowa	5,260,716	2.5
6	Indiana	4,920,743	2.2	6	Alabama	4,932,776	2.4
7	Maryland	4,674,884	2.1	7	Colorado	4,686,081	2.2
8	Iowa	4,618,842	2.1	8	Indiana	3,994,918	1.9
9	Colorado	4,076,347	1.8	9	Kansas	3,703,014	1.8
10	Kentucky	3,887,908	1.8	10	Wyoming	3,664,190	1.8
11	Kansas	3,406,555	1.5	11	Maryland	3,532,257	1.7
12	Tennessee	3,022,896	1.4	12	Washington	3,352,798	1.6
13	Wyoming	2,863,812	1.3	13	Kentucky	3,084,551	1.5
14	Missouri	2,688,321	1.2	14	Missouri	2,871,296	1.4
15	Washington	1,884,571		15	Tennessee	2,337,512	1.1
16	Virginia	1,815,274		16	Montana	2,324,207	1.1
17	Montana	1,479,803		17	Indian Territory	1,827,638	
18	Indian Territory	1,381,466		18	New Mexico	1,344,750	
19	Arkansas	1,205,479		19	Arkansas	1,238,778	
20	New Mexico	992,288		20	Texas	1,139,763	
21	Texas	686,734	5.0	21	Virginia	1,070,417	
22	Utah	593,709		22	Utah	752,252	4.2
23	Michigan	315,722		23	Michigan	462,711	
24	Georgia	*a* 255,682		24	California	*b* 405,915	
25	California	*b* 160,288		25	Georgia	*a* 212,537	
26	North Dakota	83,895		26	Oregon	212,184	
27	Oregon	58,184		27	North Dakota	93,591	
28	Idaho	1,039		28	Idaho	2,675	
	Total	219,974,667	100.0		Total	208,000,850	100.0

a Includes North Carolina.

b Includes Alaska.

Rank of coal-producing States in 1899, with amount and value of product, and percentage of each.

Production.				Value.			
Rank.	State or Territory.	Amount.	Per cent of total product.	Rank.	State or Territory.	Value.	Per cent of total value.
	Pennsylvania:	*Short tons.*			Pennsylvania:		
1	Anthracite	60,418,205	23.8	1	Anthracite	$88,142,130	34.4
	Bituminous	74,150,175	29.2		Bituminous	56,247,791	22.0
2	Illinois	24,439,019	9.7	2	Illinois	20,744,553	8.1
3	West Virginia	19,252,995	7.6	3	Ohio	14,361,903	5.6
4	Ohio	16,500,270	6.5	4	West Virginia	12,053,268	4.7
5	Alabama	7,593,416	3.0	6	Alabama	8,256,462	3.2
6	Indiana	6,006,523	2.4	5	Iowa	6,397,338	2.5
7	Iowa	5,177,479	2.1	7	Colorado	5,363,667	2.1
8	Maryland	4,807,396	1.9	8	Indiana	5,285,018	2.1
9	Colorado	4,776,224	1.9	9	Wyoming	4,742,525	1.9
10	Kentucky	4,607,255	1.8	10	Kansas	4,478,112	1.8
11	Kansas	3,852,267	1.5	11	Maryland	3,667,056	1.4
12	Wyoming	3,837,392	1.5	12	Kentucky	3,618,222	1.4
13	Tennessee	3,330,659	1.3	13	Washington	3,603,989	1.4
14	Missouri	3,025,814	1.2	14	Missouri	3,591,945	1.4
15	Virginia	2,105,791	0.8	15	Tennessee	2,940,644	1.1
16	Washington	2,029,881	0.8	16	Montana	2,347,757	0.9
17	Indian Territory	1,537,427		17	Indian Territory	2,199,785	0.9
18	Montana	1,496,451		18	New Mexico	1,461,865	
19	New Mexico	1,050,714		19	Texas	1,334,895	
20	Texas	883,832		20	Virginia	1,304,241	
21	Arkansas	843,554		21	Utah	997,271	
22	Utah	786,049		22	Arkansas	989,383	
23	Michigan	624,708	3.0	23	Michigan	870,152	3.1
24	Georgia	*a* 260,007		24	California	*b* 430,636	
25	California	*b* 160,972		25	Georgia	*a* 268,309	
26	North Dakota	98,809		26	Oregon	260,917	
27	Oregon	86,888		27	North Dakota	117,500	
28	Idaho	20		28	Idaho	100	
	Total	253,739,992	100.0		Total	256,077,434	100.

a Includes North Carolina. *b* Includes Alaska.

Rank of coal-producing States in 1900, with amount and value of product, and percentage of each.

Production.				Value.			
Rank.	State or Territory.	Amount.	Per cent of total product.	Rank.	State or Territory.	Value.	Per cent of total value.
	Pennsylvania:	*Short tons.*			Pennsylvania:		
1	Anthracite	57,367,915	21.3	1	Anthracite	$85,757,851	27.9
	Bituminous	79,842,326	29.6		Bituminous	77,438,545	25.2
2	Illinois	25,767,981	9.5	2	Illinois	26,927,185	8.8
3	West Virginia	22,647,207	8.4	3	Ohio	19,292,246	6.3
4	Ohio	18,988,150	7.0	4	West Virginia	18,416,871	6.0
5	Alabama	8,394,275	3.1	5	Alabama	9,793,785	3.2
6	Indiana	6,484,086	2.4	6	Iowa	7,155,341	2.3
7	Kentucky	5,328,964	2.0	7	Indiana	6,687,137	2.2
8	Colorado	5,244,364	1.9	8	Colorado	5,858,036	1.9
9	Iowa	5,202,939	1.9	9	Wyoming	5,457,953	1.8
10	Kansas	4,467,870	1.7	10	Kansas	5,454,691	1.8
11	Maryland	4,024,688	1.5	11	Kentucky	4,881,577	1.6
12	Wyoming	4,014,602	1.5	12	Washington	4,700,068	1.5
13	Tennessee	3,708,562	1.4	13	Missouri	4,280,328	1.4
14	Missouri	3,540,103	1.3	14	Tennessee	4,223,082	1.4
15	Washington	2,474,093	0.9	15	Maryland	3,937,381	1.3
16	Virginia	2,393,754	0.9	16	Indian Territory	2,788,124	0.9
17	Indian Territory	1,922,298	0.7	17	Montana	2,713,707	0.9
18	Montana	1,661,775		18	Virginia	2,123,222	
19	Arkansas	1,447,945		19	New Mexico	1,776,170	
20	New Mexico	1,299,299		20	Arkansas	1,653,618	
21	Utah	1,147,027		21	Texas	1,581,914	
22	Texas	968,373		22	Utah	1,447,750	
23	Michigan	849,475	3.0	23	Michigan	1,259,683	3.6
24	Georgia	*a* 333,291		24	California	523,231	
25	California	171,708		25	Georgia	393,469	
26	North Dakota	129,883		26	Oregon	220,001	
27	Oregon	58,864		27	North Dakota	158,348	
28	Idaho	10		28	Idaho	50	
	Total	269,881,827	100.0		Total	306,891,364	100.0

a Includes North Carolina.

LABOR STATISTICS.

The following table shows under one head the total number of employees in the coal mines of the United States for a period of eleven years, and the average time made by each:

Statistics of labor employed in coal mines of the United States since 1890.

State or Territory.	1890.		1891.		1892.		1893.	
	Number of days active.	Average number employed.	Number of days active.	Average number employed.	Number of days active.	Average number employed.	Number of days active.	Average number employed.
Alabama	217	10,642	268	9,302	271	10,075	237	11,294
Arkansas	214	938	214	1,317	199	1,128	151	1,559
California	301	364	222	256	204	187	208	158
Colorado	220	5,827	....	6,000	229	5,747	188	7,202
Georgia	313	425	312	850	277	467	342	736
Illinois	204	28,574	215½	32,951	219½	34,585	229	35,390
Indiana	220	5,489	190	5,879	224	6,436	201	7,644
Indian Territory	238	2,571	221½	2,891	311	3,257	171	3,446
Iowa	213	8,130	224	8,124	236	8,170	204	8,863
Kansas	210	4,523	222	6,201	208½	6,559	147	7,310
Kentucky	219	5,259	225	6,355	217	6,724	202	6,581
Maryland	244	3,842	244	3,891	225	3,886	240	3,935
Michigan	229	180	205	223	195	230	154	162
Missouri	229	5,971	218	6,199	230	5,893	206	7,375
Montana	218	1,251	....	1,119	258	1,158	242	1,401
New Mexico	192	827	265	806	223	1,083	229	1,011
North Carolina	200	80	254	80	160	90	80	70
North Dakota	....	....	....	....	216	54	193	88
Ohio	201	20,576	206	22,182	212	22,576	188	23,931
Oregon	305	208	125	100	120	90	192	110
Pennsylvania bituminous	232	61,333	223	63,661	223	66,655	190	71,931
Tennessee	263	5,082	230	5,097	240	4,926	232	4,976
Texas	241	674	225	787	208	871	251	996
Utah	289	429	....	621	230	646	226	576
Virginia	296	1,295	246	820	192	836	253	961
Washington	270	2,206	211	2,447	247	2,564	241	2,757
West Virginia	227	12,236	237	14,227	228	14,867	219	16,524
Wyoming	246	3,272	....	3,411	225	3,133	189	3,378
Total	226	192,204	*a* 223	205,803	219	212,893	204	230,365
Pennsylvania anthracite	200	126,000	203	126,350	198	129,050	197	132,944
Grand total	216	318,204	215	332,153	212	341,943	201	363,309

a General average obtained from the average days made in the different States, exclusive of Colorado, Montana, Utah, and Wyoming.

Statistics of labor employed in coal mines of the United States since 1890—Continued.

State or Territory.	1894.		1895.		1896.		1897.	
	Number of days active.	Average number employed.	Number of days active.	Average number employed.	Number of days active.	Average number employed.	Number of days active.	Average number employed.
Alabama	238	10,859	244	10,346	248	9,894	233	10,597
Arkansas	134	1,493	176	1,218	168	1,507	161	1,990
California	232	125	262	190	*a* 291	177	*a* 156	381
Colorado	155	6,507	182	6,125	172	6,704	180	5,852
Georgia	304	729	312	848	*b* 301	731	*b* 296	520
Idaho	......	....	......	....	......	....	*c* 91	7
Illinois	183	38,477	182	38,630	184	39,560	185	33,788
Indiana	149	8,603	189	8,530	163	8,806	176	8,886
Indian Territory	157	3,101	164	3,212	170	3,549	176	3,168
Iowa	170	9,995	189	10,066	178	9,672	201	10,703
Kansas	164	7,339	159	7,482	168	7,127	194	6,639
Kentucky	145	8,083	146	7,865	165	7,549	178	7,983
Maryland	215	3,974	248	3,912	204	4,039	262	4,719
Michigan	224	223	186	320	157	320	230	537
Missouri	138	7,523	163	6,299	168	5,982	191	6,414
Montana	192	1,782	223	2,184	234	2,335	252	2,337
Nevada	60	2	......	....	......	....	......	....
New Mexico	182	985	190	1,383	172	1,569	208	1,659
North Carolina	145	95	226	61	......	....	......	....
North Dakota	156	77	139	65	166	141	168	170
Ohio	136	27,105	176	24,644	161	25,500	148	26,410
Oregon	243	88	69	414	191	254	171	254
Pennsylvania bituminous	165	75,010	206	71,130	206	72,625	205	77,272
Tennessee	210	5,542	224	5,120	211	6,531	221	6,337
Texas	283	1,062	171	1,642	187	1,953	220	1,766
Utah	199	671	203	670	202	679	204	704
Virginia	234	1,635	225	2,158	198	2,510	213	2,344
Washington	207	2,662	224	2,840	221	2,622	236	2,739
West Virginia	186	17,824	195	19,159	201	19,078	205	20,504
Wyoming	190	3,032	184	3,449	*c* 210	2,937	219	3,137
Total	171	244,603	194	239,962	192	244,171	196	247,817
Pennsylvania anthracite	190	131,603	196	142,917	174	148,991	150	149,884
Grand total	178	376,206	195	382,879	185	393,162	179	397,701

a Includes Alaska. *b* Includes North Carolina. *c* Includes Nebraska.

Statistics of labor employed in coal mines of the United States since 1890—Continued.

State or Territory.	1898.		1899.		1900.	
	Number of days active.	Average number employed.	Number of days active.	Average number employed.	Number of days active.	Average number employed.
Alabama	250	10,733	238	13,481	257	13,967
Arkansas	163	2,555	156	2,313	219	2,800
California	*a* 265	284	*a* 287	369	309	378
Colorado	220	6,440	246	7,166	264	7,459
Georgia	*b* 292	534	*b* 291	637	*b* 262	681
Idaho	157	7	....	....	....	....
Illinois	175	35,026	228	36,756	226	39,101
Indiana	199	8,971	218	9,712	199	11,720
Indian Territory	198	3,216	212	4,084	228	4,525
Iowa	219	10,262	229	10,971	228	11,608
Kansas	194	7,197	226	8,000	232	8,459
Kentucky	187	7,614	224	7,461	227	9,680
Maryland	253	4,818	275	4,624	203	5,319
Michigan	245	715	232	1,291	261	1,704
Missouri	198	6,542	212	7,136	214	8,180
Montana	216	2,359	238	2,378	252	2,376
New Mexico	242	1,873	257	1,750	261	2,037
North Dakota	187	151	154	210	142	326
Ohio	169	26,986	200	26,038	215	27,628
Oregon	142	199	238	124	273	141
Pennsylvania bituminous	229	79,611	245	82,812	242	92,692
Tennessee	234	6,643	252	6,949	240	8,246
Texas	245	2,130	256	2,410	246	2,844
Utah	243	739	265	743	248	1,308
Virginia	230	1,855	252	1,960	239	3,631
Washington	270	3,145	259	3,330	289	3,670
West Virginia	218	21,607	242	23,625	231	29,163
Wyoming	242	3,475	261	4,697	266	5,332
Total	211	255,717	234	271,027	234	304,975
Pennsylvania anthracite	152	145,504	173	139,608	166	144,206
Grand total	190	401,221	214	410,635	212	449,181

a Includes Alaska. *b* Includes North Carolina.

PRICES.

The following table will be of interest as showing the fluctuations in the average prices ruling in each State since 1886. Prior to that year the statistics were not collected with sufficient accuracy to make a statement of the average prices of any practical value. These averages are obtained by dividing the total value by the total product, except for the years 1886, 1887, and 1888, when the item of colliery consumption was not considered.

Average prices for coal at the mines since 1886.

[Per short ton.]

State or Territory.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Alabama	$1.43	$1.30	$1.15	$1.11	$1.03	$1.07	$1.05
Arkansas	1.60	1.68	1.50	1.42	1.29	1.19	1.24
California	3.00	3.00	4.00	2.36	2.56	2.20	2.46
Colorado	2.35	2.20	2.20	1.51	1.40	1.37	1.62
Georgia	1.50	1.50	1.50	1.50	1.04	1.50	.99
Illinois	1.11	1.09	1.12	.97	.93	.91	.91
Indiana	1.15	1.34	1.40	1.02	.99	1.03	1.08
Indian Territory	1.60	1.87	1.88	1.76	1.82	1.74	1.71
Iowa	1.25	1.34	1.30	1.33	1.24	1.27	1.32
Kansas	1.20	1.40	1.50	1.48	1.30	1.31	1.32
Kentucky	1.15	1.15	1.20	.99	.92	.93	.92
Maryland	.95	.95	.95	.86	.86	.81	.89
Michigan	1.50	1.50	1.66	1.71	1.99	1.66	1.56
Missouri	1.30	1.34	2.21	1.36	1.24	1.23	1.23
Montana	3.50	3.50	3.50	2.42	2.42	2.27	2.36
New Mexico	3.00	3.00	3.00	1.79	1.34	1.68	1.62
North Carolina	....	....	....	....	1.74	1.93	1.44
North Dakota	1.59	1.50	3.50	1.43	1.40	1.40	.96
Ohio	.95	.88	.93	.93	.94	.94	.94
Oregon	2.50	2.20	3.00	....	2.89	3.00	4.29
Pennsylvania bituminous	.80	.90	.95	.77	.84	.87	.84
Tennessee	1.15	1.30	1.10	1.21	1.10	1.11	1.13
Texas	1.85	2.00	2.05	2.66	2.53	2.40	2.32
Utah	2.10	2.00	2.10	1.59	1.74	1.80	1.56
Virginia	1.00	.94	1.00	.93	.75	.83	.86
Washington	2.25	2.20	3.00	2.32	2.71	2.31	2.28
West Virginia	.94	.95	1.10	.82	.84	.80	.80
Wyoming	3.00	3.00	3.00	1.26	1.70	1.53	1.27
Total bituminous	*a* 1.06	*a* 1.12	*a* 1.00	1.00	.99	.99	.99
Pennsylvania anthracite	*a* 1.95	*a* 2.01	*a* 1.95	1.44	1.43	1.46	1.57
General average	*a* 1.30	*a* 1.45	*a* 1.42	1.13	1.12	1.13	1.16

a Exclusive of colliery consumption.

Average prices for coal at the mines since 1886—Continued.

[Per short ton.]

State or Territory.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Alabama	$0.99	$0.93	$0.90	$0.90	$0.88	$0.75	$1.09	$1.17
Arkansas	1.34	1.22	1.25	1.11	1.06	1.03	1.17	1.14
California	2.31	2.31	2.33	*a*2.35	*a*2.55	*a*2.53	*a*2.68	3.05
Colorado	1.24	1.24	1.20	1.16	1.17	1.15	1.12	1.12
Georgia	.98	.85	.83	.70	.72	.81	1.00	1.17
Idaho	....	....	....	....	*b*3.33	2.57	5.00	5.00
Illinois	.89	.89	.80	.80	.72	.78	.85	1.04
Indiana	1.07	.96	.91	.84	.84	.81	.88	1.03
Indian Territory	1.79	1.59	1.43	1.40	1.34	1.32	1.43	1.45
Iowa	1.30	1.26	1.26	1.17	1.13	1.14	1.24	1.38
Kansas	1.27	1.23	1.20	1.15	1.18	1.09	1.16	1.22
Kentucky	.86	.88	.86	.78	.79	.79	.79	.92
Maryland	.88	.77	.81	.80	.76	.76	.76	.98
Michigan	1.79	1.47	1.60	1.62	1.46	1.47	1.39	1.48
Missouri	1.23	1.17	1.12	1.08	1.08	1.07	1.20	1.21
Montana	1.99	2.04	1.89	1.47	1.76	1.57	1.57	1.63
Nevada	....	3.15	....	....	....	....	....	....
New Mexico	1.47	1.57	1.49	1.49	1.38	1.35	1.39	1.37
North Carolina	1.50	1.76	1.66	1.50	1.34	1.25	1.30	1.32
North Dakota	1.13	1.12	1.07	1.09	1.08	1.11	1.19	1.22
Ohio	.92	.83	.79	.79	.78	.83	.87	1.02
Oregon	3,57	3.87	3.36	2.90	3.09	3.65	3.00	3.74
Pennsylvania bituminous	.80	.74	.72	.71	.69	.67	.76	.97
Tennessee	1.08	.97	.93	.86	.81	.77	.88	1.14
Texas	2.28	2.32	1.88	1.65	1.52	1.66	1.51	1.63
Utah	1.48	1.40	1.31	1.20	1.19	1.27	1.27	1.26
Virginia	.84	.76	.63	.68	.67	.59	.62	.89
Washington	2.31	2.33	2.16	2.00	1.94	1.78	1.78	1.90
West Virginia	.77	.75	.68	.65	.63	.61	.63	.81
Wyoming	1.35	1.31	1.33	*b*1.37	1.21	1.28	1.24	1.36
Total bituminous	.96	.91	.86	.83	.81	.80	.87	1.04
Pennsylvania anthracite	1.59	1.52	1.41	1.50	1.51	1.41	1.46	1.49
General average	1.14	1.09	1.02	1.02	.99	.95	1.01	1.14

a Includes Alaska. *b* Includes Nebraska.

COAL MINED BY MACHINES IN 1900.

The progress made in the last few years in the development of the use of undercutting machines for the mining of bituminous coal in the United States has attracted more attention than any other single feature in connection with the coal-mining industry. So rapid has been the increase in the production of bituminous coal in the United States that the governments of some of the countries of Europe have considered it advisable to send representatives to this country to study the various methods employed. The statistics for 1900 show that about one-fourth of the total amount of bituminous coal mined in this country was undercut by the use of machines. The total production of bituminous coal in the United States showed an increase in 1900 over 1899 of 18,263,674 short tons, or less than 10 per cent. The machine-mined product increased from 43,963,933 short tons to 52,790,523 short tons, a gain of 8,826,590 short tons, or something over 20 per cent. It will thus be seen that nearly 50 per cent of the total increase in the output of bituminous coal in 1900 was contributed by mines operating machines.

Machines were used in 22 States and Territories in 1900, the same number as in 1899. Alaska, which reported a machine-mined product in 1896 and 1897, has not reported any coal so mined during the last three years. No commercial product was reported from Alaska in 1900. Texas produced some coal by machines in 1897 and 1898, and Utah had a small machine-mined product in 1896, but conditions in these two States were evidently not adapted to the economical use of mining machines, and no machine-mined tonnage has been reported from them since the years mentioned. The statistics of the use of mining machines in Illinois were obtained from the report of the State bureau of labor statistics. They show that while there was an increase of six in the number of firms using machines in the State, there was a decrease of ten in the number of machines in use and of over 1,000,000 tons in the machine-mined product. The statistics as presented in the subsequent tables have been, with the exception of Illinois, compiled from the reports of the operators to the Geological Survey. They show that in 1900 there were 323 firms or corporations in the United States using mining machines, as against 308 in 1899, 280 in 1898, and 208 in 1897. The numbers of machines actually in use in each year were 1,956 in 1897, 2,622 in 1898, 3,125 in 1899, and 3,907 in 1900. The total amount of coal mined by machines in 1900 was 52,790,523 short tons, as compared with 43,963,933 short tons in 1899 and 32,413,144 short tons in 1898. An apparent decrease is shown in the number of firms using mining machines in the State of Pennsylvania. This is due to the consolidation effected by the Pittsburg Coal Company and the Monongahela River Consolidated Coal and Coke Company, the companies representing them being reported separately in 1899.

Outside of Illinois there were seven other States whose machine-mined product in 1900 was less than in the preceding year, though in only three was the number of machines in use decreased. In the Indian Territory the number of machines in use was reduced from 74 to 58, and the machine-mined tonnage increased from 76,180 to 239,424 short tons. The number of machines in use in Iowa was reduced from 41 to 40, but the machine-mined tonnage was slightly increased. In New Mexico the amount of machine-mined coal obtained in 1900 was 112,000 tons, a decrease from 260,773 short tons in 1899. This decrease in the machine-mined tonnage was due to faults encountered in one of the largest coal mines in the Territory, which prevented the utilization of the machines to their full capacity. The number of machines in use in New Mexico increased from 14 to 21. In Tennessee the number of firms using machines was reduced from 5 to 3, the number of machines in use decreased from 22 to 18, and the machine-mined product fell off from 208,233 to 176,872 short tons. The machine-mined product also decreased in North Dakota, Virginia, Washington, and Wyoming, though in none of these States was the number of machines reduced, and in all but one (Washington) the number of machines increased.

In proportion to its tonnage the State of Montana shows the largest development in the use of mining machines, 62.89 per cent of the total product of this State in 1900 being won by the use of machines. Ohio comes second in the proportion of machine-mined tonnage to the total product, 46.53 per cent being machine won. Kentucky was third in the proportion of coal mined by machines, with 44 per cent of the total product mined by their use. A little over one-third of Pennsylvania's bituminous product was undercut by machines.

The record for percentage of increase in the number of machines in use in 1900 was made by West Virginia, the number of machines in this State in 1900 being more than double the number in use in 1899, and the proportion of machine-mined tonnage to the total in this State increased from 9.27 per cent in 1899 to 15.09 per cent in 1900.

The statistics of machine mining have been collected regularly during the last five years. In collecting the information for 1896 the operators were asked to state how much of their product in 1891, five years before, had also been won by the use of machines. In collecting the statistics for 1899 and 1900 the inquiries were made to cover the kinds of machines in use as well as the number. The returns to these inquiries showed that in 1900 there were 2,350 machines of the pick or punching type in use, as compared with 1,997 in 1899. Of the chain breast machines in use there were 1,509 in 1900 and 1,106 in 1899. The number of long wall machines reported in 1900 was 48, as compared with 22 in 1899. The statistics of machine mining for the years they have been obtained are presented in the following tables:

Bituminous coal mined by machines in the United States in 1891, 1896, 1897, 1898, 1899, and 1900.

State.	Number of firms using machines.						Number of machines in use.					
	1891.	1896.	1897.	1898.	1899.	1900.	1891.	1896.	1897.	1898.	1899.	1900.
Alabama	......	......	3	2	5	4	......	......	45	37	53	54
Alaska	......	1	1	(a)	(a)	......	......	6	6	(a)	(a)	(a)
Arkansas	......	1	1	1	1	2	......	14	15	21	16	20
Colorado	1	6	8	8	3	5	20	34	37	43	63	90
Illinois	16	21	32	33	37	43	241	307	320	392	410	430
Indiana	3	11	11	13	15	19	47	186	174	233	217	254
Indian Territory	......	3	3	4	1	4	......	56	54	75	71	58
Iowa	2	5	7	9	4	4	9	45	49	56	41	40

Bituminous coal mined by machines in the United States in 1891, etc.—Continued.

State.	Number of firms using machines.						Number of machines in use.					
	1891.	1896.	1897.	1898.	1899.	1900.	1891.	1896.	1897.	1898.	1899.	1900.
Kansas	......	......	1	1	1	1	......	......	1	2	3	3
Kentucky	......	......	13	16	16	21	......	......	162	158	189	239
Maryland	......	......	......	......	2	2	......	......	......	......	8	10
Michigan	......	......	......	1	4	6	......	......	......	7	25	33
Missouri	......	1	1	1	3	5	......	4	3	4	9	15
Montana	......	3	2	4	5	5	......	62	61	62	75	81
New Mexico	......	......	......	2	2	2	......	......	......	29	14	21
North Dakota	......	1	1	3	2	3	......	1	2	7	5	7
Ohio	19	31	39	52	53	58	114	209	224	245	278	341
Pennsylvania	7	41	64	99	103	73	72	454	690	1,085	1,343	1,786
Tennessee	......	......	2	4	5	3	......	......	8	19	22	18
Texas	......	......	1	1	......	......	......	......	5	5	......	......
Utah	......	1	......	......	......	......	......	1	......	......	......	......
Virginia	......	......	1	1	1	3	......	......	8	8	8	9
Washington	......	1	......	......	1	1	......	3	......	......	2	2
West Virginia	1	7	13	22	38	55	8	25	47	86	154	327
Wyoming	2	2	4	3	3	4	34	39	45	48	56	69
Total	51	136	208	280	308	323	545	1,446	1,956	2,622	3,125	3,907

a Not reported.

State.	Number of tons mined by machines.					
	1891.	1896.	1897.	1898.	1899.	1900.
Alabama	....	....	294,384	298,170	260,444	370,150
Alaska	....	15,232	17,920	(*a*)	(*a*)	(*a*)
Arkansas	....	21,094	87,532	152,192	146,899	219,085
Colorado	284,646	318,172	352,400	225,646	527,115	756,025
Illinois	3,027,305	3,871,410	3,946,257	3,415,635	6,085,312	5,083,594
Indiana	212,830	964,378	1,023,361	1,414,342	1,713,125	1,774,045
Indian Territory	....	191,585	263,811	274,370	276,180	239,424
Iowa	41,540	84,556	181,209	218,852	124,721	132,757
Kansas	....	....	4,500	11,722	40,271	46,164
Kentucky	....	....	1,299,436	1,366,676	1,625,809	2,339,944
Maryland	....	....	....	....	16,545	138,014
Michigan	....	....	....	1,456	64,055	191,577
Missouri	....	47,827	59,692	52,864	55,154	110,036
Montana	....	579,414	720,345	681,613	843,710	1,045,115
New Mexico	....	....	....	163,849	260,773	112,000
North Dakota	....	15,000	20,000	65,030	38,066	33,965
Ohio	1,651,081	3,368,349	3,843,345	5,191,375	6,822,524	8,835,743
Pennsylvania	431,440	6,092,644	8,925,293	16,512,480	22,000,722	26,867,053
Tennessee	....	....	47,207	152,002	208,033	176,872
Texas	....	....	11,750	15,340	....	....
Utah	....	760	....	....	....	....
Virginia	....	....	323,649	244,170	265,000	231,269
Washington	....	3,920	....	....	14,640	10,000
West Virginia	205,784	430,944	673,523	1,323,929	1,881,125	3,418,377
Wyoming	354,106	419,647	555,526	631,431	693,712	653,314
Total	6,211,732	16,424,932	22,649,220	32,413,144	43,963,933	52,790,523

a Not reported.

Bituminous coal mined by machines in the United States in 1891, etc.—Continued.

State.	Total tonnage.					
	1891.	1896.	1897.	1898.	1899.	1900.
Alabama			5,893,770	6,535,283	7,593,416	8,394,275
Alaska		15,232	17,920	(*a*)	(*a*)	
Arkansas		675,374	856,190	1,205,479	843,554	1,477,945
Colorado	3,512,632	3,112,400	3,361,703	4,076,347	4,776,224	5,244,364
Illinois	15,660,698	19,786,626	20,072,758	18,599,299	24,439,019	25,767,981
Indiana	2,973,474	3,905,779	4,151,169	4,920,743	6,006,523	6,484,086
Indian Territory		1,366,646	1,336,380	1,381,466	1,537,427	1,922,298
Iowa	3,825,495	3,954,028	4,611,865	4,618,842	5,177,479	5,202,939
Kansas			3,054,012	3,406,555	3,852,267	4,467,870
Kentucky			3,602,097	3,887,908	4,607,255	5,328,964
Maryland					4,807,396	4,024,688
Michigan				315,722	624,708	849,475
Missouri		2,331,542	2,665,626	2,688,321	3,025,814	3,540,103
Montana		1,543,445	1,647,882	1,479,803	1,496,451	1,661,775
New Mexico				992,288	1,050,714	1,299,299
North Dakota		78,050	77,246	83,895	98,809	129,883
Ohio	12,868,683	12,875,202	12,196,942	14,516,867	16,500,270	18,988,150
Pennsylvania	42,788,490	49,557,453	54,417,974	65,165,133	74,150,175	79,842,326
Tennessee			2,888,849	3,022,896	3,330,659	3,708,562
Texas			639,341	686,734		
Utah		418,627	521,560			
Virginia			1,528,302	1,815,274	1,105,791	2,393,754
Washington		1,195,504			2,029,881	2,474,093
West Virginia	9,220,665	12,876,296	14,248,159	16,700,999	19,252,995	22,647,207
Wyoming	2,327,841	2,229,624	2,597,886	2,863,812	3,837,392	4,014,602
Total	93,177,978	115,921,828	139,866,071	158,963,666	191,144,218	209,864,639

State.	Percentage of total product mined by machines.					
	1891.	1896.	1897.	1898.	1899.	1900.
Alabama			4.99	4.56	3.43	4.41
Alaska		100.00	100.00	(*a*)	(*a*)	
Arkansas		3.12	10.22	12.63	17.41	14.82
Colorado	8.10	10.22	10.48	5.54	11.03	14.42
Illinois	19.33	19.57	19.66	18.36	24.90	19.73
Indiana	7.16	24.69	24.65	28.74	28.52	27.36
Indian Territory		14.02	19.74	19.86	17.96	12.46
Iowa	1.09	2.14	3.93	4.74	2.21	2.55
Kansas			.15	.34	1.04	1.03
Kentucky			36.07	35.15	35.29	43.91
Maryland					.34	3.43
Michigan				.46	10.20	22.55
Missouri		2.56	2.24	1.97	1.80	3.11
Montana		37.54	43.71	46.06	56.38	62.89
New Mexico				16.51	24.81	8.62
North Dakota		19.22	25.89	77.51	38.52	26.15
Ohio	12.85	26.16	31.51	35.76	41.35	46.53
Pennsylvania	1.01	12.29	16.40	25.34	29.67	33.65
Tennessee			1.63	5.03	6.04	4.77
Texas			1.84	2.23		
Utah		.18				
Virginia			21.18	13.45	23.06	9.66
Washington		.33			.72	.40
West Virginia	2.23	3.35	4.73	7.93	9.27	15.09
Wyoming	15.21	18.82	21.38	22.05	18.07	16.27
Average	6.66	14.17	16.19	20.39	23.00	25.15

a Not reported.

STRIKES IN COAL MINES DURING 1900.

With the exception of the anthracite region in Pennsylvania and the Cumberland or Georges Creek region in Maryland, the coal-mining industry of the United States in 1900 was comparatively free from labor disturbances, at least so far as any effect upon the total product is to be observed. It is estimated that on account of the strike in the anthracite region, which is discussed in full in the chapter on anthracite production, 5,000,000 long tons of anthracite coal were taken from the prospective product of that year. There was an actual loss of 2,723,294 long tons as compared with the output in 1899. This strike was inaugurated on the 17th day of September and lasted until the 25th day of October, a period which included thirty-four working days. It is estimated that about 100,000 of the 140,000 men employed in the anthracite region were idle during this period, entailing a loss of nearly 3,500,000 working days. At an average of $3 per day per man, this would mean a loss to the anthracite miners of something over $10,000,000 in wages.

The strike in the Cumberland region affected 4,787 men out of a total of 5,319. In the majority of cases the strikes in this region lasted more than one hundred days and the average time lost per man for the entire region was one hundred and five days. One mine employing 175 men was idle about two-thirds of the entire year. Nearly all of the large mines in the State were idle at one time or another during the year. The effect of this strike was a decrease of practically 700,000 long tons in Maryland's production for 1900, as compared with 1899. These were the only instances in which there was a decrease of product because of labor troubles during 1900.

The total number of men idle because of strikes in the bituminous mines of the United States in 1900 was 31,980; the total number of days lost was 1,378,102, or an average of 43 days per man. This was a little over 2 per cent of the total working time made in the bituminous mines of the United States in 1900. The time lost in the anthracite region of Pennsylvania was equivalent to nearly 20 per cent of the time made.

The statistics of labor troubles in the United States in 1900 and 1899 are shown in the following tables. It will be observed that the total time lost in the bituminous mines in 1900 was about two-thirds of that of the preceding year.

Statistics of labor strikes in the United States in 1900.

State or Territory.	Number of mines reporting strikes.	Number of men on strike.	Total days lost.	Average number of days lost per man.
Alabama	6	1,056	50,620	48
Arkansas	2	47	5,040	107
Colorado	2	17	935	55
Illinois	34	3,909	134,433	34
Indiana	36	3,583	71,282	20
Indian Territory	3	110	31,100	283
Iowa	25	1,322	62,333	47
Kansas	4	157	3,590	23
Kentucky	29	2,946	90,095	31
Maryland	22	4,787	504,544	105
Michigan	2	81	1,514	19
Missouri	14	632	34,970	55
Montana	1	40	1,640	41
Ohio	34	2,035	45,547	22
Pennsylvania bituminous	56	7,574	223,093	29
Tennessee	13	1,559	67,308	43
Texas	2	135	2,740	20
Washington	1	100	3,000	30
West Virginia	12	1,883	44,318	24
Total	298	31,980	1,378,102	43
Pennsylvania anthracite (approximate)	....	100,000	3,500,000	35

Statistics of labor strikes in the United States in 1899.

State or Territory.	Number of mines reporting strikes.	Number of men on strike.	Total days lost.	Average number of days lost per man.
Alabama	11	1,135	68,925	61
Arkansas	12	2,041	216,265	106
Colorado	9	504	31,520	62
Illinois	47	7,133	267,171	37
Indiana	30	3,272	132,825	40
Indian Territory	19	1,825	281,256	154
Iowa	34	2,623	72,710	28
Kansas	16	1,986	88,798	45
Kentucky	12	837	24,598	29
Maryland	1	35	420	12
Michigan	5	487	9,547	20
Missouri	30	2,197	117,076	53
Montana	1	650	33,800	52
Ohio	15	877	26,394	30
Pennsylvania	70	15,131	636,160	42
Tennessee	11	1,595	37,085	23
Texas	2	185	2,775	15
West Virginia	34	3,468	76,829	22
Total	359	45,981	2,124,154	46

IMPORTS AND EXPORTS.

The following tables have been compiled from official returns to the Bureau of Statistics of the Treasury Department, and show the imports and exports of coal from 1867 to 1899, inclusive. The values given in both cases are considerably higher than the average "spot" rates by which the values of the domestic production have been computed.

The tariff from 1824 to 1843 was 6 cents per bushel, or $1.68 per long ton; from 1843 to 1846, $1.75 per ton; 1846 to 1857, 30 per cent ad valorem; 1857 to 1861, 24 per cent ad valorem; 1861, bituminous and shale, $1 per ton; all other, 50 cents per ton; 1862 to 1864, bituminous and shale, $1.10 per ton; all other, 60 cents per ton; 1864 to 1872, bituminous and shale, $1.25 per ton; all other, 40 cents per ton. By the act of 1872 the tariff on bituminous coal and shale was made 75 cents per ton, and so continued until the act of August, 1894, changed it to 40 cents per ton. On slack or culm the tariff was made 40 cents per ton by the act of 1872; was changed to 30 cents per ton by the act of March, 1883, and so continued until the act of August, 1894, changed it to 15 cents per ton. The tariff act of 1897 provides that all coals containing less than 92 per cent fixed carbon, and which will pass over a half-inch screen, shall pay a duty of 67 cents per ton. Slack or culm was not changed by the act of 1897. Tons are all 2,240 pounds. Anthracite coal has been free of duty since 1870. During the period from June, 1854, to March, 1866, the reciprocity treaty was in force, and coal from the British possessions in North America was admitted into the United States duty free.

The exports consist both of anthracite and bituminous coal, the amount of bituminous being the greater in the last few years. They are made principally by rail over the international bridges and by lake and sea to the Canadian provinces. Exports are also made by sea to the West Indies, to Central and South America, and elsewhere.

The imports are principally from Australia and British Columbia to San Francisco, from Great Britain to the Atlantic and Pacific coasts, and from Nova Scotia to Atlantic coast points.

The statistics of the imports for 1900 showed a very large increase in the receipts of slack or culm, of which 578,144 tons were imported last year. This large increase has been due to the establishment of a plant of Otto-Hoffman coke ovens at Everett, near Boston, Mass., the slack being imported from Nova Scotia for feeding these ovens.

A considerable amount of discussion has been indulged in by the various periodicals, daily and otherwise, published in the United States in regard to the large increase in the exports of American coal. It is true that the exports, particularly of bituminous coal, for 1900 showed a 50 per cent increase over 1899, and was nearly double that of 1898. When considered with the total production of the United States, however, the coal exported becomes an insignificant factor, the amount sent out of this country in 1900, although 50 per cent larger than that of 1899, being but a little more than 3 per cent of the domestic production. The amount of anthracite coal exported in 1900 was less than in 1899, this decrease being due to the strike in the anthracite fields.

Coal imported and entered for consumption in the United States, 1867 to 1900.

Year ending—	Anthracite.		Bituminous and shale.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
June 30, 1867			509,802	$1,412,597
1868			394,021	1,250,513
1869			437,228	1,222,119
1870			415,729	1,103,965
1871	973	$4,177	430,508	1,121,914
1872	390	1,322	485,063	1,279,686
1873	2,221	10,764	460,028	1,548,208
1874	471	3,224	492,063	1,937,274
1875	138	963	436,714	1,791,601
1876	1,428	8,560	400,632	1,592,846
1877	630	2,220	495,816	1,782,941
1878	158	518	572,846	1,929,660
1879	488	721	486,501	1,716,209
1880	8	40	471,818	1,588,312
1881	1,207	2,628	652,963	1,988,199
1882	36	148	795,722	2,141,373
1883	507	1,172	645,924	3,013,555
1884	1,448	4,404	748,995	2,494,228
1885	4,976	15,848	768,477	2,548,432
Dec. 31, 1886	2,039	4,920	811,657	2,501,153
1887	14,181	42,983	819,242	2,609,311
1888	24,093	68,710	1,085,647	3,728,060
1889	20,652	117,434	1,001,374	3,425,347
1890	15,145	46,695	819,971	2,822,216
1891	37,607	112,722	1,363,313	4,561,105
1892	65,058	197,583	1,143,304	3,744,862
1893	53,768	148,112	*a* 1,082,993	3,623,892
1894	90,068	234,024	*b* 1,242,714	3,785,513
1895	141,337	328,705	*c* 1,212,023	3,626,623
1896	101,689	237,717	1,211,448	3,453,742
1897	24,534	59,222	*d* 1,276,135	3,424,833
1898	3,149	8,609	*e* 1,277,070	3,569,743
1899	47	171	*f* 1,329,903	3,869,354
1900	118	1,113	*g* 1,881,519	5,006,881

a Including 14,632 tons of slack or culm, valued at $16,906.
b Including 30,453 tons of slack or culm, valued at $32,267.
c Including 18,174 tons of slack or culm, valued at $15,309.
d Including 42,954 tons of slack or culm, valued at $44,962.
e Including 104,555 tons of slack or culm, valued at $110,545.
f Including 200,938 tons of slack or culm, valued at $214,770.
g Including 578,144 tons of slack or culm, valued at $689,360.

Coal of domestic production exported from the United States, 1867 to 1900.

Year ending—	Anthracite.		Bituminous and shale.	
	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*	
June 30, 1867	192,912	$1,333,457	92,189	$512,742
1868	192,291	1,082,745	86,367	433,475
1869	283,783	1,553,115	....	....
1870	121,098	803,135	106,820	503,223
1871	134,571	805,169	133,380	564,067
1872	259,567	1,375,342	141,311	586,264
1873	342,180	1,827,822	242,453	1,086,253
1874	401,912	2,236,084	361,490	1,587,666
1875	316,157	1,791,626	203,189	828,943
1876	337,934	1,869,434	230,144	850,711
1877	418,791	1,891,351	321,665	1,024,711
1878	319,477	1,006,843	340,661	1,352,624
1879	386,916	1,427,886	276,000	891,512
1880	392,626	1,362,901	222,634	695,179
1881	462,208	2,091,928	191,038	739,532
1882	553,742	2,589,887	314,320	1,102,898
1883	557,813	2,648,033	463,051	1,593,214
1884	649,040	3,053,550	646,265	1,977,959
1885	588,461	2,586,421	683,481	1,989,541
Dec. 31, 1886	667,076	2,718,143	544,768	1,440,631
1887	825,486	3,469,166	706,364	2,001,966
1888	969,542	4,325,126	860,462	2,529,472
1889	857,632	3,636,347	935,151	2,783,592
1890	794,335	3,272,697	1,280,930	4,004,995
1891	861,251	3,577,610	1,615,869	5,104,850
1892	851,639	3,722,903	1,645,869	4,999,289
1893	1,333,287	6,241,007	2,324,591	6,009,801
1894	1,440,625	6,359,021	2,195,716	4,970,270
1895	1,470,710	5,937,130	2,211,983	4,816,847
1896	1,350,000	5,925,506	2,276,202	5,072,818
1897	1,298,768	5,836,730	2,399,263	5,326,761
1898	1,350,948	5,712,985	3,152,459	6,699,248
1899	1,707,796	7,140,100	4,044,354	8,573,276
1900	1,662,286	7,107,412	6,255,033	14,416,667

WORLD'S PRODUCT OF COAL.

In the following table is given the coal product of the principal countries for the years nearest the one under review for which figures could be obtained. For the sake of convenience the amounts are expressed in the unit of measurement adopted in each country and reduced for comparison to short tons of 2,000 pounds. In each case the year is named for which the product is given:

The world's production of coal.

Country.		Usual unit in producing country.	Equivalent in short tons.
United States (1900)	long tons	240,965,917	269,881,827
Great Britain (1900)	do	225,181,300	252,203,056
Germany (1900)	metric tons	149,551,000	164,805,202
Austria-Hungary (1899)	do	38,739,000	42,690,378
France (1900)	do	33,270,000	36,663,540
Belgium (1900)	do	23,352,000	25,733,904
Russia (1900)	do	15,890,000	17,510,780
Canada (1900)	short tons	5,332,197	5,332,197
Japan (1898)	metric tons	6,761,301	7,572,657
India (1899)	long tons	4,937,160	5,529,619
New South Wales (1900)	do	5,506,064	6,166,792
Spain (1900)	metric tons	2,772,000	3,054,744
New Zealand (1899)	long tons	975,234	1,092,262
Sweden (1899)	metric tons	239,344	263,757
Italy (1899)	do	388,534	428,164
South African Republic (1898)	long tons	1,907,271	2,136,143
Queensland (1899)	do	494,009	553,290
Victoria (1899)	do	262,380	293,866
Natal (1900)	do	241,062	269,990
Cape Colony (1899)	do	186,299	208,655
Tasmania (1899)	do	44,277	49,590
Other countries (*a*)	do	2,000,000	2,240,000
Total			844,680,413
Percentage of the United States			32

a Includes China, Turkey, Servia, Portugal, United States of Colombia, Chile, Borneo and Labuan, Mexico, Peru, Greece, etc.

In connection with the preceding statement the following tables are presented in which the world's production of coal since 1868 is given in all countries for which the statistics are available. This table shows that in 1899 the United States took first place among the coal producers of the world, supplanting Great Britain, which had up to that time been the leading coal-producing country. Both Great Britain and the United States increased their production in 1900, Great Britain by a little over 5,000,000 long tons and the United States by 14,400,000 long tons. In 1899 the coal output of the United States exceeded that of Great Britain by 6,458,783 long tons. This lead was increased to over 15,000,000 long tons in 1900, and it would seem from this record that the United States is as firmly fixed in first place among the world's producers of coal as it stands among the world's producers of pig iron, which latter position she has held continuously since 1890, with the exception of the year 1894, when Great Britain's pig-iron product exceeded ours by 770,000 tons. The steps by which the United States has advanced to her present high position are graphically shown in the following table. In 1868, the first year for which any statistics of coal production in the United States are available, the product amounted to 31,648,960 short tons, less than one-third that of Great Britain and

4,600,000 tons less than that of Germany. In 1872, 1873, and 1874 the production of coal in the United States exceeded that of Germany, and since 1877 there has not been any year in which Germany has produced as much coal as the United States. The production of the United States in 1900 exceeded that of Germany by more than 50 per cent. In 1868 Great Britain produced 3.6 times as much coal as the United States. In 1880 Great Britain's product was 2.3 times that of the United States. In 1890 it was a little more than 1.4 times as much as ours, while in 1900 the United States produced about 7 per cent more coal than Great Britain. In the thirty-two years from 1868 to 1900 the coal product of the United States has increased 750 per cent, while that of Great Britain has increased only 120 per cent. In 1868 the United States produced 14.35 per cent of the total world's supply of coal, while Great Britain produced a little over 50 per cent. In 1900 the United States produced 32 per cent of the world's total, and Great Britain produced 30 per cent:

World's production of coal, by countries, since 1868.

Year.	United States.		Great Britain.		Germany.	
	Long tons.	Short tons.	Long tons.	Short tons.	Metric tons.	Short tons.
1868	28,258,000	31,648,960	103,141,157	115,518,096	32,879,123	36,249,233
1869	28,268,000	31,660,160	107,427,557	120,318,864	34,343,913	37,864,164
1870	32,863,000	36,806,560	110,431,192	123,682,935	34,003,004	37,488,312
1871	41,384,000	46,350,080	117,352,028	131,434,271	37,856,110	41,736,361
1872	45,416,000	50,865,920	123,497,316	138,316,994	42,324,467	46,662,725
1873	51,004,000	57,124,480	128,680,131	144,121,747	46,145,194	50,875,076
1874	46,916,000	52,545,920	126,590,108	141,780,921	46,658,145	51,440,605
1875	46,686,000	52,288,320	133,306,485	149,303,263	47,804,054	52,703,970
1876	47,500,000	53,200,000	134,125,166	150,220,186	49,550,461	54,629,383
1877	53,948,000	60,421,760	134,179,968	150,281,564	48,229,882	53,173,445
1878	51,655,000	57,853,600	132,612,063	148,525,511	50,519,899	55,698,188
1879	59,333,000	66,452,960	133,720,393	149,766,840	53,470,716	58,951,464
1880	63,822,830	71,481,569	146,969,409	164,605,738	59,118,035	65,177,634
1881	76,865,357	85,881,030	154,184,300	172,686,416	61,540,485	67,848,385
1882	92,219,454	103,285,789	156,499,977	175,279,974	65,378,211	72,079,478
1883	102,867,969	115,212,125	163,737,327	183,385,806	70,442,648	77,663,019
1884	106,906,295	119,735,051	160,757,779	180,048,712	72,113,820	79,505,487
1885	99,069,216	110,957,522	159,351,418	178,473,588	73,675,515	81,227,255
1886	101,500,024	113,680,027	157,518,482	176,420,700	73,682,584	81,235,049
1887	116,651,974	130,650,211	162,119,812	181,574,189	76,232,618	84,046,461
1888	132,731,613	148,659,407	169,935,219	190,327,445	81,960,083	90,360,992
1889	126,097,869	141,229,613	176,916,724	198,146,731	84,973,230	93,640,500
1890	140,866,931	157,770,963	181,614,288	203,408,003	89,290,834	98,398,500
1891	150,505,954	168,566,668	185,479,126	207,736,621	94,252,278	103,913,136
1892	160,115,242	179,329,071	181,786,871	203,601,296	92,544,050	102,029,815
1893	162,814,977	182,352,774	164,325,795	184,044,890	95,426,153	105,207,334
1894	152,447,791	170,741,526	188,277,525	210,870,828	98,805,702	108,883,884
1895	172,426,366	193,117,530	189,661,362	212,320,725	103,957,639	114,561,318
1896	171,416,390	191,986,357	195,361,260	218,804,611	112,471,106	123,943,159
1897	178,769,344	200,221,665	202,129,931	226,385,523	120,474,485	132,762,882
1898	196,405,953	219,974,667	202,054,516	226,301,058	130,928,490	144,283,196
1899	226,553,564	253,739,992	220,094,781	246,506,155	135,824,427	149,719,766
1900	240,965,917	269,881,827	225,181,300	252,203,056	149,551,000	164,805,202

World's production of coal, by countries, since 1868—Continued.

Year.	Austria-Hungary.		France.		Belgium.	
	Metric tons.	Short tons.	Metric tons.	Short tons.	Metric tons.	Short tons.
1868	7,021,756	7,741,486	13,330,826	14,697,236	12,298,589	13,559,194
1869	7,663,043	8,448,505	13,509,745	14,894,494	12,943,994	14,270,753
1870	8,355,945	9,212,429	13,179,788	14,530,716	13,697,118	15,101,073
1871	8,437,401	9,302,235	13,240,135	14,597,249	13,733,176	15,140,827
1872	8,825,896	9,730,550	16,100,773	17,751,102	15,658,948	17,263,990
1873	10,104,769	11,140,508	17,479,341	19,270,973	15,778,401	17,395,687
1874	12,631,364	13,926,079	16,907,913	18,640,974	14,669,029	16,172,604
1875	13,062,738	14,395,137	16,956,840	18,694,916	15,011,331	16,549,992
1876	13,000,000	14,327,300	17,101,448	18,854,346	14,329,578	15,798,360
1877	13,500,000	14,883,750	16,804,529	18,526,993	13,669,077	15,070,157
1878	13,900,000	15,324,750	16,960,916	18,699,410	14,899,175	16,426,340
1879	14,500,000	15,986,250	17,110,979	18,864,854	15,447,292	17,030,640
1880	14,800,000	16,317,000	19,361,564	21,346,124	16,886,698	18,617,585
1881	15,304,813	16,873,556	19,765,983	21,791,996	16,873,951	18,603,531
1882	15,555,292	17,149,709	20,603,704	22,715,584	17,590,989	19,394,065
1883	17,047,961	18,795,377	21,333,884	23,520,607	18,177,754	20,040,974
1884	18,000,000	19,845,000	20,023,514	22,075,924	18,051,499	19,901,778
1885	20,435,463	22,530,098	19,510,530	21,510,359	17,437,603	19,224,957
1886	20,779,441	22,909,334	19,909,894	21,950,658	17,285,543	19,057,311
1887	21,879,172	24,121,787	21,287,589	23,469,567	18,378,624	20,262,433
1888	23,859,608	26,305,218	22,602,894	24,919,691	19,218,481	21,188,375
1889	25,328,417	27,924,580	24,303,509	26,794,619	19,869,980	21,906,653
1890	27,504,032	30,323,195	26,083,118	28,756,638	20,365,960	22,453,471
1891	28,823,240	31,777,622	26,024,893	28,692,444	19,675,644	21,692,398
1892	29,037,978	32,014,371	26,178,701	28,862,018	19,583,173	21,590,448
1893	30,449,304	33,570,358	25,650,981	28,280,207	19,410,519	21,400,097
1894	31,492,000	34,704,184	27,459,137	30,273,699	20,458,827	22,555,857
1895	32,654,777	35,985,564	28,019,893	30,877,922	20,450,604	22,536,566
1896	33,676,411	37,111,405	29,189,900	32,167,270	21,252,370	23,420,112
1897	35,858,000	39,515,516	30,797,629	33,938,987	21,534,629	23,731,161
1898	37,786,963	41,652,569	32,356,104	35,656,426	22,075,093	24,326,752
1899	38,739,000	42,690,378	32,863,000	36,215,026	21,917,740	24,159,925
1900	....	(*a*)	33,270,000	36,663,540	23,352,000	25,733,904

a Latest available figures are used in making up total for 1900.

World's production of coal, by countries, since 1868—Continued.

Year.	Russia.		Japan.		Other countries.	Total.	Per cent of United States.
	Metric tons.	Short tons.	Metric tons.	Short tons.	Short tons.	Short tons.	
1868	.....	.....	.....	.....	1,147,330	220,561,535	14.35
1869	.....	.....	.....	.....	1,104,563	228,561,503	13.85
1870	696,673	768,082	.....	.....	1,063,121	238,653,228	15.42
1871	.....	.....	.....	.....	1,114,248	259,675,271	17.85
1872	.....	.....	.....	.....	1,268,115	281,859,396	18.05
1873	.....	.....	.....	.....	1,502,516	301,430,987	18.95
1874	.....	.....	.....	.....	2,708,756	297,215,859	17.68
1875	1,709,718	1,184,964	.....	.....	2,639,104	308,459,666	16.95
1876	.....	.....	.....	.....	2,597,143	309,626,718	17.18
1877	.....	.....	.....	.....	2,821,155	315,178,824	19.17
1878	2,483,575	2,738,141	.....	.....	3,176,050	318,441,990	18.17
1879	2,874,790	3,169,456	.....	.....	3,362,605	333,585,069	19.92
1880	3,238,470	3,570,413	.....	.....	3,621,342	364,737,405	19.60
1881	3,439,787	3,792,365	.....	.....	5,185,974	392,663,253	21.87
1882	3,672,782	4,049,242	.....	.....	6,128,631	420,082,472	24.58
1883	3,916,105	4,317,506	1,021,000	1,125,142	6,929,841	450,990,397	25.55
1884	3,869,689	4,266,332	1,159,000	1,277,218	7,367,309	454,022,811	26.37
1885	4,207,905	4,639,215	1,314,000	1,448,028	7,570,507	447,581,529	24.79
1886	4,506,027	4,967,895	1,402,000	1,545,004	9,082,815	450,848,791	25.22
1887	4,464,174	4,921,752	1,785,000	1,967,070	10,399,273	481,362,743	27.14
1888	5,187,312	5,719,011	2,044,000	2,252,488	11,493,176	521,225,803	28.52
1889	6,215,577	6,852,674	2,435,000	2,683,370	12,618,299	531,797,039	26.56
1890	6,016,525	6,633,219	2,653,000	2,923,606	13,025,637	563,693,232	27.99
1891	6,233,020	6,871,905	3,230,000	3,559,460	14,744,329	587,554,583	28.69
1892	6,816,323	7,514,996	3,228,000	3,557,256	14,998,633	593,497,904	30.22
1893	7,535,000	8,307,337	3,350,000	3,691,700	15,783,599	582,638,296	31.30
1894	8,629,000	9,509,158	4,311,000	4,750,722	18,197,510	610,487,368	27.97
1895	9,079,138	10,005,210	4,849,000	5,343,598	19,428,643	644,177,076	29.98
1896	9,229,000	10,170,358	5,019,690	5,531,698	20,866,748	664,001,718	28.92
1897	11,207,475	12,350,638	5,647,751	6,225,516	22,074,093	696,512,163	28.75
1898	12,862,033	14,173,960	6,761,301	7,572,657	24,797,873	738,739,158	29.78
1899	13,104,000	14,440,608	.....	(*a*)	26,259,249	*a* 801,303,756	31.67
1900	15,890,000	17,510,780	.....	(*a*)	*b* 27,619,069	*a* 844,680,413	31.95

a Latest available figures are used in making up totals for 1899 and 1900.

b This includes, in addition to the countries named on the following pages, the output of Natal, 269,990 tons; Cape Colony, 208,655 tons; Tasmania, 49,590 tons; China, Turkey, Servia, Portugal, etc., (estimated), 2,240,000 tons. Total, 2,768,235 tons.

Product of minor coal-producing countries since 1868.

Year.	New South Wales.		Queensland.		New Zealand.	
	Long tons.	Short tons.	Long tons.	Short tons.	Long tons.	Short tons.
1868	954,231	1,068,739	19,611	21,964	....	....
1869	919,774	1,030,147	11,120	12,454	....	....
1870	868,564	972,791	22,639	25,356	....	....
1871	898,784	1,006,638	17,000	19,040	....	....
1872	1,012,426	1,133,917	27,727	31,054	....	....
1873	1,192,862	1,336,005	33,613	37,647	....	....
1874	1,304,567	1,461,115	43,443	48,656	....	....
1875	1,329,729	1,489,296	32,107	35,960	....	....
1876	1,319,918	1,478,308	50,627	56,702	....	....
1877	1,444,271	1,617,584	60,918	68,228	....	....
1878	1,575,497	1,764,556	52,580	58,890	162,218	181,684
1879	1,583,381	1,773,387	55,012	61,613	231,218	258,964
1880	1,466,180	1,642,122	58,052	65,018	299,923	335,913
1881	1,769,597	1,981,949	65,612	73,485	337,262	377,733
1882	2,109,282	2,362,396	74,436	83,368	378,272	423,665
1883	2,521,457	2,824,032	104,750	117,320	421,764	472,376
1884	2,749,109	3,079,002	120,727	135,214	480,831	538,531
1885	2,878,863	3,224,327	209,698	234,862	511,063	572,390
1886	2,830,175	3,169,796	228,656	256,094	534,353	598,475
1887	2,922,497	3,273,197	238,813	267,470	558,620	625,654
1888	3,203,444	3,587,857	311,412	348,781	613,895	687,562
1889	3,655,632	4,094,308	265,507	297,368	586,445	656,818
1890	3,060,876	3,428,181	338,344	378,945	637,397	713,885
1891	4,037,929	4,522,480	271,603	304,195	668,794	749,049
1892	3.780,968	4,234,684	265,086	296,896	673,315	754,113
1893	3,278,328	3,671,727	264,403	296,131	691,548	774,534
1894	3,672,076	4,112,725	270,705	303,190	719,546	805,892
1895	3,737,536	4,186,040	322,977	361,734	727,000	814,240
1896	3,909,517	4,378,659	371,000	415,520	793,000	888,160
1897	4,383,591	4,909,622	358,407	401,416	840,713	941,600
1898	4,736,000	5,304,320	407,819	456,757	906,778	1,015,591
1899	4,597,028	5,148,671	494,009	553,290	975,234	1,092,262
1900	5,506,064	6,166,792	....	(*a*)	....	(*a*)

a Latest available figures are used in making up totals.

Product of minor coal-producing countries since 1868—Continued.

Year.	Victoria.		Canada.	India.		Spain.	
	Long tons.	Short tons.	Short tons.	Long tons.	Short tons.	Metric tons.	Short tons.
1868							
1869							
1870							
1871							
1872							
1873							
1874			1,058,446				
1875			984,905				
1876			933,803				
1877			1,002,395				
1878			1,034,081				
1879			1,123,863				
1880			1,424,635				
1881			1,487,182	997,543	1,117,248		
1882			1,811,708	1,130,242	1,265,871		
1883			1,806,259	1,315,976	1,473,893		
1884			1,950,080	1,266,312	1,418,269		
1885			1,879,470	1,294,221	1,449,528		
1886			2,091,976	1,401,295	1,569,450	1,001,432	1,104,079
1887			2,418,494	1,560,393	1,747,640	1,038,305	1,144,731
1888			2,658,134	1,802,876	2,019,221	1,036,565	1,142,813
1889	14,421	16,152	2,719,478	2,045,359	2,290,802	1,153,755	1,272,015
1890	20,750	23,240	3,117,661	2,168,521	2,438,744	1,212,089	1,336,328
1891	22,834	25,574	3,623,076	2,328,577	2,608,006	1,287,988	1,420,007
1892	23,363	26,166	3,292,547	2,537,696	2,842,220	1,461,196	1,610,969
1893	91,726	102,733	3,201,742	2,529,855	2,833,438	1,484,794	1,636,986
1894	175,175	196,196	3,903,913	2,810,929	3,158,240	1,657,010	1,830,853
1895	194,171	217,472	3,512,504	3,538,000	3,962,560	1,783,783	1,965,729
1896	227,000	255,240	3,743,234	3,848,000	4,309,760	1,878,399	2,069,996
1897	236,277	264,630	3,786,107	4,063,127	4,550,702	1,939,400	2,137,219
1898	245,659	275,138	4,172,655	4,203,199	4,707,582	2,526,600	2,784,313
1899	262,380	293,866	4,925,051	4,937,160	5,529,619	2,742,389	3,022,113
1900		(*a*)	5,322,197		(*a*)	2,772,000	3,054,744

a Latest available figures are used in making up totals.

Product of minor coal-producing countries, since 1868—Continued.

Year.	Italy.		Sweden.		South African Republic.	
	Metric tons.	Short tons.	Metric tons.	Short tons.	Long tons.	Short tons.
1868	51,386	56,627				
1869	56,201	61,962				
1870	58,770	64,794				
1871	80,336	88,570				
1872	93,555	103,144				
1873	116,884	128,864				
1874	127,473	140,539				
1875	116,955	128,943				
1876	116,399	128,330				
1877	120,588	132,948				
1878	124,117	136,839				
1879	131,318	144,778				
1880	139,369	153,654				
1881	134,582	148,377				
1882	164,737	181,623				
1883	214,121	235,961				
1884	223,322	246,213				
1885	190,413	209,930				
1886	243,325	268,266				
1887	327,665	361,251				
1888	366,794	404,390				
1889	390,320	432,533				
1890	376,326	415,500	187,512	206,132		
1891	289,286	318,938	198,033	218,331		
1892	295,713	326,024	199,380	219,816		
1893	317,249	349,767	199,933	220,426	548,534	614,358
1894	271,395	299,103	213,633	235,532	791,358	886,321
1895	305,321	336,563	223,652	246,464	1,133,466	1,269,482
1896	276,197	304,369	226,000	249,052	1,437,297	1,609,772
1897	314,222	346,273	224,343	251,264	1,600,212	1,792,237
1898	341,327	376,245	236,277	260,448	1,907,271	2,136,143
1899	388,534	428,164	239,344	263,757		(a)
1900		(a)		(a)		(a)

a Latest available figures are used in making up totals.

COAL TRADE REVIEW.

In the review of the coal trade for 1899 it was stated that the condition of the industry in that year was the most remarkable on record. Notable as it was, however, it was eclipsed by the results shown in 1900. The previously unequaled tonnage of 1899 was exceeded in 1900 by over 16,000,000 short tons, while, owing to the general advance in prices, the total value increased nearly $51,000,000. The preceding year had shown an increase over 1898 of nearly 34,000,000 short tons, accompanied by an increase in value of a little over $48,000,000. It will be seen from this that while the increase in value in 1900 over 1899 was more in amount than that of 1899 over 1898, it was much greater in proportion to the increased tonnage. Much of the coal sold in 1899 was delivered on contracts made in 1898, and operators did not get the full benefit of the improved conditions. Moreover, the price of labor in 1899 was materially advanced without a corresponding increase in selling values. These conditions were more fully equalized in 1900, and the year generally was one of profit to the operators and of good wages and steady employment to the mine workers.

There were two exceptions to the general harmonious conditions. One was the prolonged strike of the miners in the anthracite region of Pennsylvania, and the other a strike in the Georges Creek district of Maryland. Both of these are discussed in another part of this report. The results of these strikes were reflected in the decreased tonnage of both districts. Anthracite production fell off over 2,700,000 long tons, and the Maryland output decreased about 700,000 long tons. In the case of the latter, however, the value was larger than in 1899. By the strike in the anthracite region there was a practical elimination of about 5,000,000 tons of prospective production, which, if made, would have increased the output about 2,300,000 tons over 1899. Prices were sharply advanced during the continuance of the strike, and for a while hard coal was not obtainable at any price. As will be seen by the accompanying table of coal receipts in some of the principal cities, the deliveries of anthracite coal were, without exception, less in 1900 than in 1899.

Mr. F. E. Saward, in his annual report, The Coal Trade, calls attention to the gradual elimination of the individual operator as a factor in the anthracite coal trade. This has been particularly evident during the last two years. Some of the strongest of the "independents" have been taken into the railroad interests, and it is thought by many familiar with the trade that it will be but a comparatively short time until the entire anthracite region, either by purchase or by lease, will be in the hands of the railroads.

How the record of 1900 compared with the six years immediately preceding may be seen from the following table:

Shipments of anthracite coal and average prices at the mines for seven years.

Year.	Shipments.	Average price.
	Long tons.	
1894	41,391,200	$1.85
1895	46,511,477	1.72
1896	43,177,485	1.85
1897	41,637,864	1.85
1898	41,899,751	1.75
1899	47,823,241	1.80
1900	45,276,622	1.85

The bituminous trade as a whole was in a most satisfactory condition. The year opened with a brisk demand and good prices. With the adjustment of wages in April, rates for mining were generally advanced and selling prices were also increased. There was some reaction from the higher prices during the summer months, but values continued better than for the corresponding period in 1899. The anthracite strike benefited the bituminous trade in the eastern States in the fall of the year, and with the advent of cold weather prices were well maintained until the close of the year.

A condensed statement of the receipts of coal at the principal trade centers is shown in the following table. As before stated, a loss in the receipts of anthracite is shown in each case. Only two cities, Cincinnati and Cleveland, show decreases in the receipts of bituminous coal. Following this table are contributions from secretaries of boards of trade or other competent authorities, reviewing the coal trade of their respective cities:

Coal receipts at important centers.

	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Philadelphia (long tons):						
Anthracite	5,193,898	4,981,697	5,423,045	5,179,438	....	243,607
Bituminous	4,608,092	5,156,602	5,314,460	6,807,634	1,493,174	....
Boston (long tons) (*a*):						
Anthracite	1,981,119	1,866,877	2,226,094	2,005,879	....	220,215
Bituminous	1,656,919	1,768,442	1,841,394	2,150,551	309,157	....
Pittsburg (short tons) (*b*)	15,887,345	18,467,086	22,784,206	....	....	....
Buffalo (short tons):						
Anthracite	4,109,052	4,225,000	....	....	....	....
Bituminous	2,616,185	3,081,446	....	....	....	....
Cleveland (short tons):						
Anthracite	201,756	179,891	202,782	138,614	....	64,168
Bituminous	3,779,305	4,533,721	4,857,295	4,136,696	....	720,599
Toledo (*b*)	2,984,834	3,877,678	3,837,736	5,725,107	1,887,371	....
Chicago (short tons):						
Anthracite	1,776,400	1,840,858	2,146,554	1,572,019	....	574,535
Bituminous	5,373,852	4,976,779	6,463,506	6,956,622	493,116	....
Milwaukee (short tons):						
Anthracite	645,432	768,150	922,321	639,100	....	283,221
Bituminous	910,376	920,911	997,543	1,169,493	171,950	....
St. Louis (short tons):						
Anthracite	172,933	225,616	292,118	180,550	....	111,568
Bituminous	3,349,239	3,342,498	4,124,629	4,172,706	48,077	....
Cincinnati (short tons):						
Anthracite	50,050	37,925	51,650	17,500	....	34,150
Bituminous	3,100,431	3,319,793	3,100,011	2,905,021	....	194,990

a Not including foreign (mostly Nova Scotian) coal imported, which amounted to 551,817 tons in 1900 and 201,671 in 1898.
b Anthracite and bituminous.

NEW YORK CITY.

The following review of the coal trade of New York has been prepared for this report by Mr. Henry S. Fleming, secretary of the Anthracite Coal Operators' Association:

At the beginning of January, 1900, the anthracite market was in a most favorable condition. Stocks in the hands of dealers and those held by the producers were a trifle under normal, and the buying movement was steady and for immediate consumption. Prices were well maintained at a high level. Toward the close of the month and throughout February the demand declined and the prices dropped, continuing in this manner until April, when an announcement was made of a spring circular based on $3.90 free on board New York harbor for stove and chestnut, a reduction of 50 cents from the winter schedule.

During May and June the demand was relatively light and prices ruled much below the circular. But owing to the disturbed conditions of labor, the producers felt warranted in mining a large tonnage and stocking it as a reserve in the event of any disturbance. The shipments for the first six months were 22,678,876 tons, which, assuming the average over a period of years, would have indicated total shipments of over 52,000,000 tons for the year.

At the beginning of July a new circular was announced, based on $4.25 per ton free on board, for stove and chestnut sizes. Buyers began to take a more serious view of the labor situation and endeavored to fill their yards, while a strong effort was made to hasten deliveries to the New England markets. In August it became so apparent that labor troubles could be expected that the producers exerted every effort to mine a large tonnage, while prices began to advance strongly. This condition continued until September 17, when a general strike took place, closing practically every colliery. Prices moved upward rapidly and sales were made at 25 cents and even 50 cents above the current circular, with a demand for everything that would be delivered. October opened without any prospect of a settlement, and with the available supply declining rapidly. Toward the close of the month a more hopeful feeling prevailed and on the 1st of November, after a number of conferences, the miners returned to work.

By this time practically all of the coal in the storage yards had been delivered. Many retail yards were without a ton in stock, and others had but a few days' supply left. The demand was urgent from every point, particularly from those using the small sizes for steam purposes, and the producers lent every effort to relieve the situation. But even the large production in November and December was barely enough to meet the demand for immediate consumption, giving no opportunity to lay aside a reserve stock, and owing to this high prices continued, and with little prospect of a decline until late in the spring of the present year.

The most important event of this year was the step taken by the individual operators, in connection with the Pennsylvania Coal Company, to construct a railroad from the Wyoming coal region to tide water. A somewhat similar step was taken a year before, but owing to various developments had been held in abeyance. This new plan promised better results since the road was to pass along the abandoned canal of the Delaware and Hudson Company, thus insuring easy grades to tide. The construction of this road was strongly opposed in the courts by several of the other anthracite carrying railroads, but without success. Finally, at the close of the year, an arrangement was concluded by which the Pennsylvania Coal Company passed into the hands of the Erie Railroad, and at the same time the anthracite railroads agreed to enter into contracts with the individual operators for the purchase of their coal at 65 per cent of the tide-water price, as against the former 60 per cent rate. These contracts provided for all of the coal remaining in the ground, the purpose being to prevent any possibility of further disturbance to the market or freight rates through the action of individual shippers.

For the first six months of the year the shipments from the mines amounted to 22,678,876 long tons, an increase of nearly 2,000,000 tons over 1899, as shown in the following table. The shipments for the corresponding period in 1897 and 1898 are also given:

Anthracite shipments in first six months of 1897, 1898, 1899, and 1900.

Month.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
January	2,854,435	3,073,410	3,761,766	4,482,641
February	2,519,773	2,761,999	2,810,460	3,188,180
March	2,540,968	2,700,288	3,416,712	3,133,896
April	2,552,170	2,228,750	3,078,088	3,364,482
May	2,723,625	2,399,894	3,557,694	3,833,097
June	2,920,024	3,026,971	4,073,364	4,676,580
Total	16,110,995	16,191,312	20,698,084	22,678,876

The tide-water prices for the same period were as below:

Prices of anthracite at tide water, New York, during first six months of 1897, 1898, 1899, and 1900.

[Per long ton.]

Month and size.	1897.	1898.	1899.	1900.
January:				
Broken	\$3.346	\$3.289	\$3.179	\$3.235
Egg	3.668	3.566	3.337	3.581
Stove	3.867	3.742	3.536	4.023
Chestnut	3.544	3.430	3.389	4.056
Pea	2.066	2.219	2.207	2.316
Buckwheat	1.816	1.762	1.784	1.845
Average of chestnut and larger	3.656	3.542	3.395	3.820
February:				
Broken	3.373	3.290	3.197	3.315
Egg	3.683	3.601	3.310	3.526
Stove	3.908	3.835	3.573	3.961
Chestnut	3.565	3.604	3.457	3.978
Pea	2.127	2.257	2.220	2.294
Buckwheat	1.819	1.856	1.794	1.856
Average of chestnut and larger	3.683	3.633	3.526	3.775

Prices of anthracite at tide water, New York, during first six months of 1897, 1898, 1899, and 1900—Continued.

[Per long ton.]

Month and size.	1897.	1898.	1899.	1900.
March:				
Broken	$3.354	$3.312	$3.185	$3.174
Egg	3.678	3.653	3.337	3.421
Stove	3.918	3.879	3.556	3.844
Chestnut	3.570	3.635	3.536	3.835
Pea	2.149	2.272	2.235	2.416
Buckwheat	1.826	1.815	1.783	1.836
Average of chestnut and larger	3.685	3.671	3.447	3.651
April:				
Broken	3.354	3.326	3.186	3.180
Egg	3.676	3.669	3.340	3.432
Stove	3.934	3.877	3.619	3.715
Chestnut	3.602	3.631	3.594	3.712
Pea	2.184	2.310	2.218	2.302
Buckwheat	1.845	1.833	1.785	1.866
Average of chestnut and larger	3.699	3.676	3.486	3.573
May:				
Broken	3.378	3.339	3.185	3.200
Egg	3.686	3.695	3.382	3.463
Stove	3.948	3.913	3.639	3.710
Chestnut	3.628	3.655	3.607	3.707
Pea	2.196	2.307	2.192	2.312
Buckwheat	1.840	1.838	1.763	1.872
Average of chestnut and larger	3.717	3.702	3.506	3.580
June:				
Broken	3.379	3.314	3.147	3.204
Egg	3.714	3.709	3.397	3.481
Stove	3.967	3.907	3.662	3.702
Chestnut	3.663	3.648	3.631	3.703
Pea	2.212	2.308	2.143	2.281
Buckwheat	1.853	1.832	1.756	1.867
Average of chestnut and larger	3.741	3.698	3.479	3.580

The shipments for the last six months of 1900 and the total for the year as compared with the same period in 1897, 1898, and 1899 are shown in the following statement. It will be observed that a decrease of over 4,500,000 tons is shown for the last six months of 1900 as compared with the preceding year, and that nearly all of this loss was made in October. The total for the last six months was less than for the same period in any of the preceding three years, but the total for the year exceeded that of 1897 or 1898:

Anthracite shipments in last six months of 1897, 1898, 1899, and 1900.

Month.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
July	3,975,128	3,777,406	4,189,250	3,599,720
August	4,086,873	3,783,288	4,319,031	4,951,166
September	4,072,529	4,270,163	4,365,649	2,972,948
October	5,120,892	4,765,165	4,899,303	834,786
November	4,538,450	4,854,517	4,688,859	4,994,799
December	3,732,991	4,257,895	4,505,025	5,075,189
Total for last six months	25,526,863	25,708,434	26,967,117	22,428,608
Total for year	41,637,858	41,889,751	47,665,203	45,107,484

Tide-water prices for the last six months were as below:

Prices of anthracite at tide water, New York, during last six months of 1897, 1898, 1899, and 1900.

[Per long ton.]

Month and size.	1897.	1898.	1899.	1900.
July:				
Broken	$3.400	$3.296	$3.165	$3.211
Egg	3.731	3.583	3.445	3.519
Stove	3.989	3.850	3.720	3.692
Chestnut	3.682	3.603	3.666	3.702
Pea	2.194	2.219	2.095	2.249
Buckwheat	1.841	1.818	1.745	1.855
Average of chestnut and larger	3.760	3.635	3.562	3.386
August:				
Broken	3.446	3.249	3.224	3.210
Egg	3.779	3.581	3.501	3.562
Stove	4.007	3.796	3.752	3.726
Chestnut	3.690	3.543	3.725	3.715
Pea	2.186	2.208	2.065	2.269
Buckwheat	1.852	1.801	1.755	1.859
Average of chestnut and larger	3.786	3.591	3.521	3.611
September:				
Broken	3.427	3.255	3.193	3.324
Egg	3.813	3.515	3.490	3.706
Stove	4.034	3.724	3.832	3.840
Chestnut	3.700	3.631	3.822	3.861
Pea	3.167	2.170	2.052	2.325
Buckwheat	1.817	1.805	1.753	1.880
Average of chestnut and larger	3.804	3.590	3.660	3.741
October:				
Broken	3.396	3.210	3.209	3.415
Egg	3.799	3.435	3.596	4.010
Stove	4.000	3.638	3.928	4.278
Chestnut	3.567	3.414	3.783	4.312
Pea	2.162	2.151	2.065	2.555
Buckwheat	1.788	1.797	1.750	1.919
Average of chestnut and larger	3.745	3.461	3.706	4.168

Prices of anthracite at tide water, New York, during last six months of 1897, 1898, 1899, and 1900—Continued.

[Per long ton.]

Month and size.	1897.	1898.	1899.	1900.
November:				
Broken	$3.355	$3.169	$3.234	$3.432
Egg	3.717	3.373	3.567	3.987
Stove	3.914	3.596	3.968	4.413
Chestnut	3.570	3.373	3.959	4.446
Pea	2.157	2.149	2.173	2.497
Buckwheat	1.767	1.792	1.769	1.880
Average of chestnut and larger	3.718	3.416	3.769	4.185
December:				
Broken	3.263	3.133	3.229	3.407
Egg	3.607	3.365	3.656	4.017
Stove	3.780	3.561	4.028	4.444
Chestnut	3.429	3.358	4.042	4.448
Pea	2.160	2.169	2.240	2.516
Buckwheat	1.779	1.763	1.827	1.871
Average of chestnut and larger	3.567	3.393	3.832	4.201

BOSTON, MASS.

Mr. Elwyn G. Preston, secretary of the Boston Chamber of Commerce, contributes the following statement regarding the coal trade of that city in 1900:

The receipts of coal at Boston during 1900 were the largest on record, exceeding those of 1899 by 439,088 tons, or 13 per cent.

The following table shows the receipts of coal at Boston for the last eighteen years:

Receipts of coal at Boston for eighteen years.

Year.	Domestic.				Foreign.	Total.
	By water.		All rail.			
	Anthracite.	Bituminous.	Anthracite.	Bituminous.		
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
1883						2,273,068
1884						2,225,740
1885						2,221,220
1886					44,464	2,500,000
1887					13,966	2,400,000
1888	2,057,279	1,004,195			10,081	3,071,555
1889	1,647,348	914,966			5,538	2,567,852
1890	1,740,564	964,857			14,072	2,719,493
1891	2,039,443	1,070,088			5,842	3,115,373
1892	2,163,984	919,815			1,416	3,085,215
1893	2,227,086	1,100,384		*a* 50,000	17,097	3,394,567
1894	2,237,599	958,701		*a* 71,303	41,779	3,309,382
1895	2,518,441	977,762		*a* 90,999	21,009	3,608,211
1896	2,092,798	1,391,949		*a* 104,080	61,071	3,649,898
1897	1,948,283	1,591,245	32,836	65,674	50,235	3,688,273
1898	1,835,806	1,706,929	31,071	62,143	17,122	3,653,071
1899	2,178,791	1,746,780	47,303	94,614	201,671	4,269,159
1900	1,973,733	2,086,260	32,146	64,291	551,817	4,708,247

a Total anthracite and bituminous.

Of the gross receipts of domestic coal at Boston, 397,417 tons of anthracite and 851,332 tons of bituminous, a total of 1,248,749 tons were forwarded to interior New England points by rail, leaving the net receipts at Boston, representing local consumption, as follows: Anthracite, 1,608,462 tons, a decrease of 155,805 tons; bituminous, 1,851,036 tons, an increase of 455,504 tons; total, 3,459,498, as compared with 3,159,799 tons in 1899, an increase of 9 per cent.

The following table shows the receipts at Boston for consumption, by months, during the last year:

Monthly receipts of coal at Boston for 1900 with comparisons.

Month.	Receipts, all routes.		Amount forwarded to interior New England points.		Net receipts (for local consumption).	
	Anthracite.	Bituminous.	Anthracite.	Bituminous.	Anthracite.	Bituminous.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
January	162,021	200,332	20,536	66,947	141,485	133,385
February	117,364	226,381	15,021	63,185	102,343	163,196
March	114,518	187,687	35,451	61,909	79,067	125,778
April	169,288	222,956	28,148	39,620	141,140	183,336
May	220,776	228,883	50,795	71,930	169,981	156,953
June	214,797	210,487	48,666	62,034	166,131	148,453
July	185,539	188,854	33,669	69,568	151,870	119,286
August	259,544	236,716	51,670	77,644	207,874	159,072
September	194,381	242,133	40,442	80,266	153,939	161,867
October	63,777	310,570	22,308	81,969	41,469	228,601
November	100,993	230,737	19,259	104,914	81,734	125,823
December	202,881	216,632	31,452	71,346	171,429	145,286
Totals, 1900	2,005,879	*a* 2,702,368	397,417	851,332	1,608,462	1,851,036
Totals, 1899	2,226,094	*b* 2,043,065	461,827	647,533	1,764,267	1,395,532
Totals, 1898	1,866,877	1,786,194	368,960	663,008	1,497,917	1,123,186
Totals, 1897	1,981,119	1,707,154	418,171	734,541	1,562,948	972,613

a Includes 551,817 tons foreign coal.

b Includes 201,671 tons foreign coal. Prior to 1899 imports of foreign coal were unimportant.

The scarcity of tonnage and the high rates prevailing during the latter part of 1899 continued during the opening months of 1900 and prevented the free movement of coal to replenish local stocks. Carriers' rates began to drop from the high level in March, and during April they reached practically the extreme low level of the year, from which point they made no substantial recovery during the remaining months, prices in December, contrary to expectation and the usual experience, being substantially at the low midsummer level. A six days' demurrage clause was incorporated into most charters during the first three months of the year. The range of carriers' rates is shown by the following table, the high prices being obtained during January and February, the low prices representing practically the scale in force during the last eight months of the year:

Coal freights to Boston, Mass.

From—	Per ton.
Philadelphia	$0.65 to $2.10
Baltimore	.75 to 2.10
Norfolk and Newport News	.70 to 2.00
New York	.50 to 1.50

Prices for coal in the Boston market have maintained a higher level than for several years past. The year opened with stove coal quoted in the retail trade at $6 per ton, a reduction to $5 being made in May, where it remained during the summer months. The strike caused an increase to $6 in September, and later to $7, the year closing at $6.25. Georges Creek Cumberland, at wholesale, ranged from $5.50 per ton in January down to $3.50 in December, free on board cars at tidewater, Boston. During the three summer months there was practically no Georges Creek coal offered, and buyers were obliged to content themselves with inferior grades.

Late in August bituminous coal began to come forward freely and prices dropped to below $4 per ton, $3.50 to $3.85 being the range for the last three months of the year.

Receipts of foreign coal were nearly three times the amount received in 1899, aggregating 551,817 tons.

During the year a considerable amount of coke, produced at the works of the New England Gas and Coke Company, in Everett, Mass., came into the market and to a certain extent supplied the place of soft coal, many plants being fitted up for the permanent use of that fuel. They were doubtless led to the experiment which resulted in permanent contracts being made, by the fact that at times during the year it was practically impossible to obtain coal of reasonably satisfactory quality, except in a small way. It is understood that a considerable use of coke was made for domestic uses in place of anthracite grades, although no figures are available showing to what extent this has been done.

PHILADELPHIA, PA.

The following review of the coal trade of Philadelphia has been prepared for this report by Mr. Samuel R. Kirkpatrick, railroad editor of the Press:

If it had not been for the anthracite coal strike, which began on September 17 and continued until October 27, there is hardly any doubt that the anthracite coal consumption in this city would have been the largest in the history. While the strike was looked for by some people, it was in the main somewhat unexpected, and it caught many of the dealers with bare yards; so much so that during its progress there was a sharp advance not only in the wholesale but also in the retail price of anthracite, and in many instances the large coal-producing companies were not in a position to fill their orders. For over two years now there has been a large demand for anthracite coal, and it has been almost impossible for the companies to keep a stock on hand. The Philadelphia and Reading Coal and Iron Company, which is the largest producing company and has greater facilities than any other, had, on December 31, 1900, only 12,000 tons of coal on hand at its Port Richmond yards. This small amount could hardly be seen, as the company has a capacity for storing over 400,000 tons at this place.

The anthracite coal strike created a boom in the bituminous coal trade, and in 1900 there were 1,628,285 tons of soft coal used, as against 1,482,147 tons the previous year. The shipments to points outside of Philadelphia were unusually large, there being 4,410,149 tons in 1900, as against 3,373,047 tons in 1899. The export trade was also better, there being an increase of 300,000 tons as compared with the previous year.

The total amount of anthracite distributed in this city in 1900 was 5,179,438 tons, and of bituminous, 6,807,684 tons. The bituminous coal trade was in fairly good shape until near the close of the year, when overproduction and too much stock on hand caused some cutting, which soon became general, and prices rapidly fell off. While the cutting of prices in the latter part of the year was not so great as in former years, it caused some uneasiness and few of the dealers were inclined to lay in any stock. The anthracite strike caused a number of manufacturing establishments in this city to use bituminous coal, and were it not for the objection to the smoke there is hardly any doubt that this fuel would be universally adopted; as it is, many of the manufacturers who were compelled to use bituminous have not gone back to anthracite, and many of the dealers are of the opinion that the strike has caused considerable loss to the anthracite coal trade.

When the strike began it was thought by the officials of the Philadelphia and Reading Coal and Iron Company that it would not extend to their mines, but as it was a sympathetic movement the whole coal region, with the exception of the mines operated by the Lehigh Coal and Navigation Company, was forced to shut down.

At times there was practically no coal shipped to this city, and during this period the retail dealers advanced the price to $7 per ton. The Lehigh Coal and Navigation Company was the only company that had any coal to sell, and it secured whatever prices it wished, but gave preference to its regular customers. The Philadelphia and Reading Coal and Iron Company, while having a small stock on hand at its storage yards outside of Philadelphia, held that back for the use of the cities along its line, so that the power plants, waterworks, and other municipal plants could be kept in operation. There was a great scarcity of coal throughout the country, and when the strike was declared off it was some weeks before the companies issued a circular in regard to prices. In September the price of stove coal advanced to $3.75 a ton, and in October $4.25 was easily obtained. These were the prices at the mines, and very little coal could be had at even these high figures. For the rest of the year stove coal brought $3.25 a ton at the mine.

The community-of-interest plan is now working with notable success in both the anthracite and the bituminous coal trade. The Reading Company, which controls both the Philadelphia and Reading Coal and Iron Company and the Philadelphia and Reading Railway Company, has secured control of the Central Railway Company of New Jersey, which makes it more of a factor than ever in the anthracite trade. Prices have been better maintained and the Reading Company takes the initiative in the making of prices. During 1900 the production was over 5,000,000 tons a month, and even with this large amount of coal produced the storage yards in this city were practically bare of coal. Previous to July there was a good demand for both soft and hard fuel, and prices were well maintained. The great wave of prosperity which had started the previous year was still on the move, and nearly all the manufacturing plants were using large quantities of coal. During the months of January, February, and March high prices for prepared sizes of anthracite coal at the mines prevailed, but in April the spring circular was issued and there was a general reduction of 25 cents a ton. In June prices somewhat stiffened, and held firm until the strike, when a general advance took place, although most of the companies were unable to take advantage of the high prices, as they had not the coal to deliver.

There was a falling off in the consumption of bituminous coal during the latter part of the year, although the actual consumption for twelve months was 1,628,285 tons, an increase over the previous year of 146,138 tons. This falling off was due in great measure to a certain amount of restriction put in force by a number of the manufacturing companies. Even the United Gas Improvement Company is using less soft coal every year. As soon as the bituminous trade became slack there were indications that a break would be made, and many of the operators, especially the small ones who had no facilities for storing coal, began to make concessions. At the close of the year the bituminous coal trade was in an unsettled condition and prices were considerably lower than they were at the end of the first half. The situation in the bituminous coal field was better than it had been for years, and a very few regions had any trouble with their miners. The strike of the anthracite coal miners caused the soft-coal miners to work more steadily and get out a greater amount. There were not so many complaints made by the operators as heretofore in relation to scarcity or lack of cars, as the railroad companies had, since the previous year, secured a larger number of new cars and were in a better position to take care of the trade.

The anthracite coal trade as a whole was better than it had been for many years, and, notwithstanding the closing down of the mines for a period of one month, the prices obtained compensated the operators for the losses made during the time they were unable to work their properties. Up to the time the miners went out there was a fair demand, and at all times it was in excess of the production. Prices were well held and there were no indications that cutting was being indulged in. There was a big demand for anthracite from points in New England and the Far West, but at the close of navigation on the Great Lakes many Western storage yards of the coal companies had very little coal on hand. There were only a few tons in this city, and in Boston and other large Eastern centers the situation was the same.

The price circular of the Philadelphia and Reading Coal and Iron Company, which constitutes the standard, quoted the following prices:

Circular prices for anthracite coal in Philadelphia during 1899 and 1900.

Size.	1899.		1900.				
	March.	December.	January.	April.	July.	September.	October.
Lump and steamboat	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50
Broken	2.25	2.45	2.45	2.25	2.35	2.60	2.75
Egg	2.40	2.55	2.85	2.40	2.50	2.75	3.00
Stove	2.50	2.95	2.95	2.65	2.75	3.00	3.25
Chestnut	2.50	2.95	2.95	2.65	2.75	3.00	3.25
Pea	1.50	1.75	1.75	1.50	1.50	1.75	1.75
Buckwheat	.85	1.00	1.00	1.00	1.00	1.25	1.25

There were five circulars issued to the line and city trade during the year. January prices were practically the same as December, but in April there was a slight advance, as also in July, September, and October. The above prices are subject to the usual agent's commission of 15 cents per ton. They are for coal free on board cars at the mines, and railroad freight charges must be paid in addition. During the whole year there was a good demand for nearly all sizes, the lowest prices prevailing in April. In October the highest prices prevailed, and while the circular quoted $3.25 a ton for stove and chestnut sizes, this was not the ruling figure, as many of the companies received from $1 to $1.50 more.

The following table shows the actual selling prices of prepared sizes for years 1897, 1898, 1899, and 1900:

Selling prices of prepared anthracite coal at the mines for Philadelphia for four years.

Month.	Sizes.	1897.	1898.	1899.	1900.
January	Broken	$2.40	$2.00	$2.10	$2.35-$2.50
	Egg	2.80	2.40	2.15	2.85
	Stove	2.90	2.50	2.25	2.95
	Nut	2.65	2.30	2.25	2.95
	Pea	....	....	1.15	1.60- 1.75
February	Broken	2.40	2.00	2.10	2.35- 2.50
	Egg	2.80	2.40	2.15	2.85
	Stove	2.90	2.50	2.25	2.95
	Nut	2.65	2.30	2.25	2.95
	Pea	....	....	1.15	1.35- 1.75
March	Broken	2.40	2.00	2.25	2.25- 2.50
	Egg	2.80	2.40	2.40	2.85
	Stove	2.90	2.50	2.50	2.95
	Nut	2.65	2.30	2.50	2.95
	Pea	....	....	1.15	1.35- 1.75
April	Broken	2.40	2.00	2.25	2.10- 2.35
	Egg	2.80	2.40	2.40	2.40
	Stove	2.90	2.50	2.50	2.65
	Nut	2.65	2.30	2.50	2.65
	Pea	....	....	1.15	1.35- 1.50
May	Broken	2.25	2.10	2.25	2.10- 2.35
	Egg	2.50	2.15	2.40	2.40
	Stove	2.75	2.25	2.50	2.65
	Nut	2.65	2.10	2.50	2.65
	Pea	....	....	1.15	1.35- 1.50
June	Broken	2.25	2.10	2.25	2.10- 2.25
	Egg	2.65	2.30	2.30	2.00- 2.40
	Stove	2.75	2.25	2.40	2.25- 2.50
	Nut	2.50	2.10	2.40	2.25- 2.50
	Pea	....	....	1.00	1.35- 1.50
July	Broken	2.40	2.10	2.15	2.00- 2.25
	Egg	2.80	2.30	2.30	2.25- 2.75
	Stove	2.90	2.25	2.40	2.25- 2.75
	Nut	2.65	2.10	2.40	2.25- 2.75
	Pea	....	....	1.00	1.10- 1.50
August	Broken	2.40	2.00	2.25	2.00- 2.35
	Egg	2.80	2.30	2.40	2.00- 2.50
	Stove	2.90	2.25	2.50	2.25- 2.75
	Nut	2.65	2.10	2.50	2.25- 2.75
	Pea	....	....	1.00	1.00- 1.50
September	Broken	2.40	2.00	2.25	2.10- 2.35
	Egg	2.80	2.30	2.50	2.25- 2.50
	Stove	2.90	2.25	2.60	2.50- 2.75
	Nut	2.65	2.10	2.60	2.50- 2.75
	Pea	....	....	1.00	1.00- 1.50
October	Broken	2.50	2.00	2.25	2.50- 3.00
	Egg	2.90	2.15	2.60	3.25- 3.75
	Stove	3.00	2.25	2.70	3.25- 4.25
	Nut	2.80	2.10	2.70	3.25- 4.25
	Pea	....	....	1.00	2.25- 3.25

Selling prices of prepared anthracite coal at the mines, etc.—Continued.

Month.	Sizes.	1897.	1898.	1899.	1900.
November	Broken	$2.25	$2.00	$2.25	$2.75
	Egg	2.80	2.15	2.85	3.00
	Stove	2.90	2.25	2.95	3.25
	Nut	2.65	2.10	2.95	3.25
	Pea			1.00	1.75- 2.00
December	Broken	2.25	2.00	2.25	2.75
	Egg	2.80	2.15	2.85	3.00
	Stove	2.90	2.25	2.95	3.25
	Nut	2.65	2.10	2.95	3.25
	Pea			1.75	1.75- 2.00

From September 18, the beginning of the strike, fancy prices prevailed, and they were in force until October 27, when it was declared off. In the latter part of September some operators got October prices.

There was no change in freight rates for local delivery during the year. The charges, which vary according to the region from which the shipment is made and according to size of coal, were as follows:

Freight rates on anthracite coal from regions to Philadelphia.

Region.	Prepared sizes.	Pea.	Buck-wheat.
Schuylkill	$1.70	$1.40	$1.25
Lehigh	1.75	1.45	1.30
Wyoming	1.80	1.50	1.35

The consumption of pea coal for manufacturing purposes is gradually becoming less and less, although the quantity used for household purposes is increasing. This increase for domestic purposes is due in great measure to the cheapness of the fuel, as it is considerably less than stove or chestnut. At one time it was extensively used by manufacturers, but lately the industrial establishments and other manufacturing plants have been adapting themselves to still smaller sizes, such as buckwheat and rice. It is thought that the use of pea coal for manufacturing purposes will continue to decrease, and that within a few years it will be used only by the householder. Pea coal held firm until December, when there was an advance of from $1 to $1.75 a ton at the mines.

The shipment of coal to foreign countries showed an increase in anthracite of 1,987 tons over 1899, the total shipments amounting to 27,067 tons. Bituminous coal was sent abroad in larger quantities, there being an increase in this fuel of 309,934 tons. As has been the case heretofore, the largest amount of bituminous coal sent out of this country was shipped to Cuba, it taking 276,090 tons, valued at $655,716. There were also shipped to Cuba 12,804 tons of anthracite coal, valued at $44,724. While the shipments of bituminous coal to foreign ports were not in large quantities, there were cargoes sent out to nearly all the important countries of the globe. There were small amounts of bituminous coal sent to Brazil, Chile, Cape Colony, Dutch Guiana, Argentina, British Guiana, Venezuela, and British and French Africa. Great Britain had 68,277 tons of soft coal sent to Gibraltar, valued at $133,634. There were also 4,000 tons sent to Egypt, 49,699 tons to France, 5,737 tons to Germany, 2,427 tons to Greece, and 4,174 tons to Russia on the Baltic.

It is believed that a larger foreign coal trade is to be developed. The Philadelphia and Reading Coal and Iron Company has had agents abroad, and it has sent a number of cargoes to Europe. Anthracite coal is not understood by the foreigners, and until they are educated to its use it is not likely to take the place of bituminous.

Through the courtesy of the officers of the Pennsylvania Railroad Company, the Philadelphia and Reading Railway Company, the Lehigh Coal and Navigation Company, and the Baltimore and Ohio Railroad Company, data have been furnished from which the following table has been compiled. It shows the distribution of coal at Philadelphia for the export trade, the coastwise and harbor trade, and the Philadelphia local trade. The figures of 1899 are also given for the purpose of comparison.

Distribution of coal at Philadelphia in 1899 and 1900.

[In tons of 2,240 pounds.]

	1899.		1900.	
	Anthracite.	Bituminous.	Anthracite.	Bituminous.
Export	18,080	459,266	21,067	769,200
Coastwise and harbor	1,947,483	3,373,047	1,653,805	4,410,149
Local	3,457,482	1,482,147	3,504,566	1,628,285
Total	5,423,045	5,314,460	5,179,438	6,807,634

PITTSBURG, PA.

The accompanying statistics, showing the movement of coal in this most important shipping and manufacturing center, have been compiled from reports made to the Survey by officials of the railroads entering Pittsburg and by the United States Army officers in charge of the Monongahela and Ohio River improvements. Although more coal is shipped to and through Pittsburg than is handled in any other city in the United States, there is no local bureau devoted to the collection of statistics of the city's manufacturing and transportation industries. The officials furnishing the information for this report, and to whom special acknowledgment is due, are Mr. J. G. Searles, coal freight agent, Pennsylvania Railroad, Philadelphia, Pa.; Mr. W. L. Andrews, assistant coal and coke agent, Baltimore and Ohio Railroad, Pittsburg; Mr. James Means, division freight agent, Pittsburg, Cincinnati, Chicago and St. Louis Railroad, Pittsburg; Mr. F. A. Dean, general freight agent, Pittsburg and Lake Erie Railroad, Pittsburg; Maj. W. H. Bixby, United States Army, in charge of Ohio River improvements; Maj. Charles F. Powell, United States Army, in charge of Monongahela River improvements.

During 1900 the control of the Allegheny Valley Railway passed into the control of the Pennsylvania Railroad Company. The records of the shipments over the Allegheny Valley road were not kept in a manner to show the shipments to and through Pittsburg during last year. Mr. E. P. Bates, formerly general freight agent of the Allegheny Valley road, states that the shipments were about the same as in 1899 and, this statement has been accepted as the best information obtainable.

The total movement of coal to and through Pittsburg in 1900 was 20,718,537 short tons, as compared with 20,075,066 short tons in 1899. Of the total movement in 1900, 14,900,672 tons, or 72 per cent, were received by rail, and 5,817,863 tons, or 28 per cent, by water. Of the local consumption (10,700,372 tons), 7,439,979 tons, or 70 per cent, were received by rail and 3,260,393 tons, or 30 per cent, by Monongahela River. The shipments through Pittsburg aggregated 10,018,165 tons. Of this amount 7,460,695 tons, or 74 per cent, went by rail, and 2,557,470 tons, or 76 per cent, by Ohio River. The corresponding figures for 1899 were: Local consumption: Rail, 6,237,594 tons; river, 2,860,827 tons; total, 9,098,421 tons. Shipments through Pittsburg: Rail, 8,267,505 tons; river, 2,709,140 tons; total, 10,976,645 tons.

The details of the movement of coal in the Pittsburg district since 1896 are shown in the following table:

Shipments of coal to and through Pittsburg in 1896, 1897, 1898, 1899, and 1900.

Transportation route.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Pennsylvania R. R.:	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
To Pittsburg and vicinity	1,344,685	1,379,718	1,328,540	1,698,240	1,792,448	94,208	....
To west of Pittsburg	688,740	1,206,598	1,283,052	1,459,546	1,477,277	17,731	....
Baltimore and Ohio R. R.:							
To Pittsburg district	552,031	395,265	430,139	546,679	481,587	....	65,092
To west of Pittsburg	839,145	581,851	656,345	950,632	990,082	39,450	....
Pittsburg, Cincinnati, Chicago, and St. Louis R. R. *a*	2,585,547	2,369,022	2,783,816	3,322,227	3,298,470	....	23,757

a Shipments over the Pittsburg, Cincinnati, Chicago and St. Louis Railroad are separated in the same ratio as the totals of other lines. Total shipments only over this line were reported.

Shipments of coal to and through Pittsburg in 1896, 1897, 1898, 1899, and 1900—Cont'd.

Transportation route.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Allegheny Valley Rwy.: *a*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
To Pittsburg district..	162,945	125,445	125,180	145,924	150,000	4,076	....
To west of Pittsburg..	64,887	20,721	39,977	6,332	6,500	168	....
Pittsburg and Lake Erie R. R.:							
Local and Pittsburg..	1,524,357	1,506,296	1,880,000	2,125,173	2,234,770	....	....
To west of Pittsburg..	3,048,715	3,012,591	3,759,237	4,250,346	4,469,540	....	....
Monongahela River locks:							
To Pittsburg district..	1,607,062	2,619,469	3,141,306	2,860,827	3,260,393	399,566	....
To west of Pittsburg..	4,102,190	2,670,369	2,979,494	2,709,140	2,557,470	....	151,670
Total shipments....	16,620,304	15,887,345	18,407,086	20,075,066	20,718,537	....	....
West of Pittsburg *b*.	10,295,005	8,661,152	10,218,105	10,976,645	10,018,165	....	....
Local consumption.	6,325,299	7,226,193	8,188,981	9,098,421	10,700,372	....	....

a Coal originating on this road only. Does not include coal received from the Pennsylvania Railroad and forwarded over the Allegheny Valley Railway.

b Shipments over the Pittsburg, Cincinnati, Chicago and St. Louis Railroad are separated in the same ratio as the totals of other lines. Total shipments only over this line were reported.

MONONGAHELA RIVER SHIPMENTS.

Maj. Charles F. Powell, Corps of Engineers, U. S. A., in charge of Monongahela River improvement, reports the tonnage passing through the locks in 1900 at 5,817,863 tons of 2,000 pounds. Maj. W. H. Bixby, in charge of Ohio River improvement, reports that 2,557,470 tons passed through Davis Island dam. The difference between these amounts (3,260,393) represents approximately the amount of river coal consumed at Pittsburg.

Movements of coal through Monongahela River locks and Davis Island dam.

Year.	Passed through locks on Monongahela River.	Passed Davis Island dam, Ohio River, near Pittsburg. (From annual reports, Ohio River improvement.)	Difference, approximate consumption of river coal at Pittsburg.
	Tons.	*Tons.*	*Tons.*
1890	4,652,104	3,420,357	1,231,747
1891	4,276,588	2,893,752	1,382,836
1892	3,872,340	2,299,294	1,573,046
1893	3,860,072	2,364,401	1,495,671
1894	4,649,612	2,453,787	2,195,825
1895	4,183,596	2,393,873	1,789,723
1896	5,709,252	4,102,190	1,607,062
1897	5,289,838	2,670,369	2,619,469
1898	6,120,800	2,979,494	3,141,306
1899	5,569,967	2,709,140	2,860,827
1900	5,817,863	2,557,470	3,260,393

RECEIPTS AND SHIPMENTS BY RAIL.

The following tables show the receipts and shipments of coal by railroads entering the Pittsburg district:

Receipts of coal via Pennsylvania Railroad in 1896, 1897, 1898, 1899, and 1900.

To—	1896.	1897.	1898.	1899.	1900.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Pittsburg and vicinity	1,344,685	1,379,718	1,328,540	1,698,240	1,792,448
West of Pittsburg	688,740	1,206,598	1,283,052	1,459,546	1,477,277
Total	2,033,425	2,586,316	2,611,592	3,157,786	3,269,725

Shipments of coal and coke via Baltimore and Ohio Railroad to and through Pittsburg.

Year.	Pittsburg district.		Via Pittsburg to all points.	
	Coal.	Coke.	Coal.	Coke.
	Tons.	*Tons.*	*Tons.*	*Tons.*
1896	552,031	447,866	839,145	727,219
1897	395,265	487,745	581,851	1,020,430
1898	430,139	437,343	656,345	1,610,759
1899	546,679	549,086	950,632	1,478,768
1900	481,587	578,731	999,082	1,641,767

Shipments of coal via Allegheny Valley Railway to and through Pittsburg.

Year.	Pittsburg district.	Via Pittsburg to all points.	Total.
	Tons.	*Tons.*	*Tons.*
1895	162,600	33,399	195,999
1896	162,945	64,887	227,832
1897	125,445	20,721	146,166
1898	125,180	39,977	165,157
1899	145,924	6,332	152,256
1900 *a*	150,000	6,500	156,500

a Approximate.

Shipments of coal over the Pittsburg and Lake Erie Railroad.

Year.	Tons.
1895	3,546,598
1896	4,573,072
1897	4,518,887
1898	5,639,237
1899	6,375,519
1900	6,704,310

Shipments of coal over the Pittsburg, Cincinnati, Chicago and St. Louis Railroad.

Year.	Tons.
1895	2,417,096
1896	2,585,547
1897	2,369,022
1898	2,783,816
1899	3,322,227
1900	3,298,470

CLEVELAND, OHIO.

The following summary of the coal trade of Cleveland has been prepared for this report by Mr. F. A. Scott, secretary of the chamber of commerce:

The Cleveland coal market for the year 1900 was rather uniform in the way of price obtained for the product. January and February prices ruled somewhat high, but eased off in March, and for the remainder of the year ruled much lower than the average price of the same product during the year 1899, taking into consideration the relative price of mining. The demand was strong and the car supply at times inadequate. The price of mining in Ohio from April 1, 1900, was about 20 per cent over the price paid during 1899.

The Ohio tonnage was largely increased by reason of many new mines being opened up. This increase of tonnage, together with the low prices that ruled during the year, prevented the marketing here of any great quantity of West Virginia or Pittsburg coals. Labor troubles, so far as the mining situation was concerned, were not numerous, the interstate agreement of operators and miners regulating the mining price and thereby preventing friction of any magnitude.

Coal and coke receipts and shipments at Cleveland since 1887.

RECEIPTS.

	1887.	1888.	1889.	1890.	1891.	1892.	1893.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Bituminous	1,454,744	1,737,781	1,600,000	1,560,208	2,838,586	3,651,080	3,603,984
Anthracite	176,769	181,551	160,000	205,856	201,927	259,150	262,266
Coke	114,924	124,827	150,000	194,527	189,640	351,527	235,248
Total	1,746,437	2,044,159	1,910,000	1,960,591	3,230,153	4,261,757	4,101,498

SHIPMENTS.

	1887.	1888.	1889.	1890.	1891.	1892.	1893.
Anthracite by rail	20,296	29,735	25,000	29,056	34,910	50,742	49,497
Bituminous by rail	703,506	1,000,000	1,100,000	1,200,000	1,525,000	1,728,831	24,128
Bituminous by lake							1,257,326
Total	723,802	1,029,735	1,125,000	1,229,056	1,559,910	1,779,573	1,330,951

Coal and coke receipts and shipments at Cleveland since 1887—Continued.

RECEIPTS.

	1894.	1895.	1896.	1897.	1898.	1899.	1900.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Bituminous	2,715,540	2,842,333	2,994,802	3,779,305	4,533,721	4,857,295	4,136,696
Anthracite	207,604	201,022	142,832	201,756	179,891	202,782	138,614
Coke	298,061	432,216	338,678	503,935	482,539	484,738	394,934
Total	3,221,205	3,475,571	3,476,312	4,484,996	5,196,151	5,544,815	4,670,244

SHIPMENTS.

Anthracite by rail	44,177	31,894	20,299	33,750	27,650	41,072	15,456
Bituminous by rail	30,000	64,908	25,872	71,770	511,447	46,622	31,779
Bituminous by lake	1,106,000	1,125,624	1,803,709	2,027,693	2,108,310	2,171,417	2,201,828
Coke by rail	42,048	49,536	85,256	117,390	93,628	129,146	51,448
Total	1,222,225	1,271,962	1,935,136	2,250,603	2,741,035	2,388,257	2,300,511

Clearances of coal from the Cuyahoga (Ohio) district for fourteen years.

Year.	Tons.	Year.	Tons.
1887	1,433,035	1894	2,239,829
1888	1,855,260	1895	2,948,324
1889	2,020,996	1896	3,863,645
1890	2,328,663	1897	3,613,245
1891	2,635,461	1898	3,844,239
1892	2,957,988	1899	4,062,869
1893	3,052,342	1900	4,912,421

TOLEDO, OHIO.[1]

A gratifying exhibit of Toledo's importance as a lake port is shown by the coal commerce of the city in 1900. The coal receipts last year reached a total of 5,725,107 tons, an increase of 1,887,371 tons, or nearly 50 per cent, over 1899 and nearly double those of 1897. The receipts by carrying companies for a series of years are presented in the following summary:

Coal receipts at Toledo since 1894.

Railroad.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Wabash R. R	....	1,000	5,000	6,000	10,000	10,000	15,000
Lake Shore and Michigan Southern Rwy	22,126	38,000	44,000	50,000	60,000	75,000	80,000
Cincinnati, Hamilton and Dayton R. R	72,000	30,000	35,000	40,000	50,000	60,000	60,000
Pennsylvania Co	78,792	....	529,968	573,000	782,000	838,736	1,100,000
Columbus, Hocking Valley and Toledo Rwy	540,000	500,000	850,000	730,000	1,100,000	1,200,000	2,406,600
Toledo and Ohio Central Rwy	767,670	721,914	705,272	777,129	883,692	1,039,000	1,464,100
Lake	116,000	124,000	119,000	88,705	90,000	70,000	58,093
Wheeling and Lake Erie Rwy	914,220	520,000	646,471	720,000	901,986	545,000	541,314
Total	2,510,808	1,934,914	2,934,711	2,984,834	3,877,678	3,837,736	5,725,107

[1] From the annual report of Denison B. Smith, Secretary, Produce Exchange.

The total receipts at Toledo since 1896 have been as follows:

Total coal receipts at Toledo since 1886.

Year.	Short tons.	Year.	Short tons.
1886	2,340,859	1894	2,510,808
1887	2,695,713	1895	1,934,914
1888	3,524,785	1896	2,934,711
1889	2,840,314	1897	2,984,834
1890	3,021,886	1898	3,877,678
1891	2,754,943	1899	3,837,736
1892	2,291,355	1900	5,725,107
1893	3,445,995		

CHICAGO, ILL.

The following tables are condensed from the statistical tables compiled by the Chicago Bureau of Coal Statistics and published in the Black Diamond. The effects of the strike in the anthracite region of Pennsylvania are shown in the largely decreased receipts in October and November as compared with the same months in 1899. Bituminous receipts increased nearly half a million tons, and the receipts of coke showed an increase of 93,284 tons. The combined increase in the receipts of bituminous coal and coke were a little more than the decrease in anthracite:

Receipts of anthracite coal at Chicago in 1899 and 1900.

Month.	Anthracite by lake.		Anthracite by rail.		Total anthracite.		1900.	
	1900.	1899.	1900.	1899.	1900.	1899.	Increase.	Decrease.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
January			82,852	87,204	82,852	87,204		4,352
February			53,274	85,566	53,274	85,566		32,292
March			54,371	84,679	54,371	84,679		30,308
April	26,613	4,251	27,640	89,180	44,253	93,431		49,178
May	190,729	142,226	15,151	37,039	205,880	179,265	26,615	
June	128,521	174,376	72,074	25,975	200,595	200,351	244	
July	125,890	128,118	70,362	45,030	196,252	173,148	23,104	
August	159,989	153,807	66,138	73,202	226,127	227,009		882
September	115,879	140,397	59,138	121,785	175,017	262,182		87,165
October	28,605	223,195	9,216	106,344	37,821	329,539		291,718
November	72,626	180,480	32,528	67,923	105,154	248,403		143,249
December	69,263	80,722	121,160	95,055	190,423	175,777	14,646	
Total	918,115	1,227,572	653,904	918,982	1,572,019	2,146,554		574,535

As shown in the following table, there was a slight falling off in the receipts of bituminous coal from Ohio. The most noticeable increase was from Indiana, the gain in the receipts from that State being 233,565 tons. The receipts of Indiana coal have increased each year since 1896. West Virginia coal also showed a considerable increase in 1900:

Receipts of bituminous coal and coke at Chicago for five years.

State from which received.	1896.	1897.	1898.	1899.	1900.	Increase in 1900.	Decrease in 1900.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Pennsylvania	184,655	211,158	410,801	*a*516,087	564,833	48,746	....
Ohio	330,837	313,632	240,592	550,157	547,425	....	2,732
West Virginia and Kentucky	394,549	649,441	475,738	805,122	973,982	168,860	....
Illinois	2,589,737	2,628,384	2,275,118	2,618,309	2,662,986	44,677	....
Indiana	1,351,848	1,571,237	1,574,530	1,973,831	2,207,396	233,565	....
Total bituminous coal	4,851,626	5,373,852	4,976,779	6,463,506	6,956,622	493,116	....
Coke	397,811	527,608	928,893	520,558	613,842	93,284	....

a Receipts by lake, included in this amount, were 75,277 tons.

MILWAUKEE, WIS.

Mr. William J. Langson, secretary of the chamber of commerce, of Milwaukee, has prepared for this report the following statement regarding the coal trade of that city:

The strike of anthracite-coal miners materially reduced the supply of coal at Milwaukee in 1900, whereas under ordinary circumstances it would have shown a large increase. The receipts by lake amounted to 1,651,442 tons, or 124,325 tons less than in 1899. Receipts by rail and car-ferry were slightly larger than in 1899, making the total supply 1,808,593 tons, or a net decrease of 111,271 tons. Had it not been for the strike the two-million mark would have been easily passed. As it is, that is deferred a year.

It will be observed from the following tables that the decrease in receipts was confined to anthracite coal. Assuming the receipts by rail to have been entirely bituminous coal, the total receipts of the latter amounted to 1,169,493 short tons, an increase of 171,950 tons over 1899. Anthracite receipts fell off nearly 300,000 tons. The total receipts at Milwaukee since 1895 have been as follows:

Total receipts of coal at Milwaukee, Wis., for six years.

Kind.	1895.	1896.	1897.	1898.	1899.	1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Anthracite	853,680	813,487	645,432	768,150	922,321	639,100
Bituminous	592,743	774,308	910,376	920,911	997,543	1,169,493
Total	1,446,423	1,587,795	1,555,808	1,689,061	1,919,864	1,808,593

A comparison of the receipts of coal at Milwaukee, by decades, with those of 1899 and 1900 is interesting, and is shown in the following table:

Growth of the coal trade of Milwaukee.

Year.	Receipts.
	Short tons.
1868	92,992
1878	239,667
1888	1,122,243
1898	1,689,061
1899	1,919,864
1900	1,808,593

The tables following exhibit the details of receipts and shipments at Milwaukee for a series of years:

Receipts of coal at Milwaukee for seven years.

Source.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
By lake from—	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Buffalo	658,978	755,831	745,870	545,219	624,616	797,006	515,545
Erie	97,995	86,332	19,879	92,370	134,774	273,779	222,789
Oswego	41,891	33,364	60,309	38,319	37,000	2,590	1,257
Cleveland	105,800	105,469	232,689	305,435	341,898	354,900	277,786
Ashtabula	58,179	99,521	114,625	132,103	115,579	94,284	149,208
Lorain	22,552	27,017	40,460	13,887	11,855	24,177	25,222
Sandusky	7,250	5,179	28,238	42,555	29,572	27,991	93,686
Toledo	90,357	74,603	114,501	216,318	243,818	131,047	313,393
Charlotte	....	1,153	....	....	1,275	613	....
Fairport	122,573	126,955	97,532	44,621	37,094	38,530	22,408
Ogdensburg	2,065	....	2,800	....	1,133	....	....
Huron, Ohio	3,275	11,229	29,605	44,378	4,159	5,400	30,148
Other ports	18,395	9,950	975	18,323	4,192	25,450	....
Total, lake	1,229,310	1,336,603	1,487,483	1,493,528	1,586,965	1,775,767	1,651,442
By railroad	107,736	109,920	100,312	62,280	102,096	144,097	157,151
Receipts	1,337,046	1,446,423	1,587,795	1,555,808	1,689,061	1,919,864	1,808,593

Shipments of coal from Milwaukee for seven years.

Shipped by—	1894.	1895.	1896.	1897.	1898.	1899.	1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Chicago, Milwaukee and St. Paul Rwy	246,620	398,053	264,650	362,751	398,668	327,369	378,901
Chicago and Northwestern Rwy	167,753	221,257	169,409	247,979	245,472	210,495	241,992
Wisconsin Central R. R.	12,377	17,990	12,318	42,017	31,538	35,851	47,629
Lake	6,018	3,070	306	120	4,180	....	5,950
Total	432,768	640,470	446,683	652,867	679,858	573,715	674,472

Receipts of coal at Milwaukee by lake and rail annually from 1862 to 1900, inclusive.

Year.	Tons.	Year.	Tons.
1862	21,860	1882	593,842
1863	43,215	1883	612,584
1864	44,503	1884	704,166
1865	36,369	1885	775,750
1866	66,616	1886	759,681
1867	74,568	1887	842,979
1868	92,992	1888	1,122,243
1869	87,690	1889	980,678
1870	122,865	1890	996,657
1871	175,526	1891	1,156,033
1872	210,194	1892	1,374,414
1873	229,784	1893	1,249,732
1874	177,655	1894	1,337,046
1875	228,674	1895	1,446,423
1876	188,444	1896	1,587,795
1877	264,784	1897	1,555,808
1878	239,667	1898	1,689,061
1879	350,840	1899	1,919,864
1880	368,568	1900	1,808,593
1881	550,027		

Freight rates from Buffalo to upper lake ports in 1900.

Month.	Chicago.	Milwaukee.	Duluth and Superior.	Racine.
	Cents.	*Cents.*	*Cents.*	*Cents.*
April	75	70	50	....
May	75	70	50	75
June	65–75	60–70	40–50	65–75
July	40–65	40–60	35–40	40–65
August	30–40	30–40	30–35	35–40
September	30	30	30	35
October	30–75	30–75	30	35–50
November to close	75	75	30–75	50–1.00

Yard prices per ton of coal at Milwaukee during the year 1900, reported by R. P. Elmore Company.

Month.	House use.		Cannel.		Steam coal.	
	Lackawanna and Scranton.	Pocahontas.	Bird's-eye.	Butts.	Hocking.	Pittsburg.
January	$7.25	$5.75	$7.25	$6.00	$3.70	$3.95
February	7.25	5.75	7.25	6.00	3.70	3.95
March	7.25	5.75	7.25	6.00	3.70	3.95
April	7.25	5.75	7.25	6.00	3.15	3.30
May	6.50	5.75	7.25	6.00	3.15	3.30
June	6.50	5.75	7.25	6.00	3.15	3.30
July	6.50	5.75	7.25	6.00	3.15	3.30
August	6.50	6.00	7.50	6.00	3.15	3.40
September	7.00	6.00	7.50	6.00	3.15	3.40
October	7.00	6.00	7.50	6.00	3.15	3.40
November	7.00	6.00	7.50	6.00	3.15	3.40
December	7.00	6.00	7.50	6.00	3.15	3.40

CINCINNATI, OHIO.

The following review has been prepared for this report by Mr. Charles B. Murray, superintendent of the chamber of commerce:

The aggregate receipts of coal at Cincinnati in 1900 were smaller in quantity than for any previous year since 1890 and 10½ per cent less than the annual average for a period of ten years prior to 1890. The decrease was due to a large reduction in supplies from the Pittsburg district, which furnished only 19,066,000 bushels, against an annual average of 37,000,000 for a period of ten years previously and 33,339,000 for 1899. There was an increase from the Kanawha district, the total being 42,300,000 bushels, compared with 37,845,000 for 1899 and an annual average of 32,500,000 for ten years prior to 1900. The total from all sources was 68,625,000 bushels, compared with 78,791,000 for 1899 and an annual average of 76,500,000 for a period of ten years prior to 1900. The receipts the last year represented 65 per cent by river and 35 per cent by railroad.

The decrease in receipts of coal from the Pittsburg district was partly due to low stages of water interrupting navigation, and partly to an enlarged quantity of coal from that region passing to Southern markets, under the higher prices which the year afforded, such movement of coal not appearing in the receipts reported for this market. The maintenance of supplies from the Kanawha district reflected the beneficial influence of the slack-water navigation afforded by the completion of the system of locks and dams on the Kanawha River, promoting the movement of coal and its accumulation at Point Pleasant, available for shipment down the Ohio River, incident to navigable stages of water.

The following tabulation indicates the quantities of coal separately received at Cincinnati from the Pittsburg and Kanawha districts and from all other sources for the last ten years:

Receipts of coal at Cincinnati since 1891.

Year.	Pittsburg, by river.	Kanawha.		Total Kanawha.	All other kinds.	Total.
		By river.	By rail.			
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1891	43,254,000	19,115,000	4,500,000	23,615,000	5,477,000	72,346,000
1892	42,272,000	19,215,000	9,300,000	28,515,000	6,072,000	76,859,000
1893	28,643,000	24,971,000	18,100,000	43,071,000	8,898,000	80,612,000
1894	40,157,000	16,398,000	13,300,000	29,698,000	6,603,000	76,458,000
1895	26,676,000	15,106,000	18,900,000	34,006,000	9,461,000	70,143,000
1896	36,697,000	22,015,000	13,800,000	35,815,000	7,177,000	79,689,000
1897	35,041,000	17,942,000	17,600,000	35,542,000	8,179,000	78,762,000
1898	41,271,000	19,949,000	15,900,000	35,849,000	6,823,000	83,943,000
1899	33,339,000	18,987,000	18,858,000	37,845,000	7,607,000	78,791,000
1900	19,066,000	24,587,000	17,713,000	42,300,000	7,259,000	68,625,000

The following is a summary of the coal movement at Cincinnati for two years:

Summary of coal movements at Cincinnati in 1899 and 1900, in bushels.

Details.	1900.	1899.	Details.	1900.	1899.
Total received	68,625,535	78,791,528	Anthracite	437,500	1,291,250
Pittsburg	19,066,472	33,339,381	Total:		
Ohio River	917,206	29,533	By river	44,570,535	52,356,278
Kanawha:			By rail	24,055,000	26,435,250
By river	24,586,857	18,987,364	Shipped:		
By rail	17,713,000	18,858,000	By river	2,811,771	1,195,436
Total Kanawha	42,299,857	37,845,364	By rail	9,817,375	11,703,000
Other kinds by rail	5,904,500	6,286,000			

The average annual consumption of coal at Cincinnati in recent years has been something over 60,000,000 bushels. The extensive use of oil for household fuel purposes, especially in the warm months, has had an influence in curtailing consumption of coal. As near as can be ascertained, the local consumption is pretty evenly divided between household and factory purposes. In the manufacture of gas there were used 3,200,000 bushels the past year, compared with 3,300,000 in 1899. The quantity of gas sent out by the local company during the year was 1,135,759,000 feet against 1,129,645,000 the preceding year. The reduction in net price of gas to 75 cents per 1,000 feet for general purposes and 50 cents for fuel does not appear to have enlarged the output of gas. This fact is probably explainable by the widening uses of electric lighting, etc.

Prices of coal in this market were quite uniform during the year and decidedly higher than in 1899, as well as being above prevailing prices for a considerable period previously. Sales of lots afloat were at 7½ cents per bushel, with but little exception, for both Pittsburg and Kanawha product. For ten years previously the annual average price of lots afloat was 6.38 cents per bushel. The prevailing price for lump coal delivered to consumers was \$3 per ton for Pittsburg and Kanawha product, \$3.25 being obtained to some extent. For ten years previously the annual price was \$2.60 per ton. For run-of-mine sales, and slack for steam, factory, and kindred purposes, prices are lower than for lump.

The yearly range and average prices of Pittsburg coal, afloat and delivered, per bushel, based on weekly records, compare for a series of years as shown in the following compilation:

Yearly range and average prices for Pittsburg coal at Cincinnati.

[Cents per bushel.]

Years.	Afloat.			Delivered.		
	Lowest.	Highest.	Average.	Lowest.	Highest.	Average.
1887–88	7	18	10.01	10¾	22	13.96
1888–89	6	8½	6.71	9	11¾	9.95
1889–90	6	8	6.78	9	10¾	9.69
1890–91	6½	8½	7.28	10	10¾	10.24
1892	6½	8½	7.49	9	12½	10.36
1893	6½	8¾	7.58	9	19¾	11.04
1894	5¼	9	6.34	7¼	10¾	9.11
1895	5½	6½	6.00	8⅛	10¾	9.00
1896	5½	6	5.73	8⅛	9	8.40
1897	5½	5¾	5.70	5¾	10¾	8.10
1898	5	6	5.66	7¼	9	8.05
1899	4½	7½	5.30	8⅛	11¾	9.50
1900	7½	8	7.52	10¾	11¾	10.90

Coal from the Kanawha, Virginia, and West Virginia regions sells at the same, or about the same prices as are obtained for the product from the Pittsburg district. Sales afloat are on the bushel basis, 72 pounds; sales delivered are on the ton basis, 2,000 pounds, and represent screened or lump grade.

The receipts of coke for the year were 3,670,000 bushels, and the quantity locally manufactured was 4,576,000 bushels, making a total of 8,246,000 bushels, compared with 7,185,000 bushels the preceding year. For city manufacture the average price for the year was 9.92 cents per bushel; of gas-house, 8.92 cents; of Connellsville, $6.35 per ton.

Since 1871 the receipts of coal at Cincinnati have been as follows:

Receipts of coal at Cincinnati since September 1, 1871.

Year.	Pittsburg (Youghiogheny).	Kanawha, by river.	Ohio River.	Cannel.	Anthracite.	Other kinds.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1871–72	19,254,716	....	*a* 10,359,906	1,104,003	72,171	....	30,790,796
1872–73	24,962,373	....	*a* 11,075,072	1,162,052	75,000	....	37,274,497
1873–74	24,014,681	....	*a* 10,398,153	710,000	112,000	....	35,234,834
1874–75	24,225,002	4,476,619	4,277,327	565,352	248,750	1,597,260	35,390,310
1875–76	27,017,592	6,004,675	4,400,792	409,358	282,578	2,068,322	40,183,317
1876–77	28,237,572	3,631,823	5,141,150	322,171	376,125	1,913,793	39,622,634
1877–78	26,743,055	6,386,623	3,288,008	380,768	439,350	1,654,425	38,892,229
1878–79	20,769,027	6,134,039	4,068,452	333,549	768,750	2,136,850	34,210,667
1879–80	31,750,968	8,912,801	4,268,214	202,489	712,075	2,351,699	48,198,246

a Including Kanawha coal.

Receipts of coal at Cincinnati since September 1, 1871—Continued.

Year.	Pittsburg (Youghiogheny).	Kanawha, by river.	Ohio River.	Cannel.	Anthracite.	Other kinds.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1880–81	23,202,084	10,715,459	3,151,934	67,684	770,525	2,336,752	40,244,438
1881–82	37,807,961	13,950,802	3,560,881	77,336	779,925	3,090,715	59,267,620
1882–83	33,895,064	13,260,347	3,309,534	180,621	977,250	2,997,216	54,620,032
1883–84	32,239,473	15,926,743	2,956,688	293,010	1,085,350	3,910,795	56,412,059
1884–85	32,286,133	14,588,573	3,007,078	314,774	1,257,900	2,683,864	54,138,322
1885–86	34,933,542	17,329,349	939,746	205,717	1,287,925	2,720,250	57,416,529
1886–87	37,701,094	20,167,875	338,435	129,503	1,314,775	3,693,850	63,345,532
1887–88	41,180,713	20,926,596	1,533,358	26,098	1,328,225	5,710,649	70,705,639
1888–89	36,677,974	23,761,853	544,940	12,129	1,020,525	3,075,000	65,092,421
1889–90	42,601,615	19,221,196	454,385	....	1,001,175	4,709,775	67,988,146
1890–91	43,254,460	19,115,172	1,479,670	15,111	1,118,671	7,362,698	72,345,782
1891, 4 months	13,766,390	6,288,442	234,940	....	402,528	4,437,139	25,129,439
1892 *a*	42,272,348	19,214,704	768,588	....	1,268,170	13,335,006	76,858,816
1893	28,643,562	24,971,261	405,202	....	759,626	25,832,374	80,612,025
1894	40,156,667	16,398,039	158,334	....	661,548	19,083,527	76,458,115
1895	26,675,823	15,106,095	14,400	....	1,227,000	27,119,823	70,143,141
1896	36,696,759	22,015,133	130,217	....	1,171,000	19,676,000	79,689,109
1897	35,040,790	17,941,769	60,217	....	1,251,250	24,468,000	78,762,026
1898	41,271,142	19,949,098	95,590	....	948,125	21,679,000	83,942,955
1899	33,339,381	18,987,364	29,533	....	1,291,250	25,144,000	78,791,528
1900	19,066,472	24,586,857	917,206	....	437,500	23,617,500	68,625,535

a Calendar years since 1892.

NOTE.—Since 1890–91 "Other kinds" represent Kanawha coal largely; in 1898, 15,885,000 bushels, or 73 per cent; in 1899, 18,858,000 bushels, or 75 per cent; in 1900, 17,713,000 bushels, or 75 per cent. (See preceding table.)

ST. LOUIS, MO.

The following summary of the coal trade of St. Louis for the year 1900 is furnished by Mr. James Cox, secretary and general manager of the Business Men's League of that city:

Prices of coal in St. Louis ruled, on the average, a little higher in 1900 than in the preceding year, but steam-producing coal continues to be abundant at very low figures. Contracts for large quantities are really made at figures lower than the actual quotations. In high-grade Illinois lump coal, of which an immense quantity is used in private dwelling houses, prices were also a little higher, but the closing for the year was almost the same as twelve months previously. Anthracite coal also sold somewhat higher. Prices of coke varied very materially. Connellsville averaged considerably lower, as also did New River coke. Kentucky and gas coke, however, were both higher throughout the year. The receipts of coke were large, amounting to nearly 8,000,000 bushels, as compared to 6,795,000 in 1899. There was a marked falling off in the receipts of anthracite coal, due largely to the increase in prices reducing the demand and leading to the using up of stocks already on hand. The receipts of soft coal were larger. On the whole there was a considerable gain in the receipts of coal and coke, as well as a considerable reduction in the amount of stock on hand at the close of the year. The principal gain in the demand was for manufacturing purposes. Business of all kinds was active throughout the year. Nearly all the factories worked their full capacity, and in many of them overtime was made. The street-railway strike during the spring and summer interfered to some extent with business, but the effect was only temporary. The passage by Congress of the world's fair bill and the incorporation of the company which is to manage the international exposition have caused a great impetus to all kinds of business and the prospects for 1901 are exceptionally good.

A vast majority of the coal used in St. Louis still comes from the southern Illinois coal fields. Receipts from Western points, which have been commented upon as falling off in recent years, were still smaller in 1900.

The following quotations show the range of prices during 1900, the figures including bridge tolls and representing prices free on board in St. Louis:

Coal prices at St. Louis, Mo., during 1900.

Kind.	Highest.	Lowest.	Closing.
Standard Illinois lump coal	$1.85	$1.45	$1.55
High-grade Illinois lump coal	2.40	1.92½	1.92½
Anthracite, large	6.50	5.75	6.50
Anthracite, small	6.75	6.00	6.75
Connellsville coke	6.85	5.30	5.30
New River coke	6.55	4.80	4.80
Indiana coke	4.30	4.00	4.00
Kentucky coke	4.05	3.80	3.80
Gas coke	4.50	4.00	4.50

The following table shows the growth in the receipts of coal and coke at St. Louis during the last ten years:

Coal and coke receipts at St. Louis since 1891.

Year.	Soft coal.	Hard coal.	Coke.
	Bushels.	*Tons.*	*Bushels.*
1891	72,078,225	139,050	6,924,250
1892	82,302,228	187,327	8,914,400
1893	87,769,375	173,653	7,807,000
1894	74,644,375	186,494	6,365,900
1895	88,589,935	207,784	7,130,300
1896	87,677,600	218,955	5,395,900
1897	83,730,980	172,933	5,671,350
1898	83,562,450	225,616	7,762,250
1899	103,115,730	292,118	6,795,100
1900	104,317,650	180,550	7,942,900

MOBILE, ALA.

Mr. Edward E. England, secretary of the chamber of commerce, contributes the following discussion of the coal trade at that port in 1900:

The prediction that Alabama would increase her output of coal for 1900 to 10,000,000 tons has been almost borne out, and the prediction that Mobile would increase her coal receipts for the same period at least 30 per cent has been more than borne out, the latter figures being for 1900, 294,970 tons as against 189,300 tons for 1899. But the most noticeable features of all are that of these large receipts only 12,383 tons were exported, leaving the remainder to supply the demands of the different industries that have been established and commenced operations within the past year and the increased number of steamers entering our port incident to the rapidly growing trade relations being established between Mobile and Cuban and Central and South American ports, the number of steamers engaged in this trade having increased over 50 per cent.

It is, however, expected that the year 1901 will see as large if not a larger decrease than the present increase of 1900, due to the recent discovery of fuel oil at Beaumont, Tex., and the expected discoveries at points even nearer to Mobile.

The adaptability of this oil as a fuel has been tested on some of the towboats and by some of the larger industries, and the tests have been exceedingly satisfactory. Already has oil become a potent factor, as since these tests a reduction in freight rates from $1.75 to $1.10 per ton has been made by the rail lines from the mines to Mobile, and contracts can not be made at even this reduction of freight rates. This is not at all to be wondered at when the barge lines operating between the oil regions and Mobile are guaranteeing to place oil in Mobile at this early stage at 60 cents per barrel, it being figured that 3 barrels are equal to 1 ton of coal, and the present price of coal for steam purposes locally being $2.85 per ton, or $1 per ton in favor of oil. Contracts for changing from coal to oil are being let by all of the electric light companies, the large industries, and by the steamers running between Mobile and Fruit Island.

The receipts of coal at Mobile for a series of years have been as follows:

Receipts of coal at Mobile, Ala., since 1883.

Year.	Alabama coal. (*a*)	Anthracite and English.	Total.
	Tons.	*Tons.*	*Tons.*
1883	25,304	1,229	26,533
1884	17,808	891	18,699
1885	40,301	775	41,076
1886	30,310	2,022	32,332
1887	39,232	910	40,142
1888	38,785	648	39,433
1889	43,620	1,454	45,074
1890	39,320	1,327	40,647
1891	51,267	1,775	53,042
1892	70,298	1,500	71,798
1893	90,000	4,130	94,130
1894	104,340	3,600	107,940
1895	156,996	4,200	161,196
1896	165,000	3,000	168,000
1897	*b* 175,160	1,600	176,760
1898	122,500	4,425	126,925
1899	187,300	*c* 2,000	189,300
1900	292,960	1,800	294,960

a This does not include the amount of coal used by the railroads on their locomotives and at their shops.
b Includes 3,000 tons received by barges via Tombigbee River.
c Anthracite only.

NORFOLK, VA.

Col. William Lamb has furnished the following statement showing the shipments of coal from Lamberts Point piers:

Pocahontas coal shipments from Lamberts Point piers since 1890.

Year.	Foreign.	Bunkers.	Coastwise.	Local.	Total.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
1890	37,723	102,755	941,019	71,010	1,152,507
1891	27,997	135,112	1,215,028	90,606	1,468,743
1892	25,653	129,627	1,400,984	98,034	1,654,298
1893	34,969	125,688	1,512,931	100,453	1,774,041
1894	44,328	105,382	1,810,480	96,841	2,057,031
1895	34,174	75,714	1,430,144	100,442	1,640,474
1896	41,600	99,867	1,433,069	96,929	1,671,465
1897	44,103	104,966	1,473,710	115,079	1,737,858
1898	200,283	107,154	1,450,943	131,422	1,889,802
1899	207,649	125,920	1,497,297	131,916	1,962,782
1900	524,558	281,411	1,126,855	180,530	2,113,354

During the year 1900 the shipments of Pocahontas coal reached high-water mark, being 150,572 tons more than the year before and

56,323 tons more than was ever shipped from this port. The exports would have been larger but for lack of railroad facilities to handle the coal.

On the 15th of January, 1900, owing to the inability of the railroad from physical causes to bring the coal to tidewater as promptly as usual, there was assembled at Lamberts Point probably the largest fleet ever seen at a coaling station in the world. There were 11 steamers requiring bunkers, 2 steamers loading for foreign ports, 1 steamer loading for the Bureau of Equipment for Manila, 2 steamers loading coastwise, and 40 schooners and 35 barges waiting in the stream, making a total of 91 vessels with a capacity of 155,985 tons of coal.

During the year 1900 Pocahontas coal was shipped to the following foreign countries and ports, a wider distribution than ever attained by any American coal in the same period: Azores, Algiers, Bermuda, Bluefield, (Central America); Buenos Aires, Colon, (South America); Chile, Curaçao, Colombia, Costa Rica, Cape Town, (Africa); Demarara, Genoa, Gibraltar, Habana, Halifax, (Nova Scotia); Iquique, Italy, Jamaica, Japan, La Guaira, Las Palmas, Manila, Malta, Messina, Montevideo, Nagasaki, Naples, Port Antonio, Port Limon, Rio de Janeiro, St. Lucia, St. Thomas, San Juan, St. Vincent, Trinidad, Tampico, and Trieste.

SAN FRANCISCO, CAL.

Mr. J. W. Harrison, in his annual report to the coal trade of San Francisco, says:

The year has proved itself the banner year for coal imports into California, exceeding in quantity all former years. Fuel consumption is usually figured as an infallible indicator of prosperity, hence we must credit 1900 as being in the foremost position for profits emanating from railroads, shipbuilding, iron products, and manufacturing interests generally. The increased consumption in the face of the extremely high cost of coal pervading the year evinces great prosperity in all commercial branches, particularly so for our coast colliery proprietors. They have found a market here and in Honolulu for their entire output, and the prices realized are largely in excess of those ruling for several years past. There is every probability that the coal imports will be equal in volume the incoming year, but values will not rule as high, as conditions will be dissimilar. Coal carriage will be less and fuel oil will declare itself as a formidable competitor; in fact, coal contracts are now being made at shaded figures for next year's delivery. The Australian shipments are diminishing gradually, as our local consumers can not pay importers' asking prices, which on January 1 were fully 15 per cent higher than a year before. Deliveries from Great Britain are almost nothing, as quotations there make their consumption prohibitory. The asking prices, free on board, at the various shipping points in England and Wales in some cases were more than double those of a year ago. We are promised new sources of fuel supplies from the North within a year, as coal properties are being developed in various sections, but little reliance is being placed on these promises, as they so seldom materialize.

The various sources from which supplies have been derived are as follows:

Sources of coal consumed in California.

Source.	1890.	1891.	1892.	1893.	1894.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
British Columbia	441,759	652,657	554,600	588,527	647,110
Australia	194,725	321,197	314,280	202,017	211,733
English and Welsh	35,662	168,586	210,660	151,269	157,562
Scotch	1,610	31,840	24,900	18,809	18,636
Eastern (Cumberland and anthracite)	32,550	42,210	35,720	18,960	16,640
Franklin, Green River, Cedar River, etc.	216,760	178,230	164,930	167,550	*a* 153,199
Carbon Hill, South Prairie, etc	191,109	196,750	218,390	261,435	241,974
Mount Diablo and Coos Bay	74,210	90,684	66,150	63,460	65,263
Japan, etc	13,170	20,679	4,220	7,758	*b* 15,637
Total	1,201,555	1,702,833	1,593,850	1,479,785	1,527,754

Source.	1895.	1896.	1897.	1898.	1899.	1900.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
British Columbia	651,295	551,852	558,372	651,208	623,133	766,917
Australia	268,960	273,851	281,666	201,931	139,333	178,563
English and Welsh	201,180	156,368	107,969	75,115	93,263	54,099
Scotch	4,098	8,356	4,081	5,056	None.	None.
Eastern (Cumberland and anthracite)	26,863	17,907	21,335	37,560	38,951	17,319
Seattle (Franklin, Green River, etc.)	150,888	128,919	220,175	283,963	271,694	250,590
Carbon Hill, South Prairie, etc	256,267	255,923	286,205	348,474	355,756	418,052
Mount Diablo, Coos Bay, and Tesla	84,954	110,237	115,150	172,506	189,507	160,915
Japan and Rocky Mountains	9,015	2,247	6,587	26,560	28,390	42,673
Total	1,653,520	1,505,660	1,601,540	1,802,373	1,740,027	1,889,128

a Including Seattle. *b* Including Alaska.

As it is necessary to include deliveries at Port Los Angeles and at San Diego to arrive at an accurate statement of the consumption of coal in the State, these are added in the above sources of supply. The total amount received by water at these two points aggregated 155,238 tons in 1897, 154,402 tons in 1898, 184,747 tons in 1899, and 165,965 tons in 1900.

Mr. Harrison continues:

Fuel oil.—No event has occurred in the history of the State which will do so much to determine its permanent and successful career as the promising oil developments in several counties during the year 1900. Oil now declares itself a potent factor, as a steam and heat producer, to every manufacturing interest in the State, and its permanency can not be questioned. It will be several months before its distribution can be uniform and consumers may become assured of regular delivery as required. Already several large coal consumers have modified their plants to conform to oil. They claim the change has diminished their expense account materially, and they can see no valid reason for discontinuing its use. From information received through sources it is estimated that the product of fuel oil (only) for 1900 will foot up 4,300,000 barrels, and for the incoming year it can be safely estimated that these figures will be increased fully $12\frac{1}{2}$ per cent. This will be an increase of about 100 per cent over and above the figures officially reported by the State Mining Bureau as the output for

1899. It is claimed there are over 1,450 wells now producing, which number is increasing monthly. Some of these wells have been capped, as the present tankage is insufficient, although their present capacity, including the refineries' tanks, amounts to nearly 900,000 barrels. Fuel oil can be delivered to consumers here at about $1 per barrel, and it is generally conceded that this price will be shaded later on. This means low-priced fuel, and will assure us a larger number of factories, etc., which could not be profitably maintained under ruling coal values.

Coke.—The total amount received here by water in 1900 was 41,741 tons, against 31,091 tons in 1899. It is difficult to approximate the quantity received by rail, as it does not reach San Francisco, being delivered direct to interior consumers. Over 50 per cent of the coke reaching here comes direct by sail from England. There were over 6,000 tons of Comax coke delivered here from British Columbia, which found immediate sale.

SEATTLE, WASH.

Mr. Lovett M. Wood, editor of the Trade Register, contributes the following review of the coal trade of Seattle in 1900:

The accompanying tables, giving the receipts and shipments of coal at Seattle by mines and months, show an increase of 87,957 tons in receipts, compared with the previous year, and an increase of 34,134 tons in exports. There was no foreign coal imported here during 1900. The Leary mine, which was expected to be an important producer, has been practically idle, due to strikes and pending litigation among stockholders for control of management. The recent completion of one of the largest and most modern electrical coal conveyors, with a capacity of 10,000 tons per day, has added materially to the facilities of this, the leading coal market of the State of Washington. The Government has recently let another large contract for coal from here for Alaska use—1,000 tons. The marked increase in population and manufacturing is making greater demands for home coal consumption, while the situation in California is such that this section has advantage there over British Columbian coals. The outlook is for greater State mine production this year as well as local consumption and export.

Shipments of coal from the mines to Seattle, Wash., in 1900.

Mine.	Tons.
Issaquah Coal Co	130,314
Black Diamond	207,014
Newcastle	107,819
Franklin	120,732
Renton Cooperative Co	31,550
Cedar Mountain	10,587
Sunset Coal Co	4,398
Over Northern Pacific R. R	127,005
Coal Creek	64,325
Lawson	69,427
Gem	33,151
Leary	3,000
Total	909,322

Receipts and exports of coal at Seattle, Wash., in 1900, by months.

Month.	Receipts.	Exports. *a*
	Tons.	*Tons.*
January	86,389	43,704
February	76,074	42,410
March	79,878	45,442
April	68,661	31,672
May	67,118	28,818
June	65,369	28,110
July	67,629	38,688
August	74,689	43,215
September	71,849	40,410
October	86,963	46,246
November	80,494	37,290
December	84,209	50,745
Total 1900	909,322	478,562
Total 1899	821,365	*b* 444,428
Increase in 1900	87,957	34,134

a Foreign and domestic points (mostly San Francisco, Cal.). *b* 16,400 tons to foreign.

Coal receipts at Seattle, Wash., 1889 to 1900.

Year.	Receipts.	Exports. *a*
	Tons.	*Tons.*
1889	369,198	....
1890	487,215	....
1891	421,587	....
1892	416,174	....
1893	461,034	342,114
1894	437,939	318,670
1895	363,979	257,739
1896	425,103	194,771
1897	472,311	287,883
1898	622,284	378,578
1899	821,365	*b* 444,428
1900	909,322	478,562

a Foreign and domestic points (mostly San Francisco, Cal.). *b* 16,400 tons to foreign.

PRODUCTION OF COAL BY STATES.

There were twenty-seven States and two Territories which contributed to the total coal product of the United States in 1900. Alaska, which produced a small amount of coal in 1897, 1898, and 1899, did not report any product in 1900, the mines in that Territory being in litigation last year. Idaho, which is included among the coal-producing States, had a total product in 1900 of 10 tons, and might readily be excluded from the number of coal-producing States. The two Territories which produced coal were Indian Territory and New Mexico. Of the twenty-nine States and Territories which produced coal in 1900 twenty-one had an output exceeding 1,000,000 tons each, as against nineteen holding this record in 1899. Nine of these twenty-one States had an output exceeding 5,000,000 tons, and five produced more than 8,000,000 tons each. Three—Pennsylvania, Illinois, and West Virginia—each exceeded 21,000,000 tons in output. As is well known, Pennsylvania stands first among the coal-producing States, the combined output of anthracite and bituminous coal in Pennsylvania having exceeded 50 per cent of the total coal product of the United States in each year for which there are any reliable records.

Illinois continues in second place, with 9½ per cent of the total product. West Virginia continues in third place, with 8.4 per cent of the total product, but falls to fourth place when the value of output is considered. Ohio produced, 7.4 per cent of the total product in 1900, and holds fourth place in rank of production and third in value of output. Alabama, the fifth in producing importance, contributed 3.1 per cent of the total product. Indiana, the sixth in rank, produced 2.4 per cent of the total product.

It will be seen from this that all of the six leading coal-producing States are east of the Mississippi River, and that all but two—Illinois and Indiana—belong to the Appalachian system. Taking the Mississippi River as a dividing line, we find that the States east of that river produced in 1900 235,313,128 short tons, or 87½ per cent of the total, while the States west of the Mississippi produced 33,751,153 short tons, or 12½ per cent. According to the Tenth Census of the United States, the States west of the Mississippi River produced in 1880 4,624,324 tons, while the States east of the river produced 66,837,866, the percentages being 6 and 94, respectively. From 1880 to 1900 the States west of the Mississippi River have increased their production 848 per cent, while the States east of the river increased their production 252 per cent.

Subdividing the Eastern division into the Northern and Southern States by the natural boundaries of the Potomac and Ohio rivers we find that the States north of the boundary produced in 1900 193,102,613 short tons, or 72 per cent of the total, as compared with 187,031,987 short tons, or 73.7 per cent, in 1899. The Southern States produced in 1900 42,210,515 short tons, or 15.7 per cent, as against 37,064,232 short tons, or 14.6 per cent, in 1899.

Comparing the production of these two subdivisions in 1900 with that of 1880, we find that the greatest proportion in development has been in the States south of the Ohio and Potomac rivers. At the time of the Tenth Census the production from this region amounted to only 3,793,308 short tons. It increased to 42,210,515 short tons in 1900, and last year the product was more than eleven times what it was in 1880. The production of the States north of the Ohio and Potomac rivers in 1900 was a little more than three times the output of the same States in 1880.

The following tables have been prepared showing the amount and value of the coal produced in the States east of the Mississippi and north of the Ohio and Potomac rivers, the States east of the Mississippi and south of the Ohio and Potomac rivers, and the States west of the Mississippi River. The increase shown in the States east of the Mississippi and south of the Ohio and Potomac rivers as compared with other divisions is of particular interest as indicating the industrial development of those States.

Coal production in States north of Ohio and Potomac rivers.

State.	1880.		1890.		1900.	
	Production.	Value.	Production.	Value.	Production.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Illinois	6, 115, 377	$8, 779, 832	15, 292, 420	$14, 171, 230	25, 767, 981	$26, 927, 185
Indiana	1, 454, 327	2, 150, 258	3, 305, 737	3, 259, 233	6, 484, 086	6, 687, 137
Maryland	2, 228, 917	2, 585, 537	3, 357, 813	2, 899, 572	4, 024, 688	3, 927, 381
Michigan	100, 800	224, 500	74, 977	149, 195	849, 475	1, 259, 683
Ohio	6, 008, 595	7, 719, 667	11, 494, 506	10, 783, 171	18, 988, 150	19, 292, 246
Pennsylvania:						
Anthracite	28, 711, 379	42, 282, 948	46, 468, 641	66, 383, 772	57, 367, 915	85, 757, 851
Bituminous	18, 425, 163	18, 567, 129	42, 302, 173	35, 376, 916	79, 842, 326	77, 438, 545
Total	63, 044, 558	82, 309, 871	122, 296, 267	133, 023, 089	193, 324, 621	221, 290, 028

Coal production in States south of Ohio and Potomac rivers.

State.	1880.		1890.		1900.	
	Production.	Value.	Production.	Value.	Production.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Alabama	323, 972	$476, 911	4, 090, 409	$4, 202, 469	8, 394, 275	$9, 793, 785
Georgia	154, 644	231, 605	228, 337	238, 315	315, 557	370, 022
Kentucky	946, 288	1, 134, 960	2, 701, 496	2, 472, 119	5, 328, 964	4, 881, 577
North Carolina	350	400	10, 262	17, 864	17, 734	23, 447
Tennessee	495, 131	629, 724	2, 169, 585	2, 395, 746	3, 708, 562	4, 223, 082
Virginia	43, 079	99, 802	784, 011	589, 925	2, 393, 754	2, 123, 222
West Virginia	1, 829, 844	2, 013, 671	7, 394, 654	6, 208, 128	22, 647, 207	18, 416, 871
Total	3, 793, 308	4, 587, 073	17, 378, 754	16, 124, 566	42, 806, 053	39, 832, 006

Coal production in States west of Mississippi River.

State.	1880.		1890.		1900.	
	Production.	Value.	Production.	Value.	Production.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Arkansas	14,778	$33,535	399,888	$514,595	1,447,945	$1,653,618
California	236,950	663,013	110,711	283,019	171,708	523,231
Colorado	462,747	1,041,350	3,094,003	4,344,196	5,244,364	5,858,036
Idaho	....	....	....	....	10	50
Indian Territory	....	....	869,229	1,579,188	1,922,298	2,788,124
Iowa	1,461,116	2,507,453	4,021,739	4,995,739	5,202,939	7,155,341
Kansas	771,442	1,517,444	2,259,922	2,947,517	4,467,870	5,454,691
Missouri	884,304	1,464,425	2,735,221	3,382,858	3,540,103	4,280,328
Montana	224	800	517,477	1,252,492	1,661,775	2,713,707
Nebraska	200	750	1,500	4,500	....	....
New Mexico	....	....	375,777	504,390	1,299,299	1,776,170
North Dakota	....	....	30,000	42,000	129,883	158,348
Oregon	43,205	97,810	61,514	177,875	58,864	220,001
Texas	....	....	184,440	465,900	968,373	1,581,914
Utah	14,748	33,645	318,159	552,390	1,147,027	1,447,750
Washington	145,015	389,046	1,263,689	3,426,590	2,474,093	4,700,068
Wyoming	589,595	1,080,451	1,870,366	3,183,669	4,014,602	5,457,953
Total	4,624,324	8,829,722	18,113,635	27,656,918	33,751,153	45,769,330

The production in the several States and Territories in 1900 and preceding years is discussed with more detail in the following pages.

ALABAMA.

Total product in 1900, 8,394,275 short tons; spot value, $9,793,785.

As compared with the production in 1899, the output of coal in Alabama in 1900 exhibits an increase of 800,859 short tons, or 10.5 per cent. The product in 1899 had exceeded that of 1898 by 1,058,133 short tons, or 16.2 per cent. In both 1899 and 1900 the production was the largest ever reported for the State. The value of the product in 1900 shows an increase over the preceding year of $1,537,323, or 19 per cent. While the percentage of increase in value during 1900 was nearly double that of the percentage of increase in product, it was scarcely comparable with the gain in value obtained in 1899, when, with an increase of 16.2 per cent in product, there was an increase in value of 67 per cent. The continued increase in value as compared with that of the product, however, is notable. The average price per ton received for Alabama coal in 1900 was $1.17, as against $1.09 in 1899, and the highest price obtained by the producers in Alabama since 1887, a period of thirteen years.

Comparing the product of 1900 with that of 1898, an increase of 1,858,992 short tons in the output is noted, equivalent to 28.4 per cent, while the value nearly doubled in 1900, being 98.5 per cent more than that of 1898. There was only one county, Tuscaloosa, in which the output in 1900 was less than that of 1899. The product in Tuscaloosa County showed a decrease of 57,029 short tons, or not quite 22 per cent. The product of this county in 1900, however, was larger than in 1898, or any year preceding. The largest increase in 1900 was in Jefferson County, the most important coal-producing county of the State, where the product exceeded that of 1899 by 376,600 tons. The next largest increase was in Walker County, in which the gain was 240,086 tons, or a little less than 20 per cent. The gain in Bibb County, the third county in producing importance, was only 52,522 tons, or about 5½ per cent. The largest comparative increase was in St. Clair County, in which the product for 1900 was almost exactly three times that of the preceding year. Another large proportionate increase was in Shelby County, whose output in 1900 showed a gain of 56 per cent over 1899.

It was noted in the report for 1899 that although the number of mining machines in use in the State during that year was larger than in 1898, there was a decrease in the production of machine-mined coal in the State. The returns for 1900 show that the machines which were introduced in the latter part of 1899 were utilized to some extent in winning the product for 1900. There was, however, a gain of but one in the number of machines in use in 1900, as compared with 1899. The total number of machines reported for last year was 54, and the machine-mined product amounted to 370,150 short tons, as compared with 53 machines, producing 260,444 short tons in 1899. Of the 54 machines in use in 1900, 50 were of the pick or "puncher" type, driven by air, and 4 were of the chain pattern, but were also air driven. The Corona Coal and Coke Company, one of the large producing organizations in the State, has its plant equipped for the use of electric chain machines, but did not use them during 1900, and these machines are not included in the total. The coal-mining industry in Alabama during 1900 was comparatively free from labor disturbances. There were a few strikes reported, the most important of which was one of one hundred and five days at the Gamble mines of the Tennessee Coal, Iron and Railroad Company, where 140 men were idle for the time mentioned; also at the Montevallo mine, in Shelby County, where 140 men were idle for six months. Fifty men were on strike for thirty days at the Export Coal and Railway Company's mines in Shelby County, and 80 men were on strike from March 26 to July 27 at the Climax mines, also in Shelby County. Fifty-six men were on strike for twenty days in the Glen Carbon collieries, in Shelby County, and 50 men were idle for thirty days at the Chickasaw No. 5 mines of the Galloway Coal Company in Walker County. These disturbances were not sufficient to affect the industry as a whole.

In the following table is given a statement of the production of coal in Alabama during 1899 and 1900, by counties, showing the distribution of the product for consumption. It must be stated, however, that the amount of coal made into coke is considerably in excess of that shown in these tables. In a number of places the coal is made into coke at ovens located a considerable distance from the mines, and in this case the coal is returned as shipped instead of as made into coke. The actual amount of coal made into coke in Alabama in 1900 was 3,582,547 short tons, and in 1899, 3,028,472 short tons.

Coal product of Alabama in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Bibb	880,029	2,052	30,182	....	912,263	$1,041,484	$1.14	248	1,355
Blount and St. Clair.	62,976	150	1,825	....	64,951	54,565	.84	247	183
Cullman and Marion.	20,395	25	....	....	20,420	22,556	1.10	150	105
Etowah	9,078	200	300	....	9,578	10,215	1.07	227	28
Jefferson	2,238,255	34,598	105,244	2,500,599	4,878,696	5,289,676	1.08	251	7,720
Shelby	85,557	100	1,271	....	86,928	152,046	1.75	198	354
Tuscaloosa	233,678	1,162	4,924	85,697	325,461	398,766	1.23	223	801
Walker	1,160,939	6,607	11,748	70,000	1,249,294	1,240,004	.99	214	2,900
Winston	10,705	100	20	....	10,825	12,150	1.12	185	35
Small mines	....	35,000	....	....	35,000	35,000	......	....	......
Total	4,701,612	79,994	155,514	2,656,296	7,593,416	8,256,462	1.09	238	13,481

Coal product of Alabama in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Bibb	939,505	917	23,784	579	964,785	$1,183,072	$1.23	265	1,257
Blount and Cullman	13,472	5,100	....	....	18,572	21,072	1.13	233	53
Etowah	20,855	....	....	....	20,855	24,718	1.19	142	78
Jefferson	3,258,260	32,145	127,856	1,837,035	5,255,296	6,144,993	1.17	269	7,943
Marion and Winston.	49,663	200	....	....	49,863	63,082	1.27	217	136
St. Clair	87,128	54,140	4,060	10,942	156,270	184,040	1.18	205	307
Shelby	116,447	8,840	10,545	....	135,832	210,072	1.55	176	523
Tuscaloosa	155,066	5,104	6,609	101,643	268,422	298,458	1.11	237	657
Walker	1,467,615	5,145	16,620	....	1,489,380	1,629,278	1.10	249	3,013
Small mines	....	35,000	....	....	35,000	35,000	......	....	......
Total	6,108,011	146,591	189,474	1,950,199	8,394,275	9,793,785	1.17	257	13,967

The distribution of the coal product of Alabama from 1889 to 1900, and the production by counties since 1895, with the increases and decreases in 1900 as compared with 1899, are shown in the following tables:

Distribution of the coal product of Alabama from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	2,327,209	59,945	79,515	1,106,314	3,572,983	$3,961,491	$1.10	248	6,975
1890	2,487,983	84,578	88,952	1,428,896	4,090,409	4,202,469	1.03	217	10,691
1891	2,882,813	91,456	100,160	1,745,352	4,759,781	5,087,596	1.07	268	9,302
1892	3,122,075	37,843	135,627	2,233,767	5,529,312	5,788,898	1.05	271	10,075
1893	3,536,935	59,599	96,412	1,443,989	5,136,935	5,096,792	.99	237	11,294
1894	3,269,548	43,911	130,404	953,315	4,397,178	4,085,535	.93	238	10,859
1895	3,610,433	272,551	137,021	1,673,770	5,693,775	5,126,822	.90	244	10,346
1896	3,555,493	285,416	138,268	1,769,520	5,748,697	5,174,135	.90	248	9,894
1897	4,543,597	86,790	126,187	1,137,196	5,893,770	5,192,085	.88	233	10,597
1898	4,926,828	107,576	145,808	1,355,071	6,535,283	4,932,776	.75	250	10,733
1899	4,701,612	79,994	155,514	2,656,296	7,593,416	8,256,462	1.09	238	13,481
1900	6,108,011	146,591	189,474	1,950,199	8,394,275	9,793,785	1.17	257	13,967

Coal product of Alabama since 1895, by counties.

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
	Short tons.	*Short tons*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Bibb	653,732	710,842	671,077	810,891	912,263	964,785	52,522	....
Blount	62,400	32,760	37,350	18,300	15,724	18,572	2,848	....
Cullman	....	1,000	....					
Etowah	900	3,080	3,168	5,884	9,578	20,855	11,277	....
Jefferson	3,726,325	3,729,719	3,714,676	4,204,590	4,878,696	5,255,296	376,600	....
St. Clair	30,806	33,368	67,584	72,808	52,252	156,270	104,018	....
Shelby	52,754	52,923	84,673	68,987	86,928	135,832	48,904	....
Tuscaloosa	208,117	205,223	234,488	238,954	325,461	268,422	....	57,039
Walker	946,241	952,642	1,037,516	1,071,334	1,249,294	1,489,380	240,086	....
Winston	4,500	2,140	8,238	8,535	*a* 28,220	*a* 49,863	21,643	....
Small mines	8,000	25,000	35,000	35,000	35,000	35,000	....	....
Total	5,693,775	5,748,697	5,893,770	6,535,283	7,593,416	8,394,275	*b* 800,859	....

a Includes product of Marion County. *b* Net increase.

The production of Alabama since 1870 has been as follows:

Annual coal product of Alabama since 1870.

Year.	Short tons.	Value.	Average price per ton.	Average number of days active.	Average number of employees.
1870	13,200				
1873	44,800				
1874	50,400				
1875	67,200				
1876	112,000				
1877	196,000				
1878	224,000				
1879	280,000				
1880	380,800				
1881	420,000				
1882	896,000				
1883	1,568,000				
1884	2,240,000				
1885	2,492,000				
1886	1,800,000	$2,574,000	$1.43		
1887	1,950,000	2,535,000	1.30		
1888	2,900,000	3,335,000	1.15		
1889	3,572,983	3,961,491	1.10	248	6,975
1890	4,090,409	4,202,469	1.03	217	10,642
1891	4,759,781	5,087,596	1.07	268	9,302
1892	5,529,312	5,788,898	1.05	271	10,075
1893	5,136,935	5,096,792	.99	237	11,294
1894	4,397,178	4,085,535	.93	238	10,859
1895	5,693,775	5,126,822	.90	244	10,346
1896	5,748,697	5,174,135	.90	248	9,894
1897	5,893,770	5,192,085	.88	233	10,597
1898	6,535,283	4,932,776	.75	250	10,733
1899	7,593,416	8,256,462	1.09	238	13,481
1900	8,394,275	9,793,785	1.17	257	13,967

ARKANSAS.

Total product in 1900, 1,447,945 short tons; spot value, $1,653,618.

Coal production in Arkansas in 1899 was seriously interfered with by labor troubles. There were during that year 11 mines, out of a total of 22, in which the men were on strike for periods ranging from thirty to one hundred and eighty days. The total number of men on strike at one time or another was 2,195, out of a total of 2,313 in the State. As a result of these labor troubles the production of the State in 1899 exhibited a decrease of 361,925 tons, or over 30 per cent, as compared with 1898. Many of the miners that were on strike during 1899 had not returned to work by the first of 1900, but their places had been supplied to a considerable extent by other labor. In addition to this there was only one strike of any duration during 1900, and this was in the mines of the Western Anthracite Company, at Montana, Ark., where 17 men were idle for one hundred and twenty days. These improved conditions are reflected in an increase of 604,391 short tons, as compared with 1899, and of 242,466 tons, as compared with 1898, the year of largest previous production. The curtailed supply caused by the strike of 1899, as well as the generally improved industrial conditions, advanced the price of Arkansas coal from $1.03 in 1898 to $1.17 in 1899. The increased output in 1900, accompanied by an increase of 400,000 tons in the Indian Territory, caused a slight decline in the average price for Arkansas coal. The product, however, in 1900 had a value exceeding that of 1899 by $664,235 and of $414,840 over the value of the product in 1898.

There were, during 1900, 20 undercutting machines reported as in use in the State. All of these were of the chain pattern, no pick machines being in use. The product obtained by machines in 1900 amounted to 219,085 short tons, as compared with 146,899 tons mined by the use of 16 machines in 1899.

In the following tables are presented the statistics of production in 1899 and 1900, by counties, with the distribution of the product for consumption:

Coal product of Arkansas in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Franklin, Johnson, Logan	230,276	1,385	7,835	239,496	$290,114	$1.21	181	635
Pope	14,050	2,050	1,600	17,700	51,000	2.90	74	147
Sebastian	567,040	861	12,457	580,358	636,269	1.10	153	1,531
Small mines		6,000		6,000	12,000			
Total	811,366	10,296	21,892	843,554	989,383	1.17	156	2,313

Coal product in Arkansas in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Johnson	134,372	514	4,250	139,136	$217,222	$1.56	199	311
Sebastian	975,753	1,555	22,171	999,479	1,030,740	1.03	221	1,958
Franklin, Logan, and Pope	286,549	2,881	13,900	303,330	393,656	1.30	222	531
Small mines		6,000		6,000	12,000			
Total	1,396,674	10,950	40,321	1,447,945	1,653,618	1.14	219	2,800

Since 1889 the distribution of the Arkansas coal product has been as follows:

Distribution of the coal product of Arkansas from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1889	268,518	6,820	4,246	279,584	$395,836	$1.42	....	677
1890	374,969	9,240	15,679	399,888	514,595	1.29	214	938
1891	518,120	8,909	15,350	542,379	647,560	1.19	214	1,317
1892	513,908	7,450	14,200	535,558	666,230	1.24	199	1,128
1893	549,504	11,778	13,481	574,763	773,347	1.34	151	1,559
1894	488,077	7,870	16,679	512,626	631,988	1.22	134	1,493
1895	576,112	14,935	7,275	598,322	751,156	1.25	176	1,218
1896	647,240	8,640	19,494	675,374	755,577	1.12	168	1,507
1897	827,518	11,588	18,084	856,190	903,993	1.06	156	1,990
1898	1,167,103	13,256	25,120	1,205,479	1,238,778	1.03	163	2,555
1899	811,366	10,296	21,892	843,554	989,383	1.17	156	2,313
1900	1,396,674	10,950	40,321	1,447,945	1,653,618	1.14	219	2,800

According to the Tenth United States Census the coal product of Arkansas in 1880 was 14,778 short tons, valued at $33,535. No statistics were obtained in 1881. With this exception the statistics of production since 1880 have been as follows:

Annual production of coal in Arkansas since 1880.

Year.	Short tons.	Value.	Average price per ton.	Average number of days active.	Average number of employees.
1880	14,778	$33,535	....	....	....
1882	5,000	....	....	....	....
1883	50,000	....	....	....	....
1884	75,000	....	....	....	....
1885	100,000	....	....	....	....
1886	125,000	200,000	$1.60	....	....
1887	129,600	194,400	1.50	....	....
1888	276,871	415,306	1.50	....	978
1889	279,584	395,836	1.42	....	677
1890	399,888	514,595	1.29	214	938
1891	542,379	647,560	1.19	214	1,317
1892	535,558	666,230	1.24	199	1,128
1893	574,763	773,347	1.34	151	1,559
1894	512,626	631,988	1.22	134	1,493
1895	598,322	751,156	1.25	176	1,218
1896	675,374	755,577	1.12	168	1,507
1897	856,190	903,993	1.06	156	1,990
1898	1,205,479	1,238,778	1.03	163	2,555
1899	843,554	989,383	1.17	156	2,313
1900	1,447,945	1,653,618	1.14	219	2,800

The production of Arkansas, by counties, with increases in 1900 as compared with 1899, is shown in the following table:

Coal product of Arkansas since 1895, by counties.

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Franklin, Johnson, Pope	252,938	222,711	281,299	328,412	*a*257,196	*a*442,466	185,270
Sebastian	339,384	446,663	568,891	871,067	580,358	999,479	419,121
Small mines	6,000	6,000	6,000	6,000	6,000	6,000	....
Total	598,322	675,374	856,190	1,205,479	843,554	1,447,945	604,391

a Includes also product of Logan County.

CALIFORNIA.

Total product in 1900, 171,708 short tons; spot value, $523,231.

The principal production from California is from Alameda, Amador, and Contra Costa counties, nearly 97 per cent of the product of the State being from these three counties. The output for the State in 1900 was, as in the preceding year, the largest in its history, amounting to 171,708 short tons, an increase of about 7 per cent over 1899. The production last year was, however, just double in amount and two and one-half times in value that of 1897. The average price per ton obtained in 1900 was $3.05, an increase from $2.67 in 1899 and the highest figure obtained since 1888.

California does not offer many inducements for the exploiting of coal properties, all of the product up to the close of 1900 being lignite. During 1900, however, a company was incorporated to exploit what is claimed to be an important bed of bituminous coal located 16 miles northwest of Randsburg, in Kern County. The coal is found in what is known as the Mohave Desert and is said to be a good quality of bituminous coal. The Mammoth Coal Company, of Los Angeles, has been incorporated to exploit the property. No coal was reported as mined on this property in 1900. While the production of coal in California for 1900 was the largest ever obtained, it is scarcely to be expected that this increase will continue. The inferior quality of the coal so far developed in the State, combined with the notable oil discoveries made in many parts of California, will tend to the substitution of oil for coal for manufacturing and other purposes.

None of the coal produced in California was undercut by machines, and the conditions are not favorable for the introduction of mechanical mining.

The production during 1899 and 1900, with the distribution of the product for consumption, is shown in the following table:

Coal product of California in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Alameda, Amador, and Contra Costa	147,641	137	4,432	152,210	$406,771	$2.67	292	345
Kern, Orange, and Riverside	3,400	5,105	....	8,505	21,562	2.54	272	18
Total	151,041	5,242	4,432	160,715	428,333	2.67	291	363

Coal product of California in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Alameda, Amador, and Contra Costa	158,508	50	6,650	165,208	$505,981	$3.06	312	360
Orange and Riverside	2,000	4,500	....	6,500	17,250	2.65	245	18
Total	160,508	4,550	6,650	171,708	523,231	3.05	309	378

Distribution of the coal product of California from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1889	111,128	3,146	7,546	121,820	$288,232	$2.37	....	....
1890	103,436	2,121	5,154	110,711	283,019	2.56	301	364
1891	86,783	3,424	3,094	93,301	204,902	2.20	222	256
1892	73,269	9,679	2,230	85,178	209,711	2.46	204	187
1893	64,733	5,336	2,534	72,603	167,555	2.31	208	158
1894	52,736	8,143	6,368	67,247	155,620	2.31	232	125
1895	60,440	12,171	2,842	75,453	175,778	2.33	262	190
1896	69,608	4,537	4,399	78,544	166,123	2.12	297	157
1897	74,762	6,869	4,361	85,992	201,236	2.34	150	363
1898	123,568	15,996	4,724	144,288	349,915	2.43	265	284
1899	151,041	5,242	4,432	160,715	428,333	2.67	291	363
1900	160,508	4,550	6,650	171,708	523,231	3.05	309	378

Coal product of California since 1883.

Year.	Short tons.	Value.	Average price per ton.	Average number of days active.	Average number of employees.
1883	76,162				
1884	77,485				
1885	71,615				
1886	100,000	$300,000	$3.00		
1887	50,000	150,000	3.00		
1888	95,000	380,000	4.00		
1889	121,820	288,232	2.36		
1890	110,711	283,019	2.56	301	364
1891	93,301	204,902	2.20	222	256
1892	85,178	209,711	2.46	204	187
1893	72,603	167,555	2.31	208	158
1894	67,247	155,620	2.31	232	125
1895	75,453	175,778	2.33	262	190
1896	78,544	166,123	2.12	297	157
1897	85,992	201,236	2.34	150	363
1898	144,288	349,915	2.43	265	284
1899	160,715	428,333	2.67	291	363
1900	171,708	523,231	3.05	309	378

COLORADO.

Total product in 1900, 5,244,364 short tons; spot value, $5,858,036.

With an increased production of 468,140 short tons in 1900 over 1899, Colorado attains a production exceeding 5,000,000 tons for the first time in the history of the State. This increase places Colorado at the head of the coal-producing States west of the Mississippi River, the position heretofore held by Iowa. It also advances Colorado from ninth to eighth in the rank of all the coal-producing States. The production of Colorado is closely followed by Iowa, with 5,237,642 short tons. The increase in value of the product in 1900 over that of 1899 was in exact proportion to that of the product, there being no change in the average price per ton. There was, however, an increase of nearly 50 per cent in the amount of coal mined by machines, of which the operators received the benefit in lieu of an advance in the selling price of the coal.

The number of machines in use increased from 63 in 1899 to 90 in 1900, and the machine-mined tonnage increased from 527,115 short tons to 756,025 short tons. In 1898 the number of tons mined by machines in Colorado was only 225,646 short tons. The machines in use in 1900 consisted of 47 air-driven pick or punching machines, 37 electrically driven chain machines, and 6 air-driven chain machines.

No strikes of any importance were reported during the year, so that the industry may be said to have been in an entirely satisfactory condition. The total number of men employed shows an increase from 7,166 in 1899 to 7,459 in 1900, and the average number of working days increased from 246 to 264.

The details of production by counties for the last two years, with the distribution of the product for consumption, are shown in the following tables:

Coal product of Colorado in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Boulder	515,709	7,116	17,650	....	540,475	$719,836	$1.33	190	862
Delta	1,200	4,657	243	....	6,100	8,400	1.38	283	12
El Paso	27,668	....	....	....	27,668	33,937	1.23	131	93
Fremont	592,582	8,174	19,853	....	620,609	981,722	1.58	236	1,258
Garfield	129,725	1,989	2,640	....	134,354	149,447	1.11	158	275
Gunnison	202,738	14,110	5,776	96,810	319,434	444,353	1.39	234	498
Huerfano	590,845	4,185	37,547	....	632,577	727,781	1.15	238	1,240
Jefferson	....	9,900	....	....	9,900	19,075	1.93	259	18
La Plata	112,672	3,770	58	....	116,500	161,728	1.39	227	160
Las Animas	1,435,931	21,523	20,079	647,610	2,125,143	1,863,876	.88	295	2,408
Routt	300	911	....	....	1,211	1,742	1.44	83	11
Weld	9,779	36,384	1,410	....	47,573	69,032	1.45	239	110
Arapahoe, Larimer	....	2,936	....	....	2,936	4,295	1.46	167	11
Mesa, Montezuma, Montrose	17,072	500	....	....	17,572	26,910	1.53	256	18
Pitkin, Rio Blanco	45,120	1,998	1,732	125,322	174,172	151,533	.87	222	192
Total	3,681,341	118,153	106,988	869,742	4,776,224	5,363,667	1.12	246	7,166

Coal product of Colorado in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Boulder	529,729	15,334	29,271	....	574,334	$773,876	$1.35	266	637
Delta	200	5,060	157	....	5,417	7,396	1.37	187	14
El Paso	76,934	16,000	1,400	....	94,334	109,294	1.16	192	200
Fremont	588,951	2,152	28,310	....	619,413	1,029,237	1.66	225	1,097
Garfield	137,982	1,661	1,516	....	141,159	152,603	1.08	246	177
Gunnison	295,654	2,653	11,494	122,754	432,555	589,592	1.36	289	479
Huerfano	824,466	3,858	26,620	....	854,944	912,110	1.07	287	1,115
La Plata	111,923	10,657	144	800	123,524	177,486	1.44	207	220
Las Animas	1,320,373	19,740	34,076	749,222	2,123,411	1,808,996	.85	283	3,098
Pitkin	74,500	731	2,997	97,714	175,942	162,474	.92	222	236
Routt	....	1,375	....	....	1,375	2,256	1.64	70	13
Weld	57,910	19,175	2,930	....	80,015	103,489	1.29	199	133
Arapahoe and Larimer	....	5,040	....	....	5,040	8,050	1.60	206	13
Jefferson and Rio Blanco	2,250	1,491	170	....	3,911	5,872	1.50	250	8
Mesa, Montezuma, and Montrose	7,000	1,990	....	....	8,990	15,305	1.70	250	19
Total	4,027,872	106,917	139,085	970,490	5,244,364	5,858,036	1.12	264	7,459

Since 1889 the distribution of the coal product in Colorado has been as follows:

Distribution of the coal product of Colorado from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	2,109,335	91,248	88,537	308,061	2,597,181	$3,993,768	$1.54	....	4,904
1890	2,636,939	65,432	48,451	343,181	3,094,003	4,344,196	1.40	....	5,827
1891	2,934,332	70,000	50,000	458,300	3,512,632	4,800,000	1.37	....	6,000
1892	2,938,980	126,748	55,721	389,381	3,510,830	5,685,112	1.62	229	5,747
1893	3,345,951	65,386	178,993	512,059	4,102,389	5,104,602	1.24	188	7,202
1894	2,181,048	56,688	112,414	481,259	2,831,409	3,516,340	1.24	155	6,507
1895	2,445,578	49,088	99,055	489,261	3,082,982	3,675,185	1.20	182	6,125
1896	2,424,027	65,755	93,128	529,490	3,112,400	3,606,642	1.16	172	6,704
1897	2,649,042	76,699	93,782	542,180	3,361,703	3,947,186	1.17	180	5,852
1898	3,132,676	130,305	117,820	695,546	4,076,347	4,686,081	1.15	220	6,440
1899	3,681,341	118,153	106,988	869,742	4,776,224	5,363,667	1.12	246	7,166
1900	4,027,872	106,917	139,085	970,490	5,244,364	5,858,036	1.12	264	7,459

The production by counties for the last six years with the increases and decreases in 1900 as compared with 1899 has been as follows:

Coal product of Colorado since 1895, by counties.

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Boulder	377,395	448,706	477,790	451,539	540,475	574,334	33,859	....
Fremont	315,344	294,822	304,589	426,553	620,609	619,413	....	1,196
Garfield	274,271	165,797	182,884	222,480	134,354	141,159	6,805	....
Gunnison	239,182	260,596	297,417	323,321	319,434	432,555	113,121	....
Huerfano	386,696	353,338	367,894	1,075,881	632,577	854,944	222,367	....
Jefferson	....	....	10,445	12,366	9,900	3,000	....	6,900
Las Animas	1,253,149	1,261,555	1,427,526	1,211,340	2,125,143	2,123,411	....	1,732
La Plata	106,099	104,661	76,788	100,650	116,500	123,524	7,024	....
Pitkin	....	168,413	171,111	195,496	172,917	175,942	3,025	....
Weld	27,934	4,300	8,310	24,085	47,573	80,015	32,442	....
Other counties	102,912	50,212	36,949	32,636	56,742	*a* 116,067	59,325	....
Total	3,082,982	3,112,400	3,361,703	4,076,347	4,776,224	5,244,364	*b* 468,140	....

a Of this amount El Paso County produced 94,334 tons. *b* Net increase.

The total production of the State since 1864, when mining first began, was as follows:

Coal product of Colorado since 1864.

Year.	Short tons.	Year.	Short tons.
1864	500	1883	1,229,593
1865	1,200	1884	1,130,024
1866	6,400	1885	1,356,062
1867	17,000	1886	1,368,338
1868	10,500	1887	1,791,735
1869	8,000	1888	2,185,477
1870	13,500	1889	2,597,181
1871	15,600	1890	3,077,003
1872	68,540	1891	3,512,632
1873	69,997	1892	3,510,830
1874	77,372	1893	4,102,289
1875	98,838	1894	2,831,409
1876	117,666	1895	3,082,982
1877	160,000	1896	3,112,400
1878	200,630	1897	3,361,703
1879	322,732	1898	4,076,347
1880	437,005	1899	4,776,224
1881	706,744	1900	5,244,364
1882	1,061,479		

GEORGIA.

Total product in 1900, 315,557 short tons; spot value, $370,022.

As compared with 1899, the coal product of Georgia in 1900 exhibited an increase of 82,446 short tons, or a little over 35 per cent. In addition to this increase in production there was an advance in the average price per ton from $1 in 1899 to $1.17 in 1900, the total value showing an increase of $136,678, or 54 per cent. The number of men engaged in the mining of the product in 1900 was 597, who made an average of 278, as against 567 men for 302 days in 1899. A large percentage of the miners engaged in the production of Georgia coal are State convicts employed under the lease system, and as their efficiency is apt to vary considerably from year to year, the labor statistics of Georgia are scarcely comparable to those of other States. No machines are employed in any of the mines, and on account of the convict employment strikes are of rare occurrence.

The statistics of production during the last twelve years are shown in the following table:

Coal product of Georgia since 1889.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	46,131	158	15,000	164,645	225,934	$338,901	$1.50	....	....
1890	57,949	....	....	170,388	228,337	238,315	1.04	313	425
1891	15,000	1,000	5,000	150,000	171,000	256,500	1.50	312	850
1892	52,614	250	3,756	158,878	215,498	212,761	.99	277	467
1893	196,227	....	4,869	171,644	372,740	365,972	.98	342	736
1894	178,610	....	8,978	166,523	354,111	299,290	.85	304	729
1895	135,692	150	6,256	118,900	260,998	215,863	.83	312	*a* 848
1896	120,496	875	7,520	109,655	238,546	168,050	.70	303	*b* 713
1897	120,398	1,481	5,500	68,490	195,869	140,466	.72	304	*c* 469
1898	135,926	890	5,650	101,721	244,187	198,169	.81	298	*d* 504
1899	149,954	440	6,150	76,567	233,111	233,344	1.00	302	*e* 567
1900	160,889	1,305	6,895	146,468	315,557	370,022	1.17	278	*f* 597

a Includes 500 State convicts.
b Includes 360 State convicts.
c Includes 300 State convicts.
d All convict labor.
e Includes 475 convicts.
f Includes 510 convicts.

The following table shows the total annual product since 1884:

Coal product of Georgia since 1884.

Year.	Short tons.	Year.	Short tons.
1884	150,000	1893	372,740
1885	150,000	1894	354,111
1886	223,000	1895	260,998
1887	313,715	1896	238,546
1888	180,000	1897	195,869
1889	225,934	1898	244,187
1890	228,337	1899	233,111
1891	171,000	1900	315,557
1892	215,498		

IDAHO.

Spasmodic attempts have been made to mine coal in Idaho, but they have not met with success. A small amount, 10 tons, valued at $50, produced at Horseshoe Bend, Boise County, was mined in 1900 and sold to local trade.

ILLINOIS.

Total product in 1900, 25,767,981 short tons; spot value, $26,927,185.

The year 1900 was the second in which the statistics of the coal production of Illinois have been collected directly by the Geological Survey. Previous to 1899 the statistics for Illinois were taken from the reports of the bureau of labor statistics. The statistics as collected by the State bureau are complete and reliable, but in the State report the statistics are made to cover fiscal years ending June 30. As collected by the Geological Survey the statistics are for calendar years, and in order that better comparisons could be made with other States, and to have the statistics for Illinois uniform with the other features of the report, the returns for the last two years have been collected by the Survey. Usually the coal operators of Illinois have responded cordially to the requests of this office. In the few instances where reports have not been received direct the figures have been taken for the fiscal year as reported to the State bureau. No attempt has been made to compile accurate returns from the numerous small local mines, and a total of 150,000 tons as produced by these mines in 1900 has been based upon the figures obtained by the State bureau.

The Survey's compilation, with the estimates mentioned above, shows the total product in Illinois in 1900 to have been 25,767,981 short tons, as compared with a total of 25,153,929 tons as reported to the State bureau for the fiscal year ending June 30. The report of the Geological Survey for the calendar year 1899 showed the production of Illinois to have been 24,439,019 short tons, as compared with 23,434,445 short tons given for the fiscal year in the State report. The semi-yearly increases as shown by the two reports are corroborative of the annual increase as shown by each report and attest the correctness of both sets of statistics.

Illinois continues to hold second place among the coal-producing States, having a total production of about 10 per cent more than that of West Virginia, which comes third. The Survey statistics for 1900 show that the product in that year exceeded that of 1899 by 1,328,962 short tons, or 5.4 per cent. The value of the product in Illinois, like that in nearly all of the other States, increased in much greater proportion, the gain being $6,182,632, or 30 per cent. The average price per ton advanced from 85 cents in 1899 to $1.04 in 1900.

The number of men employed in the coal mines of Illinois in 1900 was 39,101, as against 36,756 in 1899. The average number of days worked was 226 in 1900 against 228 days in 1899.

The statistics relating to the machine-mined product have been taken from the State report. They show that in 1900 there were 430 machines in use, a decrease from 440 in 1899. The machine-mined product decreased from 6,085,312 short tons in 1899 to 5,083,594 short tons in 1900. There was an increase of three in the number of mines in which machines were in use, but the statistics show that a number of those mines in which machines had been installed did not use them in 1900.

As in 1899, the coal-mining industry in Illinois during 1900 was comparatively free from labor troubles. The number of strikes reported to the Survey in 1900 was 34. The total number of men affected was 3,909, and the average number of days lost per man was 34. This satisfactory condition was no doubt in large part due to the organization effected among the coal operators and known as the Illinois Coal Operators' Association. This has for its object the settlement of labor disputes by a unique system of arbitration, which has worked most satisfactorily during the last two years.

The statistics of production in Illinois, as reported to the Geological Survey in 1899 and 1900, are presented in the following tables:

Coal product of Illinois in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bond	100,955	....	....	100,955	$57,842	$0.57	178	181
Brown	....	2,630	....	2,630	3,945	1.50	91	30
Bureau	1,291,007	60,638	49,263	1,400,908	1,671,104	1.19	227	3,565
Calhoun	....	6,113	....	6,113	9,170	1.50	272	17
Cass	....	3,430	....	3,430	5,490	1.60	194	20
Christian	547,218	49,386	20,423	617,027	469,183	.76	161	928
Clinton	532,738	22,819	21,897	577,454	413,216	.72	234	760
Fulton	586,787	53,745	11,162	651,694	614,739	.94	194	1,126
Gallatin	10,728	5,833	275	16,836	16,289	.97	163	52
Greene	1,728	13,692	....	15,420	22,800	1.48	211	48
Grundy	1,182,837	47,658	26,597	1,257,092	1,426,803	1.14	253	2,703
Hamilton	....	640	....	640	900	1.40	71	11
Hancock	....	5,498	....	5,498	7,862	1.43	186	26
Henry	45,972	45,991	466	92,429	140,431	1.52	291	209
Jackson	694,282	79,584	34,474	808,340	652,939	.81	200	1,053
Jefferson	61,265	800	945	63,010	63,010	1.00	210	83
Jersey	....	4,050	....	4,050	6,075	1.50	150	20
Johnson	1,030	2,501	10	3,541	2,751	.78	124	19
Kankakee	121,164	3,854	4,244	129,262	127,932	.99	248	207
Knox	....	55,820	104	55,924	74,613	1.33	185	180
Lasalle	1,736,624	234,083	44,597	2,015,304	1,991,741	.99	255	3,440
Livingston	67,890	54,125	7,469	129,484	147,986	1.14	197	267
Logan	147,654	37,176	650	185,480	187,825	1.01	209	249
McDonough	20,059	22,160	50	42,269	56,733	1.34	129	275
McLean	165,724	8,087	12,676	186,487	245,209	1.31	254	421
Macon	77,345	73,058	....	150,403	169,907	1.13	221	532
Macoupin	1,629,811	49,806	47,485	1,727,102	1,243,388	.72	211	2,039
Madison	1,432,069	58,765	47,215	1,538,049	1,057,975	.69	252	1,350
Marion	653,938	29,695	26,854	710,487	475,081	.67	226	955
Marshall	322,627	17,305	10,800	350,732	378,606	1.08	275	764
Menard	371,256	29,935	31,757	432,948	362,030	.84	214	531
Mercer	450,120	36,368	16,986	503,474	570,218	1.13	233	781
Montgomery	288,374	9,120	3,930	301,424	186,615	.62	263	399
Morgan	....	4,500	6	4,506	6,759	1.50	250	14
Peoria	671,781	111,204	9,254	792,239	708,682	.89	234	1,164
Perry	769,095	31,990	8,340	809,425	487,437	.60	200	1,153
Randolph	387,676	43,366	5,992	437,034	303,522	.69	227	592
Rock Island	....	43,177	828	44,005	69,436	1.58	158	154
St. Clair	1,866,420	159,977	52,956	2,079,353	1,381,534	.66	219	2,325
Saline	88,243	7,100	393	95,736	73,176	.76	231	174
Sangamon	2,133,926	115,940	39,842	2,289,708	1,790,742	.78	229	2,793
Schuyler	....	15,874	....	15,874	17,996	1.13	221	41
Scott	18,765	2,962	500	22,227	27,979	1.26	283	55
Shelby	79,057	20,352	6,000	105,409	118,490	1.12	207	154
Stark	515	24,375	540	25,430	34,206	1.35	192	83
Tazewell	80,491	17,351	250	98,092	88,645	.90	208	200
Vermilion	2,032,274	130,775	28,018	2,191,067	1,677,004	.77	244	2,549
Warren	....	16,892	100	16,992	26,894	1.58	204	58
Washington	28,000	3,960	400	32,360	27,213	.84	175	87
Will	32,368	6,309	3,598	42,275	59,524	1.41	252	131
Williamson	990,952	43,487	37,928	1,072,367	779,316	.73	223	1,350
Woodford	151,165	12,559	15,300	179,024	205,590	1.15	248	438
Total	21,871,930	1,936,515	630,574	24,439,019	20,744,553	.85	228	36,756

Coal product of Illinois in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bond	150,000	....	....	150,000	$135,000	$0.90	250	200
Bureau	1,216,790	56,130	45,864	1,318,784	1,898,190	1.44	218	3,538
Calhoun	....	6,300	....	6,300	6,678	1.06	261	24
Christian	527,301	63,288	31,594	622,183	614,764	.99	162	1,056
Clinton	490,468	11,871	29,118	531,457	493,362	.93	242	614
Fulton	578,039	11,624	12,982	602,645	742,242	1.23	193	1,072
Gallatin	....	5,944	25	5,969	5,875	.98	217	9
Greene	....	5,220	....	5,220	7,830	1.50	139	26
Grundy	1,245,570	40,461	29,657	1,315,688	1,790,013	1.36	267	2,985
Hancock	1,255	12	....	1,267	1,901	1.50	80	15
Henry	12,567	58,352	1,127	72,046	130,721	1.81	202	216
Jackson	889,202	50,480	46,316	985,988	997,507	1.01	207	1,133
Jefferson	48,648	....	....	48,648	44,229	.91	280	64
Johnson	600	1,150	10	1,760	1,948	1.11	137	9
Kankakee	99,054	4,828	5,247	109,129	109,129	1.00	175	250
Knox	23,890	38,225	308	62,423	93,530	1.50	164	175
Lasalle	1,772,534	165,768	84,160	2,022,462	2,521,623	1.25	255	3,462
Livingston	178,119	50,760	7,993	236,872	305,669	1.29	217	440
Logan	102,651	53,890	360	156,901	177,257	1.13	226	229
McDonough	28,806	987	500	30,293	45,495	1.50	172	142
McLean	131,855	63,543	11,906	207,304	263,235	1.27	280	407
Macon	22,925	35,100	....	58,025	113,729	1.96	175	260
Macoupin	1,884,677	45,649	82,214	2,012,540	1,872,875	.93	226	2,253
Madison	1,376,152	75,925	58,317	1,510,394	1,151,956	.77	233	1,600
Marion	595,945	172,663	37,251	805,859	747,743	.93	245	1,039
Marshall	363,189	20,772	12,126	396,087	506,673	1.28	273	810
Menard	330,947	43,332	22,798	397,077	406,131	1.02	200	547
Mercer	522,841	27,864	13,542	564,247	640,207	1.13	268	815
Montgomery	270,200	23,700	10,300	304,200	282,560	.93	184	445
Morgan	....	4,444	56	4,500	6,750	1.50	199	14
Peoria	632,322	70,057	15,560	717,939	802,020	1.12	214	1,095
Perry	503,308	43,915	13,868	561,091	494,246	.88	197	1,029
Randolph	443,613	15,440	7,494	466,547	390,510	.80	213	612
Rock Island	12,791	30,805	482	44,078	70,681	1.60	191	120
St. Clair	2,079,496	103,543	49,747	2,232,786	1,753,862	.79	215	2,643
Saline	107,676	6,964	2,010	116,650	87,649	.75	203	227
Sangamon	2,501,853	168,451	68,098	2,738,402	2,883,806	1.05	221	3,417
Schuyler	3,744	1,248	....	4,992	5,997	1.20	214	12
Scott	21,500	4,797	800	27,097	37,080	1.37	279	58
Shelby	80,435	20,450	8,507	109,392	124,712	1.14	218	195
Stark	....	14,691	500	15,191	23,190	1.53	163	44
Tazewell	58,560	32,268	2,015	92,843	106,715	1.15	197	194
Vermilion	1,968,735	133,284	37,455	2,139,474	2,151,308	1.01	225	2,892
Warren	1,000	10,919	100	12,019	19,636	1.63	198	34
Washington	20,000	15,610	1,681	37,291	36,635	.98	166	79
Will	45,113	7,400	2,810	55,323	94,640	1.71	212	158
Williamson	1,444,951	20,017	43,485	1,508,453	1,279,024	.85	228	2,006
Woodford	166,415	14,743	10,977	192,135	300,652	1.56	249	437
Small mines	....	150,000	....	150,000	150,000	......	....	....
Total	22,955,737	2,002,884	809,360	25,767,981	26,927,185	1.04	226	39,101

In the following table is shown the production of Illinois, by counties during the last five years, with the increases and decreases in 1900 as compared with 1899:

Coal product of Illinois in 1896, 1897, 1898, 1899, and 1900, by counties.

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.	Per cent of increase.	Per cent. of decrease.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*		
Bond	71,058	104,256	96,314	100,955	150,000	49,045	....	48.6	......
Brown	....	1,760	1,940	2,630	....	....	2,630	......	100.0
Bureau	1,042,304	1,145,312	865,892	1,400,908	1,318,784	....	82,124	......	5.9
Calhoun	6,000	3,868	4,893	6,113	6,300	187	....	3.1	......
Cass	8,612	4,536	2,900	3,430	....	....	3,430	......	100.0
Christian	763,228	837,897	495,616	617,027	622,183	5,156	....	0.8	......
Clinton	309,504	328,184	417,584	577,454	531,457	....	45,997	......	8.0
Fulton	516,349	469,034	563,397	651,694	602,645	....	49,049	......	7.5
Gallatin	26,350	19,945	16,812	16,836	5,969	....	10,867	......	64.5
Greene	8,270	7,200	8,520	15,420	5,220	....	10,200	......	66.1
Grundy	1,247,394	1,077,576	796,249	1,257,092	1,315,688	58,596	....	4.7	......
Hamilton	1,000	760	4,882	640	....	....	640	......	100.0
Hancock	4,497	4,160	5,600	5,498	1,267	....	4,231	......	77.0
Henry	136,415	119,497	159,049	92,429	72,046	....	20,383	......	22.1
Jackson	771,384	675,212	911,194	808,340	985,998	177,658	....	22.0	......
Jefferson	10,100	51,355	46,060	63,010	48,648	....	14,362	......	22.8
Jersey	*a*2,325	....	1,680	4,050	....	....	4,050	......	100.0
Johnson	1,250	2,778	2,030	3,541	1,760	....	1,781	......	50.3
Kankakee	72,395	180,683	84,632	129,262	109,129	....	20,133	......	15.6
Knox	39,557	41,773	49,819	55,924	62,423	6,499	....	11.6	......
Lasalle	1,409,085	1,508,833	1,165,490	2,015,304	2,022,462	7,158	....	0.4	......
Livingston	218,953	145,206	122,087	129,484	236,872	107,388	....	82.9	......
Logan	166,000	168,917	177,935	185,480	156,901	....	28,579	......	15.4
McDonough	47,821	40,532	77,696	42,269	30,293	....	11,976	......	28.3
McLean	156,891	153,334	171,594	186,487	207,304	20,817	....	11.2	......
Macon	188,207	173,163	300,264	150,403	58,025	....	92,378	......	61.4
Macoupin	2,097,539	1,975,981	1,264,926	1,727,102	2,012,540	285,438	....	16.5	......
Madison	1,080,718	780,921	630,769	1,538,049	1,510,394	....	27,655	......	1.8
Marion	643,561	626,850	714,513	710,487	805,859	95,372	....	13.4	......
Marshall	389,429	339,820	286,365	350,732	396,087	45,355	....	12.9	......
Menard	347,365	328,920	314,160	432,948	397,077	....	35,871	......	8.3
Mercer	450,071	425,518	384,345	503,474	564,247	60,773	....	12.1	......
Montgomery	171,099	251,249	294,667	301,424	304,200	2,776	....	0.9	......
Morgan	(*a*)	....	1,800	4,506	4,500	....	6	......	0.1
Peoria	457,061	504,309	640,193	792,239	717,939	....	74,300	......	9.4
Perry	626,507	689,921	845,329	809,425	561,091	....	248,334	......	30.7
Randolph	202,838	150,647	274,072	437,034	466,547	29,513	....	6.8	......
Rock Island	34,065	35,651	47,490	44,005	44,078	73	....	0.2	......
St. Clair	1,671,323	1,718,194	1,600,752	2,079,353	2,232,786	153,433	....	7.4	......
Saline	46,495	51,689	100,005	95,736	116,650	20,914	....	21.8	......
Sangamon	1,587,812	1,838,453	1,763,863	2,289,708	2,738,402	448,694	....	19.6	......
Schuyler	7,915	7,841	11,149	15,874	4,992	....	10,882	......	68.6
Scott	18,410	25,125	21,337	22,227	27,097	4,870	....	21.9	......
Shelby	35,297	69,329	68,388	105,409	109,392	3,983	....	3.8	......
Stark	18,085	19,472	21,936	25,430	15,191	....	10,239	......	40.2
Tazewell	113,541	86,669	84,507	98,092	92,843	....	5,249	......	5.4
Vermilion	1,822,344	2,000,623	1,520,699	2,191,067	2,139,474	....	51,593	......	2.4
Warren	12,696	10,099	12,245	16,992	12,019	....	4,973	......	29.3

a Jersey County includes product of Morgan County.

Coal product of Illinois in 1896, 1897, 1898, 1899, and 1900, by counties—Continued.

County.	1896.	1897.	1898.	1899.	1900.	Increase. 1900.	Decrease. 1900.	Per cent of increase.	Per cent of decrease.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*		
Washington	33,360	25,715	43,808	32,360	37,291	4,931	....	15.2	......
Will	86,950	25,682	40,904	42,275	55,323	13,048	....	30.9	......
Williamson	444,406	669,480	915,108	1,072,367	1,508,453	436,086	....	40.7	......
Woodford	162,790	148,829	145,840	179,024	192,135	13,111	....	7.3	......
Small mines	....	....	....	....	150,000	150,000	....	......	......
Total	19,786,626	20,072,758	18,599,299	24,439,019	25,767,981	*a*1,328,962	....	5.4	......

a Net increase.

The distribution of the product for consumption since 1889 is shown in the following table:

Distribution of the coal product of Illinois from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke at the mines.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	9,884,883	1,816,702	395,787	12,900	12,104,272	$11,755,203	$0.97	....	....
1890	12,539,784	2,130,539	606,497	15,600	15,292,420	14,171,230	.93	204	28,574
1891	12,787,993	2,246,705	610,000	16,000	15,660,698	14,237,074	.91	216	32,951
1892	14,557,655	2,624,821	675,000	4,800	17,862,276	16,243,645	.91	220	34,585
1893	16,260,463	2,931,846	753,955	3,300	19,949,564	17,827,595	.89	229	35,390
1894	13,948,910	2,590,414	570,452	3,800	17,113,576	15,282,111	.89	183	38,477
1895	14,456,524	2,684,607	591,133	3,600	17,735,864	14,239,157	.80	182	38,630
1896	16,128,103	2,995,022	659,601	3,900	19,786,626	15,809,736	.80	186	33,054
1897	16,358,221	3,041,712	669,012	3,813	20,072,758	14,472,529	.72	185	33,788
1898	15,596,888	2,149,808	852,603	....	18,599,299	14,567,598	.78	175	35,026
1899	21,871,930	1,936,515	630,574	....	24,439,019	20,744,553	.85	228	36,756
1900	22,955,737	2,002,884	809,360	....	25,767,981	26,927,185	1.04	226	39,101

The following table showing the total amount of lump and other grades of coal is for the fiscal years 1882 to 1900 and is taken from the State report:

Total number of mines, men, and tons of product, lump and other grades, since 1882.

Fiscal year ending June 30—	Whole number of mines.	Whole number of men employed.	Total product in tons (2,000 pounds).	Total tons of lump coal.	Total tons of other grades.
1882	704	20,290	11,017,069	9,115,653	1,901,506
1883	639	23,939	12,123,456	10,030,991	2,092,465
1884	741	25,575	12,208,075	10,101,005	2,107,070
1885	778	25,946	11,834,459	9,791,874	2,402,585
1886	787	25,846	11,175,241	9,246,435	1,928,806
1887	801	26,804	12,423,066	10,278,890	2,144,176
1888	822	29,410	14,328,181	11,855,188	2,472,993

Total number of mines, men, and tons of product, lump and other grades, etc.—Cont'd.

Fiscal year ending June 30—	Whole number of mines.	Whole number of men employed.	Total product in tons (2,000 pounds).	Total tons of lump coal.	Total tons of other grades.
1889	854	30,076	14,017,298	11,597,963	2,419,335
1890	936	28,574	15,292,420	12,638,364	2,654,056
1891	918	32,951	15,660,698	12,960,224	2,700,474
1892	839	34,585	17,862,276	14,730,963	3,131,313
1893	788	35,390	19,949,564	16,112,899	3,836,655
1894	836	38,477	17,113,576	13,865,284	3,248,292
1895	874	38,630	17,735,864	14,045,962	3,689,902
1896	901	33,054	19,786,626	14,210,024	5,576,602
1897	853	33,788	20,072,758	14,672,241	5,400,517
1898	881	35,026	18,599,299	14,208,795	4,390,504
1899	889	36,991	23,434,445	17,427,598	6,006,847
1900	920	39,384	25,153,929	13,927,899	11,226,030

INDIANA.

Total product in 1900, 6,484,086 short tons; spot value, $6,687,137.

The production of coal in Indiana has shown an uninterrupted increase since 1896, and each year since 1897 has been the year of maximum coal production up to that time. As compared with 1899, the output of coal in 1900 shows an increase of 477,563 short tons, or 7.9 per cent. As compared with 1896, there was an increase of over 2,500,000 tons, or more than 60 per cent. A notable advance was shown in the value of the product for 1900, there being a gain of 15 cents, or about 12 per cent, in the average price per ton. This advance in price caused a gain in the total value of $1,402,119, or about 27 per cent, over that of 1899, and of over 100 per cent as compared with 1896. The number of men employed in the coal mines of Indiana in 1900 was 11,720, who made an average of one hundred and ninety-nine working days, as compared with 9,712 men who made an average of two hundred and eighteen working days in 1899. These figures show that there was an average of 2.78 tons mined per day per man in 1900, as against 2.84 tons per day per man in 1899. This decrease in 1900 is probably due to the fact that there was practically no gain in the machine-mined tonnage in this State during 1900, this factor amounting to 1,713,125 tons in 1899 and 1,774,045 tons in 1900, from which it appears that nearly all of the 477,563 tons of increased product in 1900 was pick-mined, reducing the daily tonnage for each employee. The number of mining machines in use in the State increased from 247 to 254. Of this total in 1900, 169 were of the pick or puncher type, 2 were air-driven electric machines, and 83 were chain machines operated by electricity.

In the following tables are shown the details of production in 1899 and 1900, by counties, and the distribution of the product for consumption:

Coal product of Indiana in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Clay	1,204,788	11,368	37,792	....	1,253,948	$1,382,685	$1.10	212	2,485
Daviess and Martin	194,214	68,050	3,765	....	266,029	221,734	.83	240	509
Fountain	55,250	500	....	....	55,750	49,385	.89	311	120
Gibson	49,656	19,952	5,812	....	75,420	66,010	.87	182	83
Greene	660,929	2,045	18,825	....	681,799	613,507	.90	189	1,321
Knox	29,113	18,089	2,482	....	49,684	56,272	1.13	196	90
Parke	607,872	23,594	6,715	....	638,181	657,159	1.03	230	1,078
Perry	21,400	7,000	300	....	28,700	29,118	1.01	175	65
Pike	180,077	3,187	4,606	3,719	191,589	157,898	.82	152	495
Spencer	1,000	12,946	....	....	13,946	17,027	1.22	151	43
Sullivan	702,106	23,440	27,188	....	752,734	500,967	.67	238	743
Vanderburg	23,982	118,942	9,506	....	152,430	149,531	.98	219	279
Vermilion	605,076	....	4,800	....	609,876	450,486	.74	206	845
Vigo	984,226	11,420	34,053	....	1,029,699	764,644	.74	267	1,332
Warrick	145,920	20,041	4,777	....	170,738	132,595	.78	193	224
Small mines	....	36,000	....	....	36,000	36,000	......	....	....
Total	5,465,609	376,574	160,621	3,719	6,006,523	5,285,018	.88	218	9,712

Coal product of Indiana in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Clay	1,122,546	11,462	31,294	....	1,165,302	$1,503,802	$1.29	192	2,780
Daviess and Martin	252,825	19,650	4,150	....	276,625	301,674	1.09	221	550
Fountain	43,600	232	400	....	44,232	53,990	1.22	286	105
Gibson	48,063	14,826	4,000	....	66,889	62,223	.93	187	125
Greene	706,892	10,102	6,261	....	723,255	721,667	1.00	186	1,305
Knox	40,654	17,445	2,650	....	60,749	66,164	1.09	192	125
Parke	612,258	20,228	17,179	....	649,665	794,928	1.22	181	1,447
Perry	4,984	18,843	250	....	24,077	27,867	1.16	202	53
Pike	234,716	3,650	4,462	2,605	245,433	223,203	.91	161	606
Spencer	273	8,833	....	....	9,106	10,970	1.20	151	29
Sullivan	892,314	15,240	32,435	....	939,989	812,213	.86	210	1,274
Vanderburg	44,734	133,379	14,419	....	192,532	216,928	1.13	225	361
Vermilion	646,713	562	2,250	....	649,525	559,691	.86	209	994
Vigo	1,081,540	36,597	33,506	....	1,151,643	1,057,181	.92	217	1,640
Warrick	215,350	25,899	7,815	....	249,064	238,636	.96	204	326
Small mines	....	36,000	....	....	36,000	36,000	......	....	....
Total	5,947,462	372,948	161,071	2,605	6,484,086	6,687,137	1.03	199	11,720

The distribution of the total product for the years 1889 to 1900, together with the statistics of the labor employed, is presented in the following table:

Distribution of the coal product of Indiana from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	2,527,112	237,935	67,210	12,800	2,845,057	$2,887,852	$1.02	....	6,448
1890	3,036,737	225,167	34,703	9,130	3,305,737	3,259,233	.91	220	5,489
1891	2,689,780	211,854	63,152	8,688	2,973,474	3,070,918	1.03	190	5,879
1892	3,088,911	208,220	42,621	5,422	3,345,174	3,620,582	1.08	225	6,436
1893	3,461,830	252,879	69,797	7,345	3,791,851	4,055,372	1.07	201	7,644
1894	3,085,664	248,398	67,545	22,314	3,423,921	3,295,034	.96	149	8,603
1895	3,488,876	392,423	104,695	9,898	3,995,892	3,642,623	.91	189	8,530
1896	3,471,470	311,911	113,442	8,956	3,905,779	3,261,737	.84	163	8,806
1897	3,639,758	393,012	111,376	7,023	4,151,169	3,472,348	.84	176	8,886
1898	4,398,078	387,790	130,810	4,065	4,920,743	3,994,918	.81	199	8,971
1899	5,465,609	376,574	160,621	3,719	6,006,523	5,285,018	.88	218	9,712
1900	5,947,462	372,948	161,071	2,605	6,484,086	6,687,137	1.03	199	11,720

The product, by counties, during the last six years is presented in the following table, with the increase or decrease in each county in 1900:

Coal product of Indiana since 1895, by counties.

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Clay	1,223,186	1,232,435	925,727	928,607	1,253,948	1,165,302	....	88,646
Daviess	81,380	192,775	211,797	202,693	*a* 266,029	*a* 276,625	10,596	....
Fountain	....	105,650	137,250	139,200	55,750	44,232	....	11,518
Gibson	1,940	24,775	41,409	63,006	75,420	66,889	....	8,531
Greene	409,080	290,046	448,873	526,800	681,799	723,255	41,456	....
Knox	26,443	30,500	36,752	56,532	49,684	60,749	11,065	....
Owen	....	....	....	7,808	....	....	....	....
Parke	479,609	339,677	434,007	551,137	638,181	649,665	11,484	....
Perry	18,960	26,227	23,712	27,162	28,700	24,077	....	4,623
Pike	232,950	201,417	248,043	248,478	191,589	245,433	53,844	....
Spencer	10,879	16,703	4,339	6,633	13,946	9,106	....	4,840
Sullivan	453,167	515,285	480,045	637,849	752,734	939,989	187,255	....
Vanderburg	192,710	170,755	182,800	197,072	152,430	192,532	40,102	....
Vermilion	306,000	347,166	321,560	261,738	609,876	649,525	39,649	....
Vigo	402,335	237,647	442,531	884,109	1,029,699	1,151,643	121,944	....
Warrick	121,253	138,721	176,324	145,919	170,738	249,064	78,326	....
Small mines	36,000	36,000	36,000	36,000	36,000	36,000	....	....
Total	3,995,892	3,905,779	4,151,169	4,920,743	6,006,523	6,484,086	*b* 477,563	....

a Includes Martin County. *b* Net increase.

The total product of the State since 1873 has been as follows:

Product of coal in Indiana from 1873 to 1900.

Year.	Quantity.	Year.	Quantity.
	Short tons.		*Short tons.*
1873	1,000,000	1887	3,217,711
1874	812,000	1888	3,140,979
1875	800,000	1889	2,845,057
1876	950,000	1890	3,305,737
1877	1,000,000	1891	2,973,474
1878	1,000,000	1892	3,345,174
1879	1,196,490	1893	3,791,851
1880	1,500,000	1894	3,423,921
1881	1,771,536	1895	3,995,892
1882	1,976,470	1896	3,905,779
1883	2,560,000	1897	4,151,169
1884	2,260,000	1898	4,920,743
1885	2,375,000	1899	6,006,523
1886	3,000,000	1900	6,484,086

INDIAN TERRITORY.

Total product in 1900, 1,922,298 short tons; spot value, $2,788,124.

As compared with the preceding year the coal production of the Indian Territory in 1900 shows an increase of 384,871 short tons, or exactly 25 per cent, in amount, and of $588,339, or 26.7 per cent, in value. The large increase in tonnage was partly due to the fact that in 1900 the industry was comparatively free from labor disturbances, which prevailed to a considerable extent in 1899. Repeated efforts have been made by the mine-workers' unions to force the mine operators in the Indian Territory to recognize the union, and the strikes of 1899 were precipitated by a renewal of this struggle. The places of the striking miners were in many cases filled by imported labor, and the mines continued to operate during 1899, and to such effect that there was an increase of the production as compared with 1898 of 155,961 tons. This increase, however, was largely offset by a decreased production of 361,925 short tons in Arkansas, where the strikes due to the same cause were more effective.

The statistics for 1900 show that there was a decrease in the number of mining machines in use, and also a falling off in the machine-mined tonnage. The number of machines in use decreased from 74 in 1899 to 58 in 1900, and the product mined by machines declined from 276,180 short tons to 239,424 short tons. Of the total number of machines in use, 26 were air-driven pick machines and 28 were electric chain machines. There were also 4 electric long-wall machines employed.

In the following table are shown the details of production in the Indian Territory during the last ten years:

Distribution of the coal product of the Indian Territory since 1891.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1891	1,026,932	9,405	22,163	32,532	1,091,032	$1,897,037	$1.74	222	2,891
1892	1,156,603	10,840	18,089	7,189	1,192,721	2,043,479	1.71	211	3,257
1893	1,197,468	9,234	21,663	23,745	1,252,110	2,235,209	1.79	171	3,446
1894	923,581	4,632	30,878	10,515	969,606	1,541,293	1.59	157	3,101
1895	1,173,399	3,070	21,935	12,781	1,211,185	1,737,254	1.43	164	3,212
1896	1,295,742	12,648	45,560	12,696	1,366,646	1,918,115	1.40	170	3,549
1897	1,250,066	9,068	47,501	29,745	1,336,380	1,787,358	1.34	176	3,168
1898	1,310,178	16,632	34,055	20,601	1,381,466	1,827,638	1.32	198	3,216
1899	1,444,063	12,280	54,222	26,862	1,537,427	2,199,785	1.43	212	4,084
1900	1,796,422	14,786	54,137	56,953	1,922,298	2,788,124	1.45	228	4,525

Since 1885 the annual production has been as follows:

Product of coal in the Indian Territory from 1885 to 1900, inclusive.

Year.	Quantity.	Value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.				
1885	500,000	....	....	....	....
1886	534,580	$855,328	$1.60	....	....
1887	685,911	1,286,692	1.88	....	....
1888	761,986	1,432,072	1.89	....	....
1889	752,832	1,323,807	1.76	....	1,862
1890	869,229	1,579,188	1.82	238	2,571
1891	1,091,032	1,897,037	1.71	222	2,891
1892	1,192,721	2,043,479	1.71	211	3,257
1893	1,252,110	2,235,209	1.79	171	3,446
1894	969,606	1,541,293	1.59	157	3,101
1895	1,211,185	1,737,254	1.43	164	3,212
1896	1,366,646	1,918,115	1.40	170	3,549
1897	1,336,380	1,787,358	1.34	176	3,168
1898	1,381,466	1,827,638	1.32	198	3,216
1899	1,537,427	2,199,785	1.43	212	4,084
1900	1,922,298	2,788,224	1.45	228	4,525

A report on the geology of the eastern Choctaw coal field, by Messrs. Joseph A. Taff and George I. Adams, has recently been published in Part II of the Twenty-first Annual Report of the Survey.

IOWA.

Total product in 1900, 5,202,939 short tons; spot value, $7,155,341. Iowa's coal production in 1900 was almost exactly equal to that of the preceding year, and to this failure to increase is due the displacement of the State as the leading coal producer west of the Mississippi River. Colorado, which up to the close of 1899 had been the second State in coal-producing mines west of the river, increased its production in 1900 by 468,140 short tons over 1899, and took first place in rank for this section of the country.

The most important factor connected with the coal production in Iowa in 1900 was the large increase in value, a gain of $758,003 being presented. The average price per ton obtained in 1900 was $1.38, the highest noted within the last fifteen years. Production decreased in nine of the important coal-producing counties and increased in eight. The principal losses were sustained in Mahaska, Jasper, and Keokuk counties. The largest increase was in Lucas County, where, on account of the opening of new mines, the product increased from 32,419 tons in 1899 to 227,221 tons in 1900, a gain of 600 per cent. The other important increases were in Appanoose, Monroe, and Polk counties. Strikes occurred during 1900 in 25 mines, the total number of men affected being 1,322, who lost an average of 47 days. The total time lost amounted to 62,333 working days.

The statistics for 1900 show that there was one less machine operated in that year than in 1899, the total number decreasing from 41 to 40. There was a slight increase in the machine-mined tonnage, from 124,721 short tons in 1899 to 132,757 tons in 1900. A large amount of the coal mined in Iowa is from thin veins, in which the long-wall machine is used to advantage, so that out of the total number of 40 machines operated in 1900 14 were of the long-wall pattern. Of the others, 17 were pick machines and 9 were air-driven chain machines.

The statistics of production, by counties, during the last two years, with distribution of the product for consumption, are shown in the following tables:

Coal product of Iowa in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Adams	....	12,556	104	12,660	$22,319	$1.76	139	45
Appanoose	605,956	25,239	5,226	636,421	876,623	1.38	198	2,122
Boone	261,488	26,097	2,940	290,525	468,787	1.61	225	930
Dallas	3,210	6,811	783	10,804	16,357	1.52	254	37
Davis and Lee	....	412	....	412	724	1.76	82	5
Greene	3,605	12,993	970	17,568	28,136	1.60	200	65
Jasper	173,504	15,738	2,686	191,928	221,655	1.15	264	286
Keokuk	273,267	33,432	8,201	314,900	362,946	1.15	235	530
Lucas	28,566	2,742	1,111	32,419	44,752	1.38	178	126
Mahaska	1,211,320	44,464	17,689	1,273,473	1,427,329	1.12	262	2,258

Coal product of Iowa in 1899, by counties—Continued.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Marion	206,474	20,924	4,270	231,668	$253,606	$1.10	225	526
Monroe	668,905	8,558	11,541	689,004	725,952	1.05	221	1,213
Page	1,320	2,680		4,000	9,000	2.25	152	26
Polk	560,194	177,604	11,910	749,708	977,036	1.30	232	1,427
Scott		7,053	295	7,348	12,895	1.75	262	34
Story	2,200	4,388	200	6,788	15,364	2.26	201	29
Taylor	9,500	1,450	15	10,965	20,570	1.88	159	56
Van Buren	6,805	2,480	100	9,385	14,077	1.50	253	19
Wapello	277,733	42,362	4,934	325,029	371,514	1.14	269	586
Warren	22,260	12,525	30	34,815	64,138	1.84	238	71
Wayne	53,319	8,999	500	62,818	88,548	1.41	205	229
Webster	110,117	12,894	1,830	124,841	200,010	1.60	213	351
Small mines		140,000		140,000	175,000			
Total	4,479,743	622,401	75,335	5,177,479	6,397,338	1.24	229	10,971

Coal product of Iowa in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Adams		21,950		21,950	$41,764	$1.90	160	110
Appanoose	654,675	18,396	7,023	680,094	1,029,489	1.51	180	2,419
Boone	237,692	23,596	5,254	266,542	451,056	1.69	218	791
Dallas	8,773	7,692	272	16,737	30,531	1.82	171	76
Davis and Lee		1,398		1,398	2,395	1.71	130	12
Greene	3,500	13,344	200	17,044	31,699	1.86	188	70
Jasper	87,024	10,925	1,999	99,948	135,462	1.35	242	217
Jefferson	2,250	1,325	75	3,650	6,062	1.66	185	14
Keokuk	232,538	17,561	8,834	258,933	353,145	1.36	261	426
Lucas	211,461	7,720	8,740	227,921	300,840	1.32	246	388
Mahaska	1,091,117	24,049	26,851	1,142,017	1,408,655	1.23	251	2,045
Marion	158,637	23,371	4,438	186,446	234,009	1.26	217	417
Monroe	710,989	14,757	29,540	755,286	859,720	1.14	254	1,592
Page and Story	3,500	4,994		8,494	22,725	2.68	154	28
Polk	570,386	241,915	15,181	827,482	1,250,430	1.51	242	1,661
Scott	12,700	16,946	200	29,486	49,174	1.65	177	93
Taylor	15,270	1,879	10	17,159	34,318	2.00	250	48
Van Buren	8,676	3,352	80	12,108	17,880	1.48	242	24
Wapello	235,112	36,593	4,655	276,360	359,616	1.30	255	564
Warren	7,000	17,690	34	24,724	34,695	1.40	197	69
Wayne	34,537	30,265	338	65,140	96,584	1.48	179	218
Webster	103,507	16,754	3,399	123,660	230,092	1.86	218	326
Small mines		140,000		140,000	175,000			
Total	4,389,344	696,472	117,123	5,202,939	7,155,341	1.38	228	11,608

The distribution of the product during the last twelve years has been as follows:

Distribution of the coal product of Iowa from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	3,530,373	464,735	100,213	37	4,095,358	$5,426,509	$1.33	....	9,247
1890	3,560,738	397,503	63,498	....	4,021,739	4,995,739	1.24	213	8,130
1891	3,263,347	373,025	88,966	157	3,825,495	4,867,999	1.27	224	8,124
1892	3,459,025	401,855	57,611	....	3,918,491	5,175,060	1.32	236	8,170
1893	3,442,584	449,639	80,006	....	3,972,229	5,110,460	1.30	204	8,863
1894	3,390,751	511,683	64,819	....	3,967,253	4,997,939	1.26	170	9,995
1895	3,630,867	460,820	64,387	....	4,156,074	4,982,102	1.20	189	10,066
1896	3,367,819	494,443	91,766	....	3,954,028	4,628,022	1.17	178	9,672
1897	4,023,944	516,427	71,494	....	4,611,865	5,219,503	1.13	201	10,703
1898	3,981,362	572,063	65,417	....	4,618,842	5,260,716	1.14	219	10,262
1899	4,479,743	622,401	75,335	....	5,177,479	6,397,338	1.24	229	10,971
1900	4,412,580	707,875	117,187	....	5,202,939	7,155,341	1.38	228	11,608

In the following table is shown the production by counties, with the increases and decreases in 1900 as compared with the preceding year:

Coal product of Iowa since 1895, by counties.

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Appanoose	588,438	544,678	670,143	608,165	636,421	680,094	43,673	....
Boone	268,422	316,756	292,218	331,543	290,525	266,542	....	23,983
Dallas	6,061	9,624	6,853	7,907	10,804	16,737	5,933	....
Greene	7,197		9,245	12,920	17,568	17,044	....	524
Jasper	155,707	164,110	175,316	143,935	191,928	99,948	....	91,980
Keokuk	266,394	214,474	289,478	251,145	314,900	258,933	....	55,967
Lucas	....	....	....	6,600	32,419	227,921	195,502	....
Mahaska	1,016,623	1,047,241	1,420,510	1,292,787	1,273,473	1,142,017	....	131,456
Marion	193,768	93,023	129,502	127,293	231,668	186,446	....	45,222
Monroe	559,982	433,520	497,831	584,578	689,004	755,286	66,282	....
Polk	485,360	546,051	489,136	635,606	749,708	827,482	77,774	....
Taylor	14,062	8,400	10,726	6,555	10,965	17,159	6,194	....
Van Buren	9,896	8,396	5,760	6,600	9,385	12,108	2,723	....
Wapello	261,510	227,077	229,470	249,624	325,029	276,360	....	48,669
Warren	6,116	12,824	6,610	7,120	34,815	24,724	....	10,091
Wayne	46,315	42,732	56,996	51,550	62,818	65,140	2,322	....
Webster	123,882	134,704	168,899	137,548	124,841	123,660	....	1,181
Other counties and small mines	146,341	150,418	153,172	157,366	171,208	205,338	34,130	....
Total	4,156,074	3,954,028	4,611,865	4,618,842	5,177,479	5,202,939	*a* 25,460	....

a Net increase.

The first records of coal production in Iowa were for the year 1860, when 48,263 tons were produced. The production for such years as records are obtainable since that time is shown in the following table:

Product of coal in Iowa from 1860 to 1900, inclusive.

Year.	Quantity.	Value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.				
1860	48,263	$92,180	$1.91		
1865	69,574				
1866	99,320				
1868	241,453				
1870	283,467				
1875	1,231,547	2,500,140	2.03		
1880	1,461,166	2,507,453	1.72		
1882	3,920,000				
1883	4,457,540				
1884	4,370,566				
1885	4,012,575				
1886	4,315,779	5,391,151	1.25		
1887	4,473,828	5,991,735	1.34		
1888	4,952,440	6,438,172	1.30		
1889	4,095,358	5,426,509	1.33		9,247
1890	4,021,739	4,995,739	1.24	213	8,130
1891	3,825,495	4,807,999	1.27	224	8,124
1892	3,918,491	5,175,060	1.32	236	8,170
1893	3,972,229	5,110,460	1.30	204	8,863
1894	3,967,253	4,997,939	1.26	170	9,995
1895	4,156,074	4,982,102	1.20	189	10,066
1896	3,954,028	4,628,022	1.17	178	9,672
1897	4,611,865	5,219,503	1.13	201	10,703
1898	4,618,842	5,260,716	1.14	219	10,256
1899	5,177,479	6,397,338	1.24	229	10,971
1900	5,202,939	7,155,341	1.38	228	11,608

KANSAS.

Total product in 1900, 4,467,870 short tons; spot value, $5,454,691.

Kansas was one of the twenty-three States whose coal product in 1900 exceeded, both in amount and in value, that of any previous year in its history. Prior to 1900 the output in any one year had not attained a total of 4,000,000 tons, while in 1900 it exceeded that amount by nearly half a million tons. Upon two previous occasions—in 1894 and 1899—the value exceeded $4,000,000, while in 1900 the value of the product was over $5,450,000. As compared with 1899, the product of 1900 shows an increase of 615,603 short tons, or 16 per cent. The value increased $976,579, or nearly 22 per cent. The production, both in amount and in value, has shown an increase each year since 1896. The State ranks third among the coal-producing States west of the Mississippi River, Colorado being first and Iowa second in 1900. It ranks tenth among all the coal-producing States, having in 1900 a larger production than Maryland, whose output was materially decreased by labor difficulties.

There were only three mining machines operated in Kansas during 1900, the same number as in 1899. There was, however, a slight increase in the machine-mined product, from 40,271 tons in 1899 to 46,164 tons in 1900. All of these machines were the Morgan-Gardner chain-breast type.

Of the 139 mines from which reports of production were received, strikes occurred in four, the total number of men affected being 157 for an average of twenty-three days' time.

The details of production in 1899 and 1900 by counties, with the distribution of the product for consumption, are shown in the following tables:

Coal product of Kansas in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Cherokee	1,126,767	18,613	16,762	1,162,142	$1,186,943	$1.02	215	2,321
Cloud	583	4,000	....	4,583	11,267	2.46	153	29
Crawford	1,903,405	22,166	25,933	1,951,504	2,085,136	1.07	253	3,335
Franklin	2,225	11,800	25	14,050	28,100	2.00	265	40
Leavenworth	247,270	58,094	7,481	312,845	540,073	1.73	245	988
Linn	11,595	5,665	....	17,260	19,941	1.16	203	62
Osage	229,212	32,468	651	262,331	464,839	1.77	159	1,168
Atchison, Chautauqua, Coffey, Elk, and Lyon	3,000	3,166	....	6,166	17,658	2.86	135	37
Ellsworth, Lincoln, and Russell	440	946	....	1,386	4,155	3.00	95	20
Small mines	....	120,000	....	120,000	120,000	......	......	......
Total	3,524,497	276,918	50,852	3,852,267	4,478,112	1.16	226	8,000

Coal product of Kansas in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Cherokee	1,509,846	19,665	17,960	1,547,471	$1,716,051	$1.11	229	2,968
Cloud	....	6,035	....	6,035	15,117	2.50	149	33
Crawford	2,241,127	41,790	24,213	2,307,130	2,704,781	1.17	251	3,657
Franklin	1,731	2,420	269	4,420	10,090	2.28	160	25
Leavenworth	179,290	60,822	10,117	250,229	456,437	1.82	200	822
Linn	24,060	2,380	200	26,640	36,240	1.36	180	92
Osage	172,838	24,021	139	196,998	371,117	1.88	198	809
Atchison, Coffey, and Lyon	....	5,984	....	5,984	17,952	3.00	260	26
Ellsworth, Labette, and Lincoln	....	2,963	....	2,963	6,906	2.33	115	27
Small mines	....	120,000	....	120,000	120,000	......	......	......
Total	4,128,892	286,080	52,898	4,467,870	5,454,691	1.22	232	8,459

The distribution of the product for consumption, the total value, and the statistics of the labor employed for the last twelve years, have been as follows:

Distribution of the coal product of Kansas from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	1,891,090	300,207	29,246	500	2,221,043	$3,296,888	$1.48	....	5,956
1890	2,028,100	224,839	6,983	....	2,259,922	2,947,517	1.30	210	4,523
1891	2,428,787	255,839	31,946	133	2,716,705	3,557,305	1.31	222	6,201
1892	2,756,812	206,038	44,325	101	3,007,276	3,955,595	1.32	208	6,559
1893	2,364,810	227,321	60,412	3	2,652,546	3,375,740	1.27	147	7,310
1894	3,066,398	275,565	45,523	765	3,388,251	4,178,998	1.23	164	7,339
1895	2,587,602	279,739	59,142	387	2,926,870	3,481,981	1.20	159	7,482
1896	2,562,779	256,906	63,901	1,215	2,884,801	3,295,032	1.15	168	7,127
1897	2,745,101	253,933	54,730	248	3,054,012	3,602,326	1.18	194	6,639
1898	3,079,601	277,022	49,932	....	3,406,555	3,703,014	1.09	194	7,197
1899	3,524,497	276,918	50,852	....	3,852,267	4,478,112	1.16	226	8,000
1900	4,128,892	286,080	52,898	....	4,467,870	5,454,691	1.22	232	8,459

The following table shows the production during the last five years, distributed by counties, with the increase or decrease in each county in 1900. It will be observed that practically all of the increase in 1900 was made in Cherokee and Crawford counties, the leading coal producing counties in the State:

Coal product of Kansas in 1896, 1897, 1898, 1899, and 1900, by counties.

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Atchison	4,592	7,250	3,000	3,000	2,000	....	1,000
Cherokee	985,132	1,004,921	1,110,527	1,162,142	1,547,471	385,329	....
Crawford	1,271,434	1,352,923	1,654,493	1,951,504	2,307,130	355,626	....
Franklin	12,861	5,140	6,433	14,050	4,420	....	9,630
Leavenworth	284,700	366,362	305,576	312,845	250,229	....	62,616
Linn	14,534	27,432	20,542	17,260	26,640	9,380	....
Osage	190,948	169,395	182,156	262,331	196,998	....	65,333
Other counties and small mines	120,600	120,589	123,828	129,135	132,982	3,847	....
Total	2,884,801	3,054,012	3,406,555	3,852,267	4,467,870	*a* 615,603	....

a Net increase.

There are no records of coal production in Kansas prior to 1880, in which year a total of 550,000 tons was reported. The increase in production since that time has been continued with remarkable regularity, there being but three years in which the output was less than in the preceding one. These years were all during the period of trade depression in 1893, 1895, and 1896.

Coal product of Kansas since 1880.

Year.	Short tons.	Value.	Average price per ton.	Average number of days active.	Average number of men employed.
1880	550,000				
1881	750,000				
1882	750,000				
1883	900,000				
1884	1,100,000				
1885	1,212,057	$1,485,002	$1.23		
1886	1,400,000	1,680,000	1.20		
1887	1,596,879	2,235,631	1.40		
1888	1,850,000	2,775,000	1.50		
1889	2,221,043	3,296,888	1.48		5,956
1890	2,259,922	2,947,517	1.30	210	4,523
1891	2,716,705	3,557,305	1.31	222	6,201
1892	3,007,276	3,955,595	1.32	208	6,559
1893	2,652,546	3,375,740	1.27	147	7,310
1894	3,388,251	4,178,998	1.23	164	7,339
1895	2,926,870	3,481,981	1.20	159	7,482
1896	2,884,801	3,295,032	1.15	168	7,127
1897	3,054,012	3,602,326	1.18	194	6,639
1898	3,406,555	3,703,014	1.09	194	7,197
1899	3,852,267	4,478,112	1.16	226	8,000
1900	4,467,870	5,454,691	1.22	232	8,459

KENTUCKY.

Total product in 1900, 5,328,964 short tons; spot value, $4,881,577.

The coal-mining industry of Kentucky has exhibited remarkable strides during the last two years. Prior to 1899 the product of the State had not reached a total of 4,000,000 tons in any one year, whereas in that year it attained an aggregate of 4,607,255 tons, an increase over the year 1898 of 719,347 tons. This was followed in 1900 by another increase, the production reaching a total of over 5,300,000 tons and exceeding that of 1899 by 721,709 short tons. The value of the product in 1900 exceeded that of the preceding year by $1,263,355, and the average price advanced from 79 cents to 92 cents.

Compared with its total production the development of the use of mining machines in Kentucky is exceptional, 44 per cent of the total product in 1900 having been won by the use of machines, as compared with 35 per cent won by machines in 1899. The total number of machines in use increased from 158 in 1898 to 189 in 1899, and to 239 in 1900. The tonnage mined by machines was 1,366,676 tons in 1898, 1,625,809 tons in 1899, and 2,339,944 tons in 1900. There were only five States having a larger number of machines in use in 1900, and only four whose machine-mined product exceeded that of Kentucky. Most of the machines employed are of the pick or puncher type, 163 of the machines in use in 1900 being of this style, to 76 of the chain machines. Of the chain machines, 66 were operated by electricity and

10 by air. The extended use of mining machines in Kentucky is, doubtless, responsible for the largely increased production during the last two years.

Strikes were reported in 29 of the 107 mines from which reports were received. The strikes usually lasted about thirty days, and the average number of days lost by the 2,946 men affected was 30.5. The smallest strike was one of seven days, and the longest, one of ninety days.

The details of production during 1899 and 1900 are as follows:

Coal product of Kentucky in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Bell	106,051	6,154	2,276	38,453	152,934	$142,953	$0.93	275	304
Boyd	167,045	1,279	3,114	....	171,438	121,969	.71	243	240
Butler	32,466	2,708	....	....	35,174	31,057	.88	167	136
Carter	181,617	1,967	1,200	....	184,784	158,109	.86	222	274
Henderson	122,317	13,311	1,000	....	136,628	97,514	.71	216	210
Hopkins	1,072,454	30,473	22,025	79,731	1,204,683	794,878	.66	250	1,605
Johnson	12,265	199	....	....	12,464	25,098	2.01	251	90
Knox	227,682	3,400	4,600	....	235,682	188,043	.80	223	364
Laurel	340,935	8,034	750	....	349,719	275,192	.76	217	698
Muhlenberg	405,932	4,850	3,550	....	414,332	299,499	.72	203	750
Ohio	491,022	6,491	8,400	....	505,913	339,841	.67	212	830
Pulaski	101,214	755	1,500	....	103,469	103,147	1.00	237	219
Union	166,278	12,692	6,435	....	185,405	172,509	.93	205	214
Webster	104,256	12,169	5,966	....	122,391	82,991	.68	210	128
Whitley	514,312	8,685	2,320	....	525,317	497,764	.95	211	1,119
Daviess, Hancock, McLean	36,935	5,344	....	....	42,279	40,200	.95	179	98
Breathitt, Greenup, Lawrence, Lee	56,418	14,225	4,000	....	74,643	59,958	.80	198	182
Small mines	....	150,000	....	....	150,000	187,500	......	....	....
Total	4,139,199	282,736	67,136	118,184	4,607,255	3,618,222	.79	224	7,461

Coal product of Kentucky in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Bell	127,394	7,780	4,700	84,626	224,500	$223,804	$1.00	165	680
Boyd	164,858	1,877	4,196	....	170,931	119,995	.70	247	312
Butler	24,159	8,313	10	....	32,482	32,208	.99	158	120
Carter	247,079	637	1,040	....	248,756	247,741	1.00	249	532
Henderson	112,679	21,676	1,420	....	135,775	121,344	.89	173	250
Hopkins	1,243,347	24,442	26,264	77,773	1,371,826	1,078,757	.79	277	1,771
Johnson	18,548	616	....	....	19,164	30,239	1.58	268	98
Knox	294,587	4,600	4,782	....	303,969	279,445	.92	256	456
Laurel	344,349	2,497	4,940	....	351,786	334,677	.95	210	860
Lawrence	39,705	663	5,948	....	46,316	39,317	.85	263	107
McLean	19,719	485	250	....	20,454	15,650	.77	97	56
Muhlenberg	386,510	5,559	7,875	....	399,944	327,688	.82	202	839
Ohio	536,348	6,124	10,193	....	552,665	463,226	.84	215	881
Pulaski	90,381	1,235	1,344	....	92,960	105,243	1.13	152	336
Rockcastle	8,000	....	....	....	8,000	10,000	1.25	162	25
Union	230,411	23,099	9,761	4,862	268,133	279,720	1.04	261	507
Webster	100,038	6,917	3,610	....	110,565	87,105	.79	222	128
Whitley	649,969	18,660	4,440	....	673,069	773,538	1.15	230	1,464
Breathitt and Lee	32,258	358	800	....	33,416	41,166	1.23	192	80
Christian, Daviess, and Hancock	112,723	980	550	....	114,253	83,214	.73	220	178
Small mines	....	150,000	....	....	150,000	187,500	....	....	....
Total	4,783,062	286,518	92,123	167,261	5,328,964	4,881,577	.92	227	9,680

The distribution of the product for consumption since 1889 is shown in the following table:

Distribution of the coal product of Kentucky from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	2,111,010	246,306	23,981	18,458	2,399,755	$2,374,339	$0.98	....	....
1890	2,357,989	291,666	29,568	22,273	2,701,496	2,472,119	.92	219	5,259
1891	2,559,263	285,281	21,363	50,162	2,916,069	2,715,600	.93	225	6,355
1892	2,620,556	327,985	33,856	42,916	3,025,313	2,771,238	.92	217	6,724
1893	2,613,645	281,115	30,969	81,450	3,007,179	2,613,569	.86	202	6,581
1894	2,734,847	281,235	47,344	47,766	3,111,192	2,749,932	.88	145	8,083
1895	3,012,610	254,028	50,294	40,838	3,357,770	2,890,247	.86	153	7,799
1896	2,980,355	251,897	55,447	45,779	3,333,478	2,684,306	.78	165	7,549
1897	3,088,132	404,099	55,033	54,833	3,602,097	2,828,329	.79	178	7,983
1898	3,537,429	253,629	55,206	41,644	3,887,908	3,084,551	.79	187	7,614
1899	4,139,199	282,736	67,136	118,184	4,607,255	3,618,222	.79	224	7,461
1900	4,783,062	286,518	92,123	167,261	5,328,964	4,881,577	.92	227	9,680

The total production by counties for the last five years, and the increases and decreases in 1900 as compared with the preceding year, are shown in the following table:

Coal product of Kentucky since 1896, by counties.

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Bell	89,534	103,261	85,544	152,934	224,500	71,566	....
Boyd	121,022	192,538	208,762	171,438	170,931	....	507
Breathitt	2,406	10,053	18,440	15,700	16,416	716	....
Butler	28,444	21,847	34,114	35,174	32,482	....	2,692
Carter	136,066	124,346	63,745	184,784	248,756	63,972	....
Christian	13,124	13,000	66,496	....	93,931	93,931	....
Daviess	3,232	3,200	17,141	2,464	13,272	10,808	....
Greenup	854	852	2,500	4,225	....	....	4,225
Hancock	17,842	17,702	9,450	10,020	7,050	....	2,970
Henderson	119,540	107,187	86,395	136,628	135,775	....	853
Hopkins	777,182	976,412	974,959	1,204,683	1,371,826	167,143	....
Johnson	6,762	9,541	12,216	12,464	19,164	6,700	....
Knox	217,040	158,445	281,575	235,682	303,969	68,287	....
Laurel	288,494	364,307	288,478	349,719	351,786	2,067	....
Lawrence	47,474	48,061	59,600	49,418	46,316	....	3,102
Lee	9,847	35,711	25,796	5,300	17,000	11,700	....
McLean	24,076	33,360	21,725	29,795	20,454	....	9,341
Muhlenberg	256,268	270,760	317,392	414,332	399,944	....	14,388
Ohio	368,094	466,295	440,011	505,913	552,665	46,752	....
Pulaski	72,537	47,847	86,770	103,469	92,960	....	10,509
Rockcastle	....	12,603	....	....	8,000	8,000	....
Union	104,122	126,896	193,665	185,405	268,133	82,728	....
Webster	50,538	65,982	55,850	122,391	110,565	....	11,826
Whitley	428,980	241,891	387,284	525,317	673,069	147,752	....
Small mines	150,000	150,000	150,000	150,000	150,000	....	....
Total	3,333,478	3,602,097	2,887,908	4,607,255	5,328,964	a721,709	....

a Net increase.

Kentucky is the only State of the Union whose product is obtained from any two of the great fields. The coal-producing counties in the eastern portion of the State obtain their product from the Coal Measures of the Appalachian system. The western portion of the State is underlain by the Coal Measures of the central field, the southern extremity of which is found in this State. The western part of the State produces the larger amount of coal. In 1900 the output from the western district amounted to 3,006,097 short tons, exclusive of the product of the small country banks, as against 2,646,805 short tons in 1899 and 2,217,198 short tons in 1898. The eastern district produced 2,172,867 short tons in 1900, as compared with 1,810,450 short tons in 1900, and 1,520,710 short tons in 1898. Thus it will be seen that nearly 60 per cent of the entire product is obtained from the western counties.

The production from the two fields in Kentucky during the last four years has been as follows:

Coal product of the eastern district of Kentucky in 1897, 1898, 1899, and 1900, exclusive of small mines.

County.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease. 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Bell	103,261	85,544	152,934	224,500	71,566	
Boyd	192,538	208,762	171,438	170,931		507
Breathitt	10,053	18,440	15,700	16,416	716	
Carter	124,346	63,745	184,784	248,756	63,972	
Greenup	852	2,500	4,225			4,225
Johnson	9,541	12,216	12,464	19,164	6,700	
Knox	158,445	281,575	235,682	303,969	68,287	
Laurel	364,307	288,478	349,719	351,786	2,067	
Lawrence	48,061	59,600	49,418	46,316		3,102
Lee	35,711	25,796	5,300	17,000	11,700	
Pulaski	47,847	86,770	103,469	92,960		10,509
Rockcastle	12,603			8,000	8,000	
Whitley	241,891	387,284	525,317	673,069	147,752	
Total	1,349,456	1,520,710	1,810,450	2,172,867	*a* 362,417	

a Net increase.

Coal product of the western district of Kentucky in 1897, 1898, 1899, and 1900, exclusive of small mines.

County.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease. 1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Butler	21,847	34,114	35,174	32,482		2,692
Christian	13,000	66,496		93,931	93,931	
Daviess	3,200	17,141	2,464	13,272	10,808	
Hancock	17,702	9,450	10,020	7,050		2,970
Henderson	107,187	86,395	136,628	135,775		853
Hopkins	976,412	974,959	1,204,683	1,371,826	167,143	
McLean	33,360	21,725	29,795	20,454		9,341
Muhlenberg	270,760	317,392	414,332	399,944		14,388
Ohio	466,295	440,011	505,913	552,665	46,752	
Union	126,896	193,665	185,405	268,133	82,728	
Webster	65,982	55,850	122,391	110,565		11,826
Total	2,102,641	2,217,198	2,646,805	3,006,097	*a* 359,292	

a Net increase.

The first coal production in Kentucky was reported in 1873, with a total of 300,000 short tons. The development of the industry since that year is shown in the following table:

Annual coal product of Kentucky since 1873.

Year.	Short tons.	Year.	Short tons.
1873	300,000	1887	1,933,185
1874	360,000	1888	2,570,000
1875	500,000	1889	2,399,755
1876	650,000	1890	2,701,496
1877	850,000	1891	2,916,069
1878	900,000	1892	3,025,313
1879	1,000,000	1893	3,007,179
1880	1,000,000	1894	3,111,192
1881	1,100,000	1895	3,357,770
1882	1,300,000	1896	3,333,478
1883	1,650,000	1897	3,602,097
1884	1,550,000	1898	3,887,908
1885	1,600,000	1899	4,607,255
1886	1,550,000	1900	5,328,964

MARYLAND.

The total product in 1900, 4,024,688 short tons; spot value, $3,927,381.

The anthracite region of Pennsylvania and the Cumberland region of Maryland were the ones most seriously affected by labor disturbances during 1900. Comparatively speaking, Maryland suffered in this respect more than the anthracite district in Pennsylvania, the production in Maryland showing a decrease in output for the year of 782,708 tons, or over 16 per cent, while the decrease in the anthracite region was not quite 6 per cent. It would appear, however, that the operators had no particular reason to complain because of their loss in tonnage, for, in spite of the decrease of over three-fourths of a million tons, the value of the product exceeded that of the preceding year by $260,325 and reached a total of $3,927,381. The average price per ton advanced from 76 to 98 cents, the latter being the highest figure reported at any time since the statistics of values have been collected. The statistics of labor employed in the Maryland coal mines show that there were during 1900 a total of 5,319 men at work, whereas the average time made was 203 days, as against 4,624 men for an average of 275 days in 1899. There were 22 mines in which strikes occurred, and in one of these the disaffection lasted but 13 days. The other strikes lasted from 90 to 200 days. Altogether 4,787 of the 5,319 men were on strike at one time or another, and the average time lost by them was 105 days, entailing a total loss of 504,544 working days.

Mining machines were introduced into the coal mines of Maryland for the first time in 1899, during which year 8 machines were employed and 16,545 short tons won by them. In 1900 the number of machines in use had increased to 10 and the machine-mined product to 138,014 short tons. All of the machines in use were of the pick or puncher pattern.

The statistics of coal production in Maryland are presented in the following table:

Coal product of Maryland since 1889.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1889	2,885,336	44,217	10,162	2,939,715	$2,517,474	$0.86	....	3,702
1890	3,296,393	52,621	8,799	3,357,813	2,899,572	.86	244	3,842
1891	3,771,584	36,959	11,696	3,820,239	3,082,515	.80	244	3,891
1892	3,385,384	30,955	3,623	3,419,962	3,063,580	.89	225	3,886
1893	3,676,137	26,833	13,071	3,716,041	3,267,317	.88	240	3,935
1894	3,435,600	51,750	14,078	3,501,428	2,687,270	.77	215	3,974
1895	3,840,991	59,950	14,644	3,915,585	3,160,592	.81	248	3,912
1896	4,068,558	53,046	22,332	4,143,936	3,299,928	.80	204	4,039
1897	4,391,703	27,762	22,663	4,442,128	3,363,996	.76	262	4,719
1898	4,618,990	36,941	18,953	4,674,884	3,532,257	.76	253	4,818
1899	4,716,581	68,750	22,065	4,807,396	3,667,056	.76	275	4,624
1900	3,949,539	51,565	23,584	4,024,688	3,927,381	.98	203	5,319

Product of coal in Maryland from 1883 to 1900.

Year.	Short tons.	Value.	Average price per ton.	Average number of days active.	Average number of men employed.
1883	2,476,075				
1884	2,765,617				
1885	2,833,337				
1886	2,517,577	$2,391,698	$0.95		
1887	3,278,023	3,114,122	.95		
1888	3,479,470	3,293,070	.95		
1889	2,939,715	2,517,474	.86		3,702
1890	3,357,813	2,899,572	.86	244	2,842
1891	3,820,239	3,082,515	.80	244	3,891
1892	3,419,962	3,063,580	.89	225	3,886
1893	3,716,041	3,267,317	.88	240	3,935
1894	3,501,428	2,687,270	.77	215	3,974
1895	3,915,585	3,160,592	.81	248	3,912
1896	4,143,936	3,299,928	.80	204	4,039
1897	4,442,128	3,363,996	.76	262	4,719
1898	4,674,884	3,532,257	.76	253	4,818
1899	4,807,396	3,667,056	.76	275	4,624
1900	4,024,688	3,927,381	.98	203	5,319

The records of shipments of coal from the Cumberland region in Maryland, and from the Piedmont region, across the Potomac River in West Virginia, have been carefully preserved since 1842 and are published annually in the reports of the Cumberland Coal Trade. The following table, which shows the shipments from this entire region, is obtained from the published report of the Cumberland Coal Trade:

Total shipments from the Cumberland coal field in

Year.	Frostburg region. Cumberland and Pennsylvania R. R. By Baltimore and Ohio R. R.	By Chesapeake and Ohio Canal.	By Pennsylvania R. R.	Total.	Cumberland Coal and Iron Company's railroad. By Baltimore and Ohio R. R.	By Chesapeake and Ohio Canal.	Total.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
1842	757			757	951		951
1843	3,661			3,661	6,421		6,421
1844	5,156			5,156	9,734		9,734
1845	13,738			13,738	10,915		10,915
1846	11,240			11,240	18,555		18,555
1847	20,615			20,615	32,325		32,325
1848	36,571			36,571	43,000		43,000
1849	63,676			63,676	78,773		78,773
1850	73,783	3,167		76,950	119,023	875	119,898
1851	70,893	51,438		122,331	103,808	31,540	135,348
1852	128,534	46,357		174,891	139,925	19,362	159,287
1853	150,381	84,060		234,441	155,278	70,535	225,813
1854	148,953	63,731		212,684	173,580	92,114	265,694
1855	93,691	77,095		170,786	97,710	100,691	198,401
1856	86,994	80,387		167,381	121,945	105,149	227,094
1857	80,743	55,174		135,917	88,573	54,000	142,573
1858	48,018	166,712		214,730	66,009	87,539	153,548
1859	48,415	211,639		260,054	72,423	86,203	158,626
1860	70,669	232,278		302,947	80,500	63,600	144,100
1861	23,878	68,303		92,181	25,983	29,296	55,279
1862	71,745	75,206		146,951	41,096	23,478	64,574
1863	117,796	173,269		291,065	111,087	43,523	154,610
1864	287,126	194,120		481,246	67,676	64,522	132,198
1865	384,297	285,295		669,592	104,651	57,907	162,558
1866	592,938	291,019		883,957	52,251	52,159	104,410
1867	623,031	385,249		1,008,280	40,106	72,904	113,010
1868	659,115	424,406		1,083,521	100,345	57,919	158,264
1869	1,016,777	573,243		1,590,020	130,017	78,908	208,925
					2,092,660	1,192,224	3,284,884
					Eckhart Branch R. R.		
1870	909,511	520,196		1,429,707	114,404	83,941	198,345
1871	1,247,279	656,085		1,903,364	69,864	194,254	264,118
1872	1,283,956	612,537	22,021	1,918,514	26,586	203,666	230,252
1873	1,509,570	641,220	114,589	2,265,379	89,765	137,582	227,347
1874	1,295,804	631,882	67,671	1,995,357	113,670	135,182	248,852
1875	1,095,880	715,673	160,213	1,971,766	52,505	164,165	216,670
1876	939,262	443,435	131,866	1,514,563	15,285	189,005	204,290
1877	755,278	473,946	170,884	1,399,808	63,181	111,350	174,531
1878	823,801	486,038	145,864	1,455,703	99,455	123,166	222,621
1879	933,240	397,009	154,264	1,484,513	141,907	104,238	246,145
1880	1,055,491	471,800	213,446	1,740,737	197,525	131,325	328,850
1881	1,113,263	270,156	153,501	1,536,920	271,570	151,526	423,096
1882	576,701	115,344	91,574	783,619	199,183	76,140	275,323
1883	851,985	302,678	217,065	1,371,728	197,235	141,390	338,625
1884	1,193,780	150,471	199,138	1,543,389	289,884	124,718	414,602
1885	1,091,904	171,460	206,227	1,469,591	289,407	117,829	407,236
1886	1,131,949	115,531	141,520	1,389,000	243,321	113,791	357,112
1887	1,584,114	132,177	176,241	1,892,532	332,798	125,305	458,103
1888	1,660,406	155,216	193,046	2,008,668	374,888	95,191	470,079
1889	1,430,381	26,886	177,152	1,634,419	368,497	26,407	394,904
1890	1,511,418		291,704	1,803,122	522,334		522,334
1891	1,628,574	9,070	289,232	1,926,876	463,142	39,294	502,436
1892	1,426,994	93,705	214,011	1,734,710	349,207	170,116	519,323
1893	1,332,634	135,409	360,807	1,828,850	341,321	201,947	543,268
1894	1,068,739	95,523	372,205	1,536,467	436,216	208,914	645,130
1895	1,193,834	101,076	255,133	1,550,043	464,407	212,534	676,941
1896	1,344,402	169,195	163,471	1,677,068	610,418	195,279	805,697
1897	1,790,813	96,536	169,679	2,057,028	586,592	166,691	753,283
1898	2,131,626	24,997	116,195	2,272,818	507,196	213,139	720,335
1899	2,334,109	27,570	161,191	2,522,870	473,608	164,853	638,461
1900	1,813,462	14,621	126,615	1,954,698	304,320	96,513	400,833
Total	44,991,621	11,799,290	5,256,515	62,047,426	8,609,691	4,219,351	12,829,042

Maryland and West Virginia from 1842 to 1900.

Frostburg region.				Piedmont region.		Total.			
Georges Creek and Cumberland R. R.									
By Chesapeake and Ohio Canal.	By Pennsylvania R. R.	Local and Baltimore and Ohio.	Total.	Georges Creek R. R.	Hampshire R. R. by Baltimore and Ohio R. R.	Baltimore and Ohio R. R. and local.	Chesapeake and Ohio Canal.	Pennsylvania R. R.	Aggregate.
Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
......	......	......	......	......	......	1,708	......	......	1,708
......	......	......	......	......	......	10,082	......	......	10,082
......	......	......	......	......	......	14,890	......	......	14,890
......	......	......	......	......	......	24,653	......	......	24,653
......	......	......	......	......	......	29,795	......	......	29,795
......	......	......	......	......	......	52,940	......	......	52,940
......	......	......	......	......	......	79,571	......	......	79,571
......	......	......	......	......	......	142,449	......	......	142,449
......	......	......	......	......	......	192,806	4,042	......	196,848
......	......	......	......	......	......	174,701	82,978	......	256,679
......	......	......	......	......	......	268,459	65,719	......	334,178
......	......	......	......	73,725	......	376,219	157,760	......	533,979
......	......	......	......	181,303	......	503,836	155,845	......	659,681
......	......	......	......	227,245	65,570	478,486	183,786	......	662,272
......	......	......	......	269,210	42,765	502,330	204,120	......	706,450
......	......	......	......	252,368	51,628	465,912	116,574	......	582,486
......	......	......	......	218,318	63,060	395,405	254,251	......	649,656
......	......	......	......	257,740	47,934	426,512	297,842	......	724,354
......	......	......	......	289,298	52,564	493,031	295,878	......	788,909
......	......	......	......	85,554	36,660	172,075	97,599	......	269,674
......	......	......	......	69,482	36,627	218,950	98,684	......	317,634
......	......	......	......	266,430	36,240	531,553	216,792	......	748,345
......	......	......	......	......	44,552	399,354	258,642	......	657,996
......	......	......	......	......	71,345	560,293	343,202	......	903,495
......	......	......	......	......	90,964	736,153	343,178	......	1,079,331
......	......	......	......	......	72,532	735,669	458,153	......	1,193,822
......	......	......	......	......	88,658	848,118	482,325	......	1,330,443
......	......	......	......	......	83,724	1,230,518	652,151	......	1,882,669
				2,190,673					
				Empire and West Virginia mines.					
......	......	......	......	28,035	60,988	1,112,938	604,137	......	1,717,075
......	......	......	......	81,218	96,453	1,494,814	850,339	......	2,345,153
......	......	......	......	85,441	121,364	1,517,347	816,103	22,021	2,355,471
......	......	......	......	77,582	103,793	1,780,710	778,802	114,589	2,674,101
......	......	......	......	57,492	109,194	1,576,160	767,064	67,671	2,410,895
......	......	......	......	63,537	90,800	1,302,237	879,838	160,698	2,342,773
......	......	......	......	108,723	7,505	1,070,775	632,440	131,866	1,835,081
......	......	......	......	......	......	818,450	584,996	170,884	1,574,339
......	......	......	......	......	998	924,254	609,204	145,864	1,679,322
......	......	......	......	......	51	1,075,198	501,247	154,264	1,730,709
......	......	......	......	66,573	......	1,319,589	603,125	213,446	2,136,160
83,136	125,097	4,947	313,180	88,722	......	1,478,502	504,818	278,598	2,261,918
78,298	93,861	31,436	203,595	277,929	......	1,085,249	269,782	185,435	1,540,466
215,767	202,223	77,829	495,819	338,001	......	1,444,766	680,119	419,288	2,544,173
69,765	156,959	283,336	510,060	466,928	......	2,233,928	344,954	356,097	2,934,979
79,455	214,518	291,685	585,658	403,489	......	2,076,485	368,744	420,745	2,865,974
53,480	98,371	348,196	500,047	346,308	......	2,069,774	282,802	239,891	2,592,467
4,863	153,230	418,057	576,150	449,011	......	2,724,347	262,345	389,104	3,375,796
112	286,787	341,024	627,923	564,397	......	2,669,216	286,700	715,151	3,671,067
......	365,029	243,487	608,516	576,047	......	2,357,585	57,459	798,842	3,213,886
......	677,593	228,138	905,731	774,904	......	2,723,341	......	1,282,748	4,006,091
......	763,845	229,266	993,111	959,673	......	2,855,225	51,121	1,474,087	4,380,433
......	568,003	236,314	804,317	971,214	......	2,557,177	266,901	1,205,486	4,029,564
......	741,954	201,938	943,892	1,031,797	......	2,423,159	338,107	1,586,541	4,347,807
......	773,074	111,036	884,110	900,399	......	2,084,265	304,437	1,577,404	3,966,106
125	1,031,015	110,258	1,141,398	1,157,803	......	2,418,554	314,551	1,793,080	4,526,185
......	995,443	75,400	1,070,843	1,307,822	......	2,807,161	364,474	1,689,795	4,861,430
......	918,712	111,135	1,029,847	1,463,331	......	3,615,142	263,227	1,426,120	5,303,489
......	913,775	100,312	1,014,087	1,526,396	......	3,900,403	238,136	1,395,097	5,533,636
......	1,068,771	92,895	1,161,666	1,808,464	......	4,269,323	192,423	1,669,715	6,131,461
......	703,837	116,974	820,811	1,995,574	......	*a*3,750,257	111,134	1,310,525	5,171,916
585,001	10,852,097	3,653,663	15,090,761	17,302,985	1,475,969	75,603,473	17,899,050	21,395,052	114,897,575

a Includes 138,926 tons used on line of Cumberland and Pennsylvania Railroad and its branches and at Cumberland and Piedmont; also 349,868 tons used by the Baltimore and Ohio Railroad Company in locomotives, rolling mills, etc.

MICHIGAN.

Total product in 1900, 849,475 short tons; spot value, $1,259,683.

The remarkable development of the coal fields in Bay and Saginaw counties, Michigan, which began in 1897, has continued, and the results are shown by the largely increased production since that year. The greatest increase was shown in 1899, with a total output of 624,708 short tons. The product increased 98 per cent over the preceding year. The returns for 1900 show an increase scarcely less in amount than that of 1899 over 1898, the gain for 1900 being 224,767 short tons. This was continued by a still more remarkable increase in value, from $870,152, in 1899, to $1,259,683, in 1900, a gain of $389,531, or 44 per cent. The rapidly increased production of Michigan coal in 1900 reflects the advancement in manufacturing industries in the Lake cities, whose fuel supply can be drawn from the Michigan coal fields to advantage.

Michigan was practically undisturbed by strikes during 1900, there being but two mines in which any disturbance occurred, and these were of short duration, the total number of men affected being 81, and the average time lost nineteen days per man.

A noticeable increase is to be observed in the amount of coal mined by machines in Michigan in 1900. A number of machines were installed in the latter part of 1899, whose operations did not materially affect the total for that year. Eight more machines were added in 1900 to the 25 previously installed, making a total of 33, and the machine-mined tonnage was trebled from 64,055 tons, in 1899, to 191,577 tons, in 1900. Of the 33 machines in use, 25 were pick machines and 8 of the chain pattern. One of the chain machines was driven by air and 7 by electricity.

The production in Michigan in 1899 and 1900, by counties, together with the distribution of the product for consumption, is shown in the following tables:

Coal product of Michigan in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bay	98,080	1,603	4,905	104,588	$138,602	$1.33	155	311
Eaton	1,100	2,317	4	3,421	6,710	1.96	145	26
Jackson	....	20,476	1,124	21,600	38,860	1.80	210	77
Saginaw	441,459	4,844	9,304	455,607	624,354	1.37	274	742
Genesee, Huron, Shiawassee	33,641	4,951	900	39,492	61,626	1.56	209	135
Total	574,280	34,191	16,237	624,708	870,152	1.39	232	1,291

Coal product of Michigan in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bay	167,428	13,894	9,492	190,814	$283,184	$1.48	274	436
Eaton	....	4,530	....	4,530	8,770	1.94	224	17
Genesee and Huron	3,678	1,298	1,277	6,253	11,442	1.83	220	20
Jackson	3,997	17,676	1,644	23,317	43,388	1.86	254	81
Saginaw	594,127	2,860	4,125	601,112	872,486	1.45	260	1,087
Shiawassee	23,449	....	....	23,449	40,413	1.72	223	63
Total	792,679	40,258	16,538	849,475	1,259,683	1.48	261	1,704

The following tables show the distribution of the product during the last nine years and the total product of the State since 1877:

Coal product of Michigan for nine years.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1892	27,200	45,180	5,610	77,990	$121,314	$1.56	230	195
1893	27,787	16,367	1,825	45,979	82,462	1.79	154	162
1894	60,817	7,055	2,150	70,022	103,049	1.47	224	223
1895	80,403	27,019	4,900	112,322	180,016	1.60	186	320
1896	83,150	6,547	3,185	92,882	150,631	1.62	157	320
1897	188,636	24,686	10,270	223,592	325,416	1.46	230	537
1898	232,155	75,622	7,945	315,722	462,711	1.47	245	715
1899	574,280	34,191	16,237	624,708	870,152	1.39	232	1,291
1900	792,679	40,258	16,538	849,475	1,259,683	1.48	261	1,709

The annual record of coal production in Michigan for such years as the statistics have been obtained is shown in the following table:

Coal product of Michigan from 1877 to 1900.

Year.	Short tons.	Year.	Short tons.
Previous to 1877	350,000	1889	67,431
1877	69,197	1890	74,977
1878	85,322	1891	80,307
1879	82,015	1892	77,990
1880	129,053	1893	45,979
1881	130,130	1894	70,022
1882	135,339	1895	112,322
1883	71,296	1896	92,882
1884	36,712	1897	223,592
1885	45,178	1898	315,722
1886	60,434	1899	624,708
1887	71,461	1900	849,475
1888	81,407		

MISSOURI.

Total product in 1900, 3,540,103 short tons; spot value, $4,280,328.

The coal product of Missouri in 1900 exceeded that of 1899 by 514,289 short tons in amount and $688,383 in value. It has, in fact, increased each year from 1896, and the output in 1900 was the largest recorded with the exception of 1888, when a total of 3,909,967 tons was obtained. The most important coal-producing county in the State is Macon, whose product in 1900 was 836,248 short tons. This county is also credited with the largest increase in 1900 over 1899, the gain amounting to 296,705 short tons, or about 55 per cent. The next largest increase was in Vernon County, in which the gain was 137,613 short tons, or about 75 per cent. Randolph County's increase in tonnage was almost as much as that of Vernon, being 137,494 short tons, or 45 per cent. Lafayette, Adair, and Barton counties also showed large increases. The most important loss was exhibited in Bates County, whose product in 1900 was 186,085 short tons less than in 1899.

The coal-mining industry of Missouri may be considered as a record of the industrial conditions in the State, with such unimportant fluctuations as are due to the variations in the weather. The industry in this State is also necessarily somewhat affected by strikes or other disturbing influences within its own borders or in adjoining States, but as a general thing the coal production of Missouri reflects local industrial conditions, as the market for the product is practically confined to the State's borders. Missouri is surrounded by other large coal-producing States and most of the large cities of the State draw their fuel supply from the coal fields of adjoining States, St. Louis being chiefly supplied by coal from Illinois, Kansas City drawing its fuel largely from Kansas, while little, if any, Missouri coal is consumed outside of the State. Iowa on the north, Kansas on the west, Arkansas and Indian Territory on the south, Illinois and Kentucky on the east complete a barrier which confines the Missouri product to local markets.

The amount of coal mined by machines in Missouri during 1900 was almost exactly double the amount so produced in 1899. During the previous year there were three mining companies using machines. In 1900 this number had been increased to five, and the number of mining machines from nine to fifteen. The tonnage won by them increased from 55,154 to 110,036. Of the machines in use in 1900, 11 were chain-breast machines, and 4 were long wall, the long-wall machines in use being of the Sperry pattern, whose use is now practically confined to this State.

Labor troubles in the coal mines of Missouri were considerably less in 1900 than in the preceding year. There were 14 mines in which strikes of various duration occurred during 1900, as compared with 30 in 1899. The number of men on strike was 632 in 1900 and 2,197 in 1899. The average time lost in both years, per man, was about the same, but the total number of working days lost in 1899 was 117,076, and in 1900, 34,970.

The statistics of production in 1899 and 1900, by counties, are shown in the following tables:

Coal product of Missouri in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Adair	172,677	1,265	1,510	175,452	$199,846	$1.14	248	345
Audrain	20,865	24,539	503	45,907	61,263	1.33	211	118
Barton	107,256	2,112	2,100	111,468	144,771	1.30	260	249
Bates	446,387	7,340	3,070	456,797	432,778	.95	210	595
Boone	3,760	16,130	390	20,280	25,500	1.26	226	53
Caldwell	35,400	10,500	2,200	48,100	71,900	1.50	236	115
Callaway	....	23,193	17	23,210	39,165	1.69	177	76
Grundy	33,539	6,770	1,762	42,071	74,859	1.78	212	176
Henry	86,844	8,011	216	95,071	142,505	1.50	198	322
Lafayette	342,770	21,433	5,050	369,253	565,470	1.53	195	1,118
Linn	70,321	13,553	1,054	84,928	132,782	1.56	235	272
Macon	520,182	5,312	14,049	539,543	523,003	.97	202	1,438
Montgomery	475	1,372	8	1,855	2,604	1.40	229	7
Putnam	131,679	526	2,450	134,655	161,028	1.20	270	372
Ralls	22,040	500	100	22,640	27,710	1.22	296	60
Randolph	294,775	8,907	1,280	304,962	300,260	.98	214	703
Ray	198,536	4,992	3,094	206,622	282,399	1.37	193	705
Vernon	179,427	1,585	4,202	185,214	177,463	.96	167	313
Cole, Howard, and Livingston	2,500	1,786	....	4,286	9,564	2.23	195	19
Jackson and Johnson	22,000	10,000	1,500	33,500	77,075	2.30	251	80
Small mines	....	120,000	....	120,000	140,000	......	....	....
Total	2,691,433	289,826	44,555	3,025,814	3,591,945	1.20	212	7,136

Coal product of Missouri in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Adair	237,185	5,429	1,700	244,314	$312,305	$1.28	215	493
Audrain	18,996	24,257	821	44,074	61,040	1.38	205	130
Barton	158,491	5,811	2,290	166,592	208,365	1.25	280	312
Bates	257,681	8,912	4,119	270,712	264,348	.98	172	479
Boone	6,500	12,107	12	18,619	24,288	1.30	216	52
Caldwell	22,000	9,800	2,300	34,100	55,050	1.61	228	94
Callaway	....	16,410	25	16,435	29,730	1.81	192	61
Henry	71,400	9,292	318	81,010	118,772	1.47	219	287
Johnson	4,039	900	....	4,939	4,602	.93	176	15
Lafayette	432,472	17,872	7,514	457,858	740,561	1.62	187	1,486
Linn	55,619	14,946	746	71,311	116,532	1.63	209	240
Macon	816,657	5,750	13,841	836,248	844,616	1.01	239	1,676
Putnam	108,891	1,014	1,721	111,626	149,543	1.34	221	356
Ralls	19,472	548	125	20,145	23,046	1.14	249	55
Randolph	412,673	17,132	12,651	442,456	464,213	1.05	215	903
Ray	207,085	5,195	4,337	216,217	282,299	1.30	199	815
Vernon	316,863	1,101	4,863	322,827	311,297	.96	228	443
Chariton, Grundy, and Livingston	32,424	7,278	997	40,699	79,008	1.94	193	190
Howard and Jackson	7,375	8,900	1,100	17,375	47,400	2.73	251	84
Montgomery and Morgan	1,371	575	200	2,146	3,313	1.54	186	9
Small mines	....	120,000	....	120,000	140,000	......	......	......
Total	3,187,194	293,229	59,680	3,540,103	4,280,328	1.21	214	8,180

The distribution of the coal product of Missouri from 1889 to 1900, inclusive, is shown in the following table:

Distribution of the coal product of Missouri from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total Value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1889	2,246,845	275,999	34,979	2,557,823	$3,479,057	$1.36	......	......
1890	2,449,305	240,237	45,679	2,735,221	3,382,858	1.24	229	5,971
1891	2,350,707	265,595	58,304	2,674,606	3,283,242	1.23	218	6,199
1892	2,399,605	293,414	40,930	2,733,949	3,369,659	1.23	230	5,893
1893	2,525,227	322,754	49,461	2,897,442	3,562,757	1.23	206	7,375
1894	1,955,255	242,501	47,283	2,245,039	2,634,564	1.17	138	7,523
1895	2,104,452	231,090	36,851	2,372,393	2,651,612	1.12	163	6,299
1896	2,047,251	243,029	41,262	2,331,542	2,518,194	1.08	168	5,082
1897	2,384,797	239,686	41,143	2,665,626	2,887,884	1.08	168	6,414
1898	2,393,315	249,662	45,344	2,688,321	2,871,296	1.07	198	6,542
1899	2,691,433	289,826	44,555	3,025,814	3,591,945	1.20	212	7,136
1900	3,187,194	293,229	59,680	3,540,103	4,280,328	1.21	214	8,180

The following table shows the production, by counties, for the last five years, with the increases and decreases in 1900 as compared with 1899:

Coal production in Missouri since 1896, by counties.

[Short tons.]

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Adair	25,738	33,811	74,796	175,452	244,314	68,862	....
Audrain	21,857	45,972	30,976	45,907	44,074	....	1,833
Barton	13,731	54,400	70,551	111,468	166,592	55,124	....
Bates	452,435	335,778	318,973	456,797	270,712	....	186,085
Boone	14,751	9,180	13,779	20,280	18,619	....	1,661
Caldwell	21,800	40,800	25,000	48,100	34,100	....	14,000
Callaway	40,709	29,118	21,215	23,210	16,435	....	6,775
Cole	....	2,500	2,000	2,500	....	....	2,500
Grundy	34,602	40,508	39,532	42,071	39,239	....	2,832
Henry	35,505	44,276	39,082	95,071	81,010	....	14,061
Jackson	27,960	17,674	40,000	32,000	16,700	....	15,300
Johnson	200	....	3,700	1,500	4,939	3,439	....
Lafayette	258,177	325,798	301,066	369,253	457,858	88,605	....
Linn	64,504	81,598	68,643	84,928	71,311	....	13,617
Livingston	706	....	4,500	1,150	1,200	50	....
Macon	459,778	573,556	742,413	539,543	836,248	296,705	....
Moniteau	250	....	....	....	....	....	....
Montgomery	12,106	19,865	1,200	1,855	375	....	1,480
Morgan	200	6,000	....	....	1,771	1,771	....
Pettis	....	800	....	....	....	....	....
Putnam	87,740	102,922	117,059	134,655	111,626	....	23,029
Ralls	10,628	8,700	7,980	22,640	20,145	....	2,495
Randolph	255,713	311,099	253,558	304,962	442,456	137,494	....
Ray	129,356	182,240	210,961	206,622	216,617	9,995	....
Saline	400	....	....	....	....	....	....
St. Clair	80	....	....	....	....	....	....
Vernon	242,616	279,031	181,337	185,214	322,827	137,613	....
Other counties and small mines	120,000	120,000	120,000	120,636	120,935	299	....
Total	2,331,542	2,665,626	2,688,321	3,025,814	3,540,103	*a* 514,289	....

a Net increase.

The annual production since 1873 has been as follows:

Coal product of Missouri since 1873.

Year.	Short tons.	Year.	Short tons.
1873	784,000	1887	3,209,916
1874	789,680	1888	3,909,967
1875	840,000	1889	2,557,823
1876	1,008,000	1890	2,735,221
1877	1,008,000	1891	2,674,606
1878	1,008,000	1892	2,773,949
1879	1,008,000	1893	2,897,442
1880	1,680,000	1894	2,245,039
1881	1,960,000	1895	2,372,393
1882	2,240,000	1896	2,331,542
1883	2,520,000	1897	2,665,626
1884	2,800,000	1898	2,688,321
1885	3,080,000	1899	3,025,814
1886	1,800,000	1900	3,540,103

MONTANA.

Total product in 1900, 1,661,775 short tons; spot value, $2,713,707.

Montana is one of twenty-three States whose output in 1900 was the largest in the history of the State. The year of previous largest production was in 1897, when the product was within 15,000 tons of the output in 1900. There were two previous years in which the value of the product exceeded that of 1900; these were in 1895, when the coal product was valued at $2,850,906, and in 1897, when it was $2,897,408.

One of the most interesting features connected with the coal-mining industry in Montana was the large percentage of product which was obtained by coal-mining machines. In this respect Montana leads among all the coal-producing States. In 1900 63 per cent of the total product was mined by the use of machines, as against 56.4 per cent in 1899, and 46 per cent in 1898, the number of machines in use increasing from 62 in 1898 to 75 in 1899 and to 81 in 1900. The machine-mined product in the same years, respectively, was 681,613, 843,710, and 1,045,115 tons. The pick or puncher machines seemed to be in greater favor in Montana than the chain breast machines, as out of the 81 machines in use in 1900 69 were of the pick or puncher pattern to 12 chain machines.

The industry in Montana during 1900 was practically free from any labor disturbances. There was only one mine in which a strike occurred and this was of comparatively short duration—41 days, 40 men being idle for that length of time.

The production, by counties, in 1899 and 1900, together with the distribution of the product for consumption, and the statistics of labor employed are shown in the following tables:

Coal product of Montana in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Carbon	318,451	7,174	11,900	....	337,525	$456,518	$1.35	310	490
Cascade	881,837	9,790	18,849	54,902	965,378	1,522,700	1.58	212	1,496
Choteau	1,550	5,335	....	....	6,885	18,143	2.64	118	33
Fergus	....	900	....	....	900	2,700	3.00	138	8
Park	41,000	3,350	1,500	83,000	128,850	262,062	2.03	270	251
Gallatin, Granite, Lewis and Clarke, Meagher	51,776	3,137	2,000	....	56,913	85,634	1.50	227	100
Total	1,294,614	29,686	34,249	137,902	1,496,451	2,347,757	1.57	238	2,378

Coal product of Montana in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Carbon	381,672	6,163	6,042	....	393,877	$519,015	$1.32	258	610
Cascade	1,002,884	12,747	48,588	59,176	1,123,395	1,836,382	1.63	257	1,322
Choteau	....	5,679	78	....	5,757	14,838	2.58	117	33
Park	9,900	875	775	74,475	86,025	255,700	2.97	232	315
Fergus, Gallatin, Granite, and Lewis and Clarke	51,000	1,350	371	....	52,721	87,772	1.66	244	96
Total	1,445,456	26,814	55,854	133,651	1,661,775	2,713,707	1.63	252	2,376

The distribution of the product for consumption during the last twelve years has been as follows:

Distribution of the coal product of Montana from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	314,372	12,917	5,436	30,576	363,301	$880,773	$2.42	....	....
1890	466,016	23,427	4,034	24,000	517,477	1,252,492	2.42	....	1,251
1891	501,503	5,395	6,438	28,525	541,861	1,228,630	2.27	....	1,119
1892	521,521	4,866	1,849	36,412	564,648	1,330,847	2.36	258	1,158
1893	789,516	27,063	17,960	57,770	892,309	1,772,116	1.99	242	1,401
1894	861,171	12,900	17,324	36,000	927,395	1,887,390	2.04	192	1,782
1895	1,404,862	19,168	20,463	59,700	1,504,193	2,850,906	1.89	223	2,184
1896	1,314,873	27,476	17,676	183,420	1,543,445	2,279,672	1.47	234	2,335
1897	1,434,858	29,707	18,410	164,907	1,647,882	2,897,408	1.76	252	2,337
1898	1,261,814	29,493	19,386	169,110	1,479,803	2,324,207	1.57	216	2,359
1899	1,294,614	29,686	34,249	137,902	1,496,451	2,347,757	1.57	238	2,378
1900	1,445,456	26,814	55,854	133,651	1,661,775	2,713,707	1.63	252	2,376

In the following table is shown a statement of the amount and value of the coal product in Montana since 1896, with the increases and decreases in 1900 as compared with 1899:

Product and value of Montana coal since 1896, by counties.

County.	1896.		1897.		1898.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Carbon	235,328	$424,205	245,761	$360,818	272,396	$393,884
Cascade	1,101,298	1,473,532	1,138,590	1,999,104	988,821	1,523,932
Choteau	5,051	18,915	4,845	12,340	6,537	15,587
Fergus	....	....	....	....	950	2,337
Gallatin	108,460	214,535	132,413	223,024	63,626	102,712
Dawson	....	....	2,800	6,250		
Lewis and Clarke	56	250	....	....	319	785
Meagher	120	360	584	1,800		
Park	93,132	147,875	122,889	294,072	147,154	284,970
Total	1,543,445	2,279,672	1,647,882	2,897,408	1,479,803	2,324,207

County.	1899.		1900.		Increase, 1900.		Decrease, 1900.	
	Product.	Value.	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Carbon	337,525	$456,518	393,877	$519,015	56,352	$62,497	....	....
Cascade	965,378	1,522,700	1,123,395	1,836,382	158,017	313,682	....	....
Choteau	6,885	18,143	5,757	14,838	....	....	1,128	$3,305
Fergus	900	2,700	900	2,700	....	....	....	....
Gallatin	56,671	84,961	51,671	84,472	....	....	5,000	489
Park	128,850	262,062	86,025	255,700	....	....	42,825	6,362
Other counties	242	673	150	600	....	....	92	73
Total	1,496,451	2,347,757	1,661,775	2,713,707	a165,324	a365,950	....	....

a Net increase.

Since 1883 the total product of the State has been as follows:

Coal product of Montana since 1883.

Year.	Short tons.	Value.	Year.	Short tons.	Value.
1883	19,795	....	1892	564,648	$1,330,847
1884	80,376	....	1893	892,309	1,772,116
1885	86,440	....	1894	927,395	1,887,390
1886	49,846	....	1895	1,504,193	2,850,906
1887	10,202	....	1896	1,543,445	2,279,672
1888	41,467	....	1897	1,647,882	2,897,408
1889	363,301	....	1898	1,479,803	2,324,207
1890	517,477	$1,252,492	1899	1,496,451	2,347,757
1891	541,861	1,228,630	1900	1,661,775	2,713,707

NEBRASKA.

The southwestern corner of Nebraska contains a portion of the western coal field, but the veins of coal being on the edge of the field are pinched to thin seams, varying from 6 to 22 inches. Some coal has been taken out for local consumption, but with the development of the fields of Iowa, Kansas, and Missouri, more favored both as to quality and conditions for economical mining, and with the operators of these mines seeking a market for their surplus product, such little work as has been done on Nebraska coal deposits has been practically abandoned. A small amount (3,560 short tons) was mined in Dixon County in 1896, all of which was consumed locally. The product in 1897 fell off to 495 tons, and no output was obtained in 1898, 1899, nor 1900.

NEVADA.

No product has been reported from this State since 1894, when a small amount (150 short tons) was mined in Esmeralda County.

NEW MEXICO.

Total product in 1900, 1,299,299 short tons; spot value, $1,776,170.

New Mexico attained a total production in 1899 exceeding 1,000,000 tons for the first time in its history, the product for that year amounting to 1,050,714 short tons. The production for 1900 added nearly one-quarter of a million tons to this product, the actual figures being 248,585 short tons, or nearly 25 per cent. The increase in value was $314,705, or 21.5 per cent, indicating a slight decline in the average price per ton.

There was an increase of 50 per cent, or from 14 to 21, in the number of mining machines in use in the Territory, but a decided falling off in the amount of coal mined by their use, the machine-mined tonnage in 1900 being less than half of that of the preceding year. This decrease was due to the encountering of some serious faults in the mines in which the largest number of machines were employed and which caused the temporary abandonment of their use. The fact that the number of machines in use during the year was larger than in 1899 indicates that under normal conditions their use is economical, and an increased output by mining machines may be looked for when the present difficulties have been surmounted. There were no strikes reported in the Territory in 1900 nor in 1899, the steady employment having shown its effect to some extent in the increased production.

The details of production in the last two years have been as follows:

Coal product of New Mexico in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bernalillo	488,400	1,602	3,308	493,310	$696,666	$1.41	247	852
Colfax	356,080	8,134	4,159	368,373	439,984	1.19	294	412
Lincoln	8,837	3,582	318	12,737	24,838	1.95	112	133
Rio Arriba, San Juan, Santa Fe, Socorro	168,484	810	7,000	176,294	300,377	1.70	292	353
Total	1,021,801	14,128	14,785	1,050,714	1,461,865	1.39	257	1,750

Coal product of New Mexico in 1900, by counties.

Counties.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Bernalillo	425,864	3,630	21,152	....	450,646	$610,556	$1.35	258	811
Colfax	348,164	5,595	7,388	27,333	388,480	432,146	1.11	278	410
Lincoln	143,479	3,998	2,965	....	150,442	300,884	2.00	277	223
Rio Arribo	44,000	1,200	600	....	45,800	62,900	1.37	275	74
San Juan, Santa Fe, Socorro	236,782	1,151	25,998	....	263,931	369,684	1.41	244	519
Total	1,198,289	15,574	58,103	27,333	1,299,299	1,776,170	1.37	261	2,037

Distribution of the coal product of New Mexico from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	466,127	8,953	6,383	6,000	486,463	$870,468	$1.79	....	....
1890	358,332	11,360	6,085	....	375,777	504,390	1.34	192	827
1891	448,612	3,471	6,245	4,000	462,328	779,018	1.68	265	806
1892	645,557	8,776	6,997	....	661,330	1,074,601	1.62	223	1,083
1893	636,002	5,618	8,776	14,698	665,094	979,044	1.47	229	1,011
1894	561,523	8,266	14,365	13,042	597,196	935,857	1.57	182	985
1895	695,634	13,045	11,292	683	720,654	1,072,520	1.49	190	1,383
1896	607,319	6,677	7,446	1,184	622,626	930,381	1.49	172	1,559
1897	689,423	7,844	19,714	....	716,981	991,611	1.38	208	1,659
1898	949,903	7,660	17,601	17,124	992,288	1,344,750	1.35	242	1,873
1899	1,021,801	14,128	14,785	....	1,050,714	1,461,865	1.39	257	1,750
1900	1,198,289	15,574	58,103	27,333	1,299,299	1,776,170	1.37	261	2,037

Coal product of New Mexico since 1896, by counties.

[Short tons.]

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Bernalillo	271,137	332,488	445,558	493,310	450,646	....	42,664
Colfax	179,415	163,463	269,215	368,373	388,480	20,107	....
Lincoln	2,535	75	....	12,737	150,442	137,705	....
Rio Arriba	8,200	a 12,300	31,000	32,000	45,800	13,800	....
Santa Fe	a 161,339	208,655	246,215	137,534	252,731	115,197	....
Other counties	....	....	300	6,760	11,200	4,440	....
Total	622,626	716,981	992,288	1,050,714	1,299,299	b 248,585	42,664

a Including San Juan County. b Net increase.

Coal product of New Mexico since 1882.

Year.	Short tons.	Value.	Year.	Short tons.	Value.
1882	157,092	....	1892	661,330	$1,074,251
1883	211,347	....	1893	665,094	979,044
1884	220,557	....	1894	597,196	935,867
1885	306,202	$918,606	1895	720,654	1,072,520
1886	271,285	813,855	1896	622,626	930,381
1887	508,034	1,524,102	1897	716,981	991,611
1888	626,665	1,879,995	1898	992,288	1,344,750
1889	486,913	872,628	1899	1,050,714	1,461,865
1890	375,777	504,390	1900	1,299,299	1,776,170
1891	462,328	779,018			

NORTH CAROLINA.

Total product in 1900, 17,734 short tons; spot value, $23,447.

The entire production of North Carolina in 1900, as for several years past, was from the Cumnock mines, in Chatham County. The output in 1900 was one-third less than that of 1899.

Coal product of North Carolina for ten years.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1891	18,780	600	975	20,335	$39,635	$1.93	254	80
1892	6,679	....	....	6,679	9,599	1.44	160	90
1893	15,000	....	2,000	17,000	25,500	1.50	80	70
1894	13,500	1,000	2,400	16,900	29,675	1.76	145	95
1895	23,400	600	900	24,900	41,350	1.66	226	61
1896	5,356	295	2,162	7,813	11,720	1.50	220	18
1897	21,280	....	....	21,280	27,000	1.34	215	51
1898	9,852	304	1,339	11,495	14,368	1.25	....	....
1899	24,126	486	2,284	26,896	34,965	1.30	210	70
1900	14,757	492	2,485	17,734	23,447	1.32	151	84

The history of coal mining in the State dates from 1889. The Egypt mines, now called the Cumnock, were opened in December of that year, and yielded 192 tons. Since that time the product annually has been as follows:

Coal product of North Carolina since 1889.

Year.	Short tons.	Value.	Year.	Short tons.	Value.
1889	192	$451	1895	24,900	$41,350
1890	10,262	17,864	1896	7,813	11,720
1891	20,355	39,635	1897	21,280	27,000
1892	6,679	9,599	1898	11,495	14,368
1893	17,000	25,500	1899	26,896	34,965
1894	16,900	29,675	1900	17,734	23,447

NORTH DAKOTA.

Total production in 1900, 129,883 short tons; spot value, $158,348.

The utilization of the lignite coals of North Dakota appears to be steadily increasing, the production in 1900 showing an increase over that of the preceding year of 31,074 short tons, or 31.5 per cent. The value increased somewhat more in proportion, from $117,500 to $158,348, a gain of $40,848, or nearly 34.8 per cent.

Of the total product in 1900, 33,965 tons were mined by the use of machines, a decrease from 38,066 tons of machine-mined product in 1899.

The statistics of production are shown in the following tables:

Coal product of North Dakota in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Burleigh	500	1,050	....	1,550	$1,395	$0.90	93	10
Emmons	....	725	....	725	1,820	2.51	85	5
McLean	....	2,480	....	2,480	2,459	.99	147	9
Morton	17,400	1,400	50	18,850	19,190	1.02	153	30
Stark	22,700	4,200	....	26,920	28,015	1.04	191	29
Ward	37,131	10,913	240	48,284	64,621	1.34	154	127
Total	77,731	20,788	290	98,809	117,500	1.19	154	210

Coal product of North Dakota in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Burleigh and Emmons	6,000	3,425	185	9,610	$10,385	$1.08	55	69
McLean		3,154		3,154	4,374	1.39	142	14
Morton	23,553	3,540	335	27,428	28,880	1.05	163	57
Stark	26,000	2,050	1,000	29,050	28,390	.98	219	39
Ward	51,031	9,560	50	60,641	86,319	1.42	155	147
Total	106,584	21,729	1,570	129,883	158,348	1.22	142	326

Distribution of the coal product of North Dakota from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
1889	18,610	10,297		28,907	$41,431	$1.43		
1890		30,000		30,000	42,000	1.40		
1891		30,000		30,000	42,000	1.40		
1892	38,000	2,725		40,725	39,250	.96	216	54
1893	47,968	1,612	50	49,630	56,250	1.13	193	88
1894	37,311	4,480	224	42,015	47,049	1.12	156	77
1895	35,380	3,617		38,997	41,646	1.07	143	62
1896	71,447	6,183	420	78,050	84,908	1.09	166	141
1897	65,032	10,458	1,756	77,246	83,803	1.08	168	170
1898	71,223	11,525	2,147	83,895	93,591	1.12	187	151
1899	77,731	20,788	290	98,809	117,500	1.19	154	210
1900	106,584	21,729	1,570	129,883	158,348	1.22	142	326

Coal product of North Dakota since 1884.

Year.	Short tons.	Year.	Short tons.
1884	35,000	1893	49,630
1885	25,000	1894	42,015
1886	25,955	1895	38,997
1887	21,470	1896	78,050
1888	34,000	1897	77,246
1889	28,907	1898	83,895
1890	30,000	1899	98,809
1891	30,000	1900	129,883
1892	40,725		

OHIO.

Total product in 1900, 18,988,150 short tons; spot value, $19,292,246.

Ohio occupies fourth place in the list of coal-producing States, and until displaced by West Virginia in 1896 was third. The production of West Virginia in 1900 exceeded that of Ohio by 3,659,057 tons. When the value of the product is considered, however, Ohio ranks above West Virginia, and consequently third among the coal-producing States.

Compared with 1899, the coal product of Ohio in 1900 shows an increase of 2,487,880 short tons, or 15 per cent. The gain in 1899 over 1898 was 1,983,403 short tons, so that the gain in 1900 over 1898 amounted to 4,471,283 short tons, or about 27 per cent. This increase in production has been accompanied by a still larger proportionate increase in value. The average price per ton, which had for several years shown a declining tendency, advanced from 83 cents in 1898 to 87 cents in 1899, and to $1.02 in 1900. The gain in total value in 1900 over 1899 was $4,930,343, or 34 per cent, as compared with a gain of 15 per cent in tonnage. There was a gain of 19 per cent in the value of the product in 1899 over 1898 as compared with an increase of 14 per cent in the tonnage.

There was a considerable increase in the use of machines for mining coal in Ohio during 1900, which, taken into consideration with a decrease in the machine-mined tonnage of Illinois, makes Ohio stand second, or next to Pennsylvania, in the total amount of machine-mined coal. The number of machines in use in Illinois is larger than the number of machines reported for Ohio, but the latter State produced in 1900 3,750,000 tons by the use of machines in excess of Illinois's machine-mined product. The total number of machines reported for Ohio in 1900 is 341, a gain of 63 over 1899. The machine-mined tonnage increased from 6,822,524 to 8,835,743 short tons, a gain of about 30 per cent. There was only one State in which the percentage of the machine-mined product to the total output was larger than that of Ohio. This was Montana, whose machine-mined product was equal to 63 per cent of the total, and only a little over 46 per cent of Ohio's product was so mined.

Strikes occurred in 34 mines during 1900, but the average time lost was comparatively small and not enough to affect the industry as a whole. The total number of men made idle by reason of strikes was 2,035, and the average time lost was 22.3 days per man, or a total of 45,547 working days. In 1899 strikes were reported in 15 mines, affecting 877 men for an average of about thirty days each.

PRODUCTION BY COUNTIES.

There were four counties in Ohio whose product during 1900 exceeded 2,000,000 tons. These were Athens, Hocking, Jackson, and Perry. Five others—Belmont, Guernsey, Jefferson, Stark, and Tuscarawas—exceeded 1,000,000 tons, and one other, Columbiana, had a production exceeding 500,000 tons. The statistics for 1900 show that both Hocking and Perry counties exceeded Jackson in the amount of coal produced, Jackson County having had the largest production in 1899. Hocking County took first place in 1900, with Perry second, Jackson third, and Athens fourth. The largest gain in 1900 over 1899 was made in Perry County, whose product increased 629,304 tons, or 36.3 per cent. The next largest gain was in Hocking County, 499,740 tons; Athens County gained 497,479 tons, and Guernsey County, 289,341 tons. There were 17 counties in which the production increased in 1900, and 10 in which a decrease was reported. The most notable decrease was in Columbiana County, where the production fell off 192,915 tons, or 21.8 per cent. Athens, Hocking, and Perry counties, combined, form what is popularly known as the Hocking Valley region. These three counties produced in 1900 7,166,916 tons, or nearly 38 per cent of the State's total. The production of the Hocking Valley region in 1899 amounted to 5,540,393 short tons, above which the production in 1900 shows an increase of 1,626,523 tons, or nearly 30 per cent. The increase in the Hocking Valley region over 1899 was equal to nearly 60 per cent of the total increase in the State.

The details of production, by counties, in 1899 and 1900, together with the distribution of the product for consumption, are presented in the following tables:

Coal product of Ohio in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Athens	1,709,923	3,198	59,600	13,320	1,786,041	$1,389,136	$0.78	189	2,963
Belmont	1,044,282	194,123	3,978	....	1,242,383	944,870	.76	234	1,837
Carroll	217,424	8,467	1,300	....	227,191	181,255	.80	180	445
Columbiana	795,600	78,679	10,900	....	885,179	820,930	.93	250	1,422
Coshocton	365,920	25,743	710	....	392,373	355,888	.91	231	647
Guernsey	1,543,127	5,720	14,139	....	1,562,986	1,061,453	.68	227	1,693
Harrison	....	1,380	10	....	1,390	1,354	.97	143	7
Hocking	1,995,844	14,141	8,880	....	2,018,865	1,497,461	.74	182	2,565
Jackson	1,964,733	39,770	27,730	....	2,032,233	2,131,422	1.05	184	3,894
Jefferson	782,228	134,170	6,776	1,040	924,214	707,648	.77	265	1,139
Lawrence	102,056	14,746	170	....	116,972	110,125	.94	211	297
Mahoning	30,974	12,057	875	....	43,906	45,543	1.04	198	107
Medina	175,571	10,400	5,380	....	191,351	224,095	1.17	210	414
Meigs	168,745	102,878	2,107	....	273,730	231,576	.85	218	546
Morgan	24,855	....	50	....	24,905	20,749	.83	120	75
Muskingum	85,784	56,561	300	....	142,645	117,499	.82	200	338
Perry	1,617,377	89,895	28,215	....	1,735,487	1,366,056	.79	166	2,799
Stark	1,009,568	45,302	24,358	....	1,079,228	1,375,690	1.27	185	2,350
Summit	66,439	1,549	714	....	68,702	86,564	1.26	150	233
Tuscarawas	932,284	41,856	5,291	....	979,431	783,324	.80	202	1,583
Vinton	69,639	740	1,460	....	71,839	70,204	.98	184	166
Washington	3,900	4,408	14	....	8,322	8,322	1.00	139	27
Gallia, Scioto	17,554	1,220	....	....	18,774	15,150	.81	207	39
Geauga, Portage, Trumbull	103,472	4,774	7,407	....	115,653	164,913	1.43	190	337
Noble, Wayne	53,594	1,248	1,628	....	56,470	50,676	.90	221	115
Small mines	....	500,000	....	....	500,000	600,000	....	....	....
Total	14,880,893	1,393,025	211,992	14,360	16,500,270	14,361,903	.87	200	26,038

Coal product of Ohio in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Athens	2,198,912	7,570	61,494	15,544	2,283,520	$2,083,222	$0.90	212	3,280
Belmont	1,089,553	195,694	5,505	54,532	1,345,284	1,221,215	.91	207	1,877
Carroll	160,941	3,880	2,700	....	167,521	183,940	1.10	196	366
Columbiana	659,394	19,101	13,769	....	692,264	702,586	1.01	224	1,151
Coshocton	334,633	18,465	216	....	353,314	375,352	1.06	222	607
Guernsey	1,818,025	7,995	26,307	....	1,852,327	1,550,501	.85	230	2,191
Harrison	4,842	1,500	....	....	6,342	6,864	1.08	33	68
Hocking	2,482,018	3,688	32,899	....	2,518,605	2,294,759	.91	241	2,928
Jackson	2,221,411	52,650	30,831	....	2,304,892	2,869,294	1.24	216	4,029
Jefferson	953,460	143,575	12,401	1,150	1,110,586	1,061,918	.96	272	1,415
Lawrence	78,325	17,000	100	....	95,425	92,912	.97	160	273
Mahoning	32,452	12,674	1,336	....	46,462	54,548	1.17	176	142
Medina	113,785	13,493	2,635	....	129,913	186,102	1.43	207	240
Meigs	147,867	92,798	1,610	....	242,275	257,917	1.06	188	542
Morgan	23,954	....	50	....	24,004	27,139	1.13	195	73
Muskingum	145,504	38,636	134	....	184,274	182,176	.99	226	321
Perry	2,313,611	22,440	28,740	....	2,364,791	2,107,487	.90	193	3,184
Stark	1,045,059	37,190	34,275	....	1,116,524	1,702,401	1.52	193	2,232
Summit	105,498	2,401	1,456	....	109,355	156,777	1.43	200	244
Tuscarawas	1,164,940	84,416	11,232	....	1,260,588	1,210,480	.96	212	1,875
Vinton	61,991	6,910	....	....	68,901	69,690	1.01	205	140
Gallia, Noble, Scioto, and Washington	71,341	6,320	1,626	....	79,287	72,064	.91	213	142
Portage, Trumbull, and Wayne	119,956	3,868	7,872	....	131,696	222,902	1.69	214	308
Small mines	....	500,000	....	....	500,000	600,000	....	....	....
Total	17,347,472	1,292,264	277,188	71,226	18,988,150	19,292,246	1.02	215	27,628

The distribution of the coal product of Ohio since 1889 is shown in the following table:

Distribution of the coal product of Ohio from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	8,566,223	1,196,872	144,223	69,469	9,976,787	$9,355,400	$0.94	....	19,343
1890	10,161,887	1,164,876	143,984	23,759	11,494,506	10,783,171	.94	201	20,576
1891	11,393,209	1,281,568	140,420	53,486	12,868,683	12,106,115	.94	206	22,182
1892	11,995,256	1,411,642	117,486	38,543	13,562,927	12,722,745	.94	212	22,576
1893	11,713,116	1,348,743	167,002	24,785	13,253,646	12,351,139	.92	188	23,931
1894	10,636,402	1,101,940	126,397	45,117	11,909,856	9,841,723	.83	136	27,105
1895	11,933,686	1,227,224	152,277	42,619	13,355,806	10,618,477	.79	176	24,644
1896	11,494,275	1,181,610	172,722	26,595	12,875,202	10,253,461	.79	161	25,500
1897	10,725,047	1,259,290	192,755	19,850	12,196,942	9,535,409	.78	148	26,410
1898	13,053,427	1,226,184	222,913	14,343	14,516,867	12,027,336	.83	169	26,986
1899	14,880,893	1,393,025	211,992	14,360	16,500,270	14,361,903	.87	200	26,038
1900	17,347,472	1,292,264	277,188	71,226	18,988,150	19,292,246	1.02	215	27,628

It will be observed that the amount of coal made into coke in 1900, though small as compared with some of the other States, was larger in 1900 than in any of the eleven preceding years.

The production by counties for the last five years, with the increases and decreases and the amount and percentage of the increase and decrease in each of them in 1900, as compared with 1899, is given below:

Coal product of Ohio since 1896, by counties.

[Short tons.]

County.	1896.	1897.	1898.	1899.	1900.	Increase 1900.	Decrease 1900.	Per cent of increase.	Per cent of decrease.
Athens	1,398,141	1,153,642	1,651,449	1,786,041	2,283,520	497,479	....	27.9	....
Belmont	919,076	827,420	1,036,102	1,242,383	1,345,284	102,901	....	8.3	....
Carroll	289,117	147,931	230,786	227,191	167,521	....	59,670	....	26.3
Columbiana	534,697	774,736	893,680	885,179	692,264	....	192,915	....	21.8
Coshocton	359,379	343,589	367,292	392,373	353,314	....	39,059	....	10
Gallia	2,080	13,802	11,488	13,536	15,620	2,084	....	15.4	....
Guernsey	955,457	910,554	1,326,480	1,562,986	1,852,327	289,341	....	18.5	....
Harrison	2,504	5,886	29,112	1,390	6,342	4,952	....	356.2	....
Hocking	1,415,468	1,411,907	1,269,786	2,018,865	2,518,605	499,740	....	24.7	....
Jackson	1,629,226	1,562,651	1,770,265	2,032,233	2,304,892	272,659	....	13.4	....
Jefferson	687,912	751,848	800,540	924,214	1,110,586	186,372	....	20.2	....
Lawrence	51,597	87,340	64,849	116,972	95,425	....	21,547	....	18.4
Mahoning	24,693	37,287	35,785	43,906	46,462	2,556	....	5.8	....
Medina	194,104	170,412	249,406	191,351	129,913	....	61,438	....	32.1
Meigs	259,386	184,197	174,216	273,730	242,275	....	31,455	....	11.5
Morgan	16,294	21,965	26,730	24,905	24,004	....	901	....	3.6
Muskingum	112,333	131,606	137,506	142,645	184,274	41,629	....	29.2	....
Perry	1,722,572	1,595,199	1,831,975	1,735,487	2,364,791	629,304	....	36.3	....
Portage	48,377	79,237	82,659	108,008	101,240	....	6,768	....	6.3
Stark	962,618	639,065	888,158	1,079,228	1,116,524	37,296	....	3.5	....
Summit	23,470	52,173	51,722	68,702	109,355	40,653	....	59.2	....
Trumbull	2,280	12,607	1,640	7,575	14,099	6,524	....	86.1	....
Tuscarawas	641,087	626,972	909,857	979,431	1,260,588	281,157	....	28.7	....
Vinton	39,439	54,005	81,274	71,839	68,901	....	2,938	....	4.1
Washington	3,320	2,130	2,958	8,322	5,300	....	3,022	....	36.3
Wayne	55,438	61,773	43,356	13,754	16,357	2,603	....	18.9	....
Noble } Scioto }	25,137	37,008	47,796	*a* 48,024	58,367	10,343	....	21.5	....
Small mines	500,000	500,000	500,000	500,000	500,000	....	....	....	....
Total	12,875,202	12,196,942	14,516,867	16,500,270	18,988,150	2,487,880	....	15.1	....

a Includes Geauga County.

Records of the total production of Ohio are available only since 1872, since which time the annual output has been as follows:

Annual coal product of Ohio since 1872.

Year.	Short tons.	Year.	Short tons.
1872	5,315,294	1887	10,300,708
1873	4,550,028	1888	10,910,951
1874	3,267,585	1889	9,976,787
1875	4,864,259	1890	11,494,506
1876	3,500,000	1891	12,868,683
1877	5,250,000	1892	13,562,927
1878	5,500,000	1893	13,253,646
1879	6,000,000	1894	11,909,856
1880	7,000,000	1895	13,355,806
1881	8,225,000	1896	12,875,202
1882	9,450,000	1897	12,196,942
1883	8,229,429	1898	14,516,867
1884	7,640,062	1899	16,500,270
1885	7,816,179	1900	18,988,150
1886	8,435,211		

OREGON.

Total product in 1900, 58,864 short tons; spot value, $220,001.

Oregon is one of the three States whose product in 1900 was less than that of 1899, the output falling off from 86,888 short tons in 1899 to 58,864 tons in 1900, a decrease of 28,024 tons, or a little over 32 per cent. Nearly all the product in 1900 was from the Newport mine, in Coos County. The statistics for 1900 show that there was a larger number of men employed and for a greater number of days than was shown in the report for 1899. This is attributed to the reopening of the Beaver Hill mine, whose product in 1900, however, was unimportant.

The following tables show the statistics of production in Oregon for the last nine years and the total output since 1885:

Coal product in Oregon since 1892.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average number of employees.	Average number of days worked.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*			
1892	31,760	2,353	548	34,661	$148,546	90	120
1893	37,835	3,594	254	41,683	164,500	110	192
1894	45,068	2,171	282	47,521	183,914	88	243
1895	68,108	5,294	283	73,685	247,901	414	*a* 69
1896	88,116	12,951	654	101,721	294,564	254	191
1897	92,921	5,207	9,161	107,289	291,772	375	200
1898	54,305	3,290	589	58,184	212,184	142	199
1899	78,608	6,656	1,624	86,888	260,917	124	238
1900	48,160	9,590	1,114	58,864	220,001	141	273

a The apparently large number of men employed and small average working time are due to the large force of men employed in developing the Beaver Hill mine, which was producing coal for shipment during only twenty days in 1895. The average time made at the Newport mine was over two hundred days per man.

Coal product of Oregon from 1885 to 1900.

Year.	Short tons.	Year.	Short tons.
1885	50,000	1893	41,683
1886	45,000	1894	47,521
1887	37,696	1895	73,685
1888	75,000	1896	101,721
1889	64,359	1897	107,289
1890	61,514	1898	58,184
1891	51,826	1899	86,888
1892	34,661	1900	58,864

PENNSYLVANIA.

Total product in 1900, 122,509,144 long tons, or 137,210,241 short tons; spot value, $163,196,396.

Anthracite: Total product, 51,221,353 long tons, or 57,367,915 short tons; spot value, $85,757,851.

Bituminous: Total product, 71,287,791 long tons, or 79,842,326 short tons; spot value, $77,438,545.

The combined product of anthracite and bituminous coal in Pennsylvania in 1899 was 120,150,160 long tons, equivalent to 134,568,180 short tons, compared with which the production in 1900 shows an increase of 2,358,984 long tons, or 2,642,061 short tons. The value of the product in 1899 was $144,389,921, compared with which the value of the product in 1900 shows an increase of $18,806,475.

The anthracite production in Pennsylvania was not equal to that of the preceding year, the decrease in output being due to a strike which affected practically the whole region and which began September 17 and lasted until October 27. During this period production in the anthracite region really ceased, and because of it a prospective production of about 5,000,000 tons was practically eliminated. The actual decrease from the production in 1899 was 2,723,294 long tons, or 3,050,090 short tons, in amount, and of $2,384,279 in value.

The bituminous coal-mining industry of Pennsylvania was, on the other hand, practically free from labor troubles, and the statistics for 1900 show an increase over the preceding year of 5,692,151 short tons, or 7.7 per cent. The value of the bituminous production increased from $56,247,791 in 1899 to $77,438,545 in 1900, a net gain of $21,190,754, or 37.7 per cent.

Considering only the marketable sizes, the average price per ton of anthracite coal in Pennsylvania in 1900 was $1.85 per long ton, as against $1.80 in 1899 and $1.75 in 1898. The average price per ton for bituminous coal in 1900 was $0.97, as compared with $0.76 in 1899 and $0.67 in 1898. From this it will be seen that while the price of anthracite coal advanced a little less than 6 per cent in two years, the price of bituminous coal advanced nearly 45 per cent in the same period.

The larger proportion of the anthracite product of Pennsylvania is consumed for domestic purposes, whereas a comparatively small percentage of the bituminous product is so used. It is because of this that the great difference in the advanced price in 1900 is shown. Bituminous coal operators were benefited to a notable extent by the improved industrial conditions, and this was only slightly reflected in the anthracite trade. The combined product of anthracite and bituminous coal in Pennsylvania in 1900 was 51 per cent of the total product in the United States. The value of Pennsylvania's coal product was equivalent to 53 per cent of the total value of the coal produced in the United States in 1900. Pennsylvania so completely outranks every other coal-producing State that comparisons are only of interest when drawn with reference to the ratio of Pennsylvania's output to that of the total product of the United States, or of the combined product of the other States. The total output of anthracite and bituminous coal in Pennsylvania, which in 1900 amounted to 137,210,241 short tons, was nearly five and a half times the output of Illinois, which comes second; more than six times that of West Virginia, which comes third, and more than seven times that of Ohio, which comes fourth. Pennsylvania's product was more than double in 1900 the output of Illinois, Ohio, and West Virginia, together. The product of Pennsylvania coal has always exceeded 50 per cent of the total product of the United States, the lowest percentage being 51, in 1900. In 1880 Pennsylvania produced 65 per cent, or practically two-thirds of the total, and has averaged 55 per cent during the last twenty-one years.

The reduction in the percentage of Pennsylvania in 1900 was due to the strike in the anthracite fields during the fall of 1900. The elimination of about 5,000,000 tons of anthracite, due to the strike, caused an increased consumption of bituminous coal, which was supplied in the East largely by West Virginia coal, and in the West by the soft coal of Ohio, Indiana, and Illinois, and but for these conditions the percentage of Pennsylvania's product would have been equal to that of 1899.

In the following table is shown the total product of Pennsylvania and the United States since 1880, with the percentage of the total produced by Pennsylvania in each year:

Product of Pennsylvania coal compared with total United States since 1880.

Year.	Total United States.	Pennsylvania.	Per cent of Pennsylvania to total.
	Short tons.	*Short tons.*	
1880	71,481,569	47,529,711	65
1881	85,881,030	54,320,018	63
1882	103,285,789	57,254,507	55
1883	115,212,125	62,488,190	54
1884	119,735,051	62,404,488	52
1885	110,957,522	62,137,271	56
1886	112,743,403	62,857,210	56
1887	129,975,557	70,372,857	54
1888	148,659,402	77,719,624	52
1889	141,229,514	81,719,059	58
1890	157,788,657	88,770,814	56
1891	168,566,668	93,453,921	55
1892	179,329,071	99,167,080	55
1893	182,352,774	98,038,267	54
1894	170,741,526	91,833,584	54
1895	193,117,530	108,216,565	56
1896	191,986,357	103,903,534	54
1897	200,221,665	107,029,654	53
1898	219,974,667	118,547,777	54
1899	253,739,992	134,568,180	53
1900	269,881,827	137,210,241	51

The production of anthracite and bituminous coal is discussed separately in the subsequent pages. The chapter on anthracite production has been prepared, as heretofore, by Mr. William W. Ruley, of Philadelphia, the chief of the Bureau of Anthracite Coal Statistics. Mr. Ruley is thoroughly familiar with the conditions affecting the anthracite trade, and his report for the present year will be found particularly interesting. It discusses in detail the strike which occurred in the anthracite region in the fall of 1900, and the results of this disturbance on the general trade.

PENNSYLVANIA ANTHRACITE.[1]

It is gratifying to note that the favorable conditions surrounding the anthracite industry in the beginning of 1900 pointing to a good year for the trade were not misleading, and that the demand for coal was fully up to what could be reasonably expected; in fact, had there not been a general strike lasting for over a month in the busiest time of the year, there is little doubt that 1900 would have proved a record breaker both as to the tonnage and the total amount received for the product.

As it was, the product amounted to 51,221,353 tons, being only twice exceeded, in the years 1895 and 1899, when the product amounted to 51,785,122 tons and 53,944,647 tons, respectively. It

[1] By Wm. W. Ruley, chief of the Bureau of Anthracite Coal Statistics.

will be seen that the decrease in the 1900 tonnage as compared with the previous year was 2,723,294 tons. This decrease is fully accounted for by the strike which lasted from September 17 to October 27, during the greater part of which time there was practically a complete cessation of operations.

It is reasonable to believe that had not this strike occurred the production in 1900 would have been the largest on record, as the shipments to market from January 1 to the close of August were over 2,000,000 tons in excess of the shipments in the same period of the previous year; and while it does not follow that this entire increase would have been maintained, it is hardly likely that it would have been entirely lost. However, as the strike lasted over a month at a time when the normal monthly production is upward of 5,000,000 tons, this increase was soon obliterated, and a decrease of nearly 3,000,000 tons appeared instead.

As this strike had such a marked influence on the production for the year, it will be considered at some length at the close of the statistical section of this report.

As noted above, the total production of anthracite in 1900 amounted to 51,221,353 tons, made up as follows:

	Tons.
Sent to market	45,276,622
Sold to local trade and employees at the mines	1,078,973
Used for steam and heat at the mines	4,865,758

The last item is largely estimated, as it consists mostly of culm and dirt, some companies keeping only an approximate record of it; and as it is not considered a marketable product, it is not taken into account in making up the valuation of coal at the mines, which includes only coal shipped and that sold to local trade and employees.

The value in 1900 was $85,757,851, an increase in the rate per ton of 5 cents and a decrease of $2,384,279 on the total product, as compared with 1899.

A tabulated statement of production, valuation, average per ton, number of employees, and days worked for the last five years is given below.

Production of anthracite coal from 1896 to 1900.

Year.	Production.	Value.	Average per ton.	Number of employees.	Days worked.
	Long tons.				
1896	48,523,287	$81,748,651	$1.85	148,991	174
1897	46,974,715	79,301,954	1.85	149,557	150
1898	47,663,076	75,414,537	1.75	145,184	152
1899	53,944,647	88,142,130	1.80	139,608	173
1900	51,221,353	85,757,851	1.85	144,206	166

For the purpose of comparison statements are given below showing the production and divisions of same according to counties for the year 1899 and 1900.

Anthracite coal product in 1899, by counties.

	Total product.	Shipments.	Local trade.	Used at mines.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Susquehanna	620,067	566,181	8,886	45,000
Lackawanna	13,602,111	12,489,526	308,420	804,165
Luzerne	19,738,351	17,449,294	498,724	1,790,333
Carbon	1,683,825	1,474,304	23,654	185,867
Schuylkill	12,470,688	10,772,735	193,156	1,504,797
Columbia Sullivan	775,283	728,824	8,606	37,853
Northumberland	4,337,129	3,772,561	83,248	481,320
Dauphin	717,193	569,816	19,915	127,462
Total	53,944,647	47,823,241	1,144,609	4,976,797

Anthracite coal product in 1900, by counties.

	Total product.	Shipments.	Local trade.	Used at mines.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*
Susquehanna	496,432	464,431	9,724	22,277
Lackawanna	12,652,902	11,547,926	276,342	828,634
Luzerne	18,964,491	16,721,735	458,576	1,784,180
Carbon	1,843,886	1,610,738	34,226	198,922
Schuylkill	11,436,981	9,898,949	186,572	1,351,460
Columbia	875,643	794,839	10,953	69,851
Sullivan	175,938	169,138	1,351	5,449
Northumberland	4,180,426	3,639,291	80,879	460,256
Dauphin	594,654	429,575	20,350	144,729
Total	51,221,353	45,276,622	1,078,973	4,865,758

The item spoken of as shipments in this report includes coal actually loaded into cars at the mines for shipment to line points or to tidewater. The accompanying table gives the amount of this coal from the commencement of the anthracite industry to 1900, inclusive, divided according to the three trade regions.

It will be noted in this connection that the shipments from Sullivan County are not included in the table, which gives only coal which is rated commercially as anthracite and carried as such by the railroad companies. In the paragraph treating of the division of the fields into regions mention is made of this Sullivan County coal and of the difficulty in its classification.

Annual shipments from the Schuylkill, Lehigh, and Wyoming regions from 1820 to 1900.

Year.	Schuylkill region.		Lehigh region.		Wyoming region.		Total.
	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.
1820	....	....	365	....	....	....	365
1821	....	....	1,073	....	....	....	1,073
1822	1,480	39.79	2,240	60.21	....	....	3,720
1823	1,128	16.23	5,823	83.77	....	....	6,951
1824	1,567	14.10	9,541	85.90	....	....	11,108
1825	6,500	18.60	28,393	81.40	....	....	34,893
1826	16,767	34.90	31,280	65.10	....	....	48,047
1827	31,360	49.44	32,074	50.56	....	....	63,434
1828	47,284	61.00	30,232	39.00	....	....	77,516
1829	79,973	71.35	25,110	22.40	7,000	6.25	112,083
1830	89,984	51.50	41,750	23.90	43,000	24.60	174,734
1831	81,854	46.29	40,966	23.17	54,000	30.54	176,820
1832	209,271	57.61	70,000	19.27	84,000	23.12	363,271
1833	252,971	51.87	123,001	25.22	111,777	22.91	487,749
1834	226,692	60.19	106,244	28.21	43,700	11.60	376,636
1835	339,508	60.54	131,250	23.41	90,000	16.05	560,758
1836	432,045	63.16	148,211	21.66	103,861	15.18	684,117
1837	530,152	60.98	223,902	25.75	115,387	13.27	869,441
1838	446,875	60.49	213,615	28.92	78,207	10.59	738,697
1839	475,077	58.05	221,025	27.01	122,300	14.94	818,402
1840	490,596	56.75	225,313	26.07	148,470	17.18	864,379
1841	624,466	65.07	143,037	14.90	192,270	20.03	959,773
1842	583,273	52.62	272,540	24.59	252,599	22.79	1,108,412
1843	710,200	56.21	267,793	21.19	285,605	22.60	1,263,598
1844	887,937	54.45	377,002	23.12	365,911	22.43	1,630,850
1845	1,131,724	56.22	429,453	21.33	451,836	22.45	2,013,013
1846	1,308,500	55.82	517,116	22.07	518,389	22.11	2,344,005
1847	1,665,735	57.79	633,507	21.98	583,067	20.23	2,882,309
1848	1,733,721	56.12	670,321	21.70	685,196	22.18	3,089,238
1849	1,728,500	53.30	781,556	24.10	732,910	22.60	3,242,966
1850	1,840,620	54.80	690,456	20.56	827,823	24.64	3,358,899
1851	2,328,525	52.34	964.224	21.68	1,156,167	25.98	4,448,916
1852	2,636,835	52.81	1,072,136	21.47	1,284,500	25.72	4,993,471
1853	2,665,110	51.30	1,054,309	20.29	1,475,732	28.41	5,195,151
1854	3,191,670	53.14	1,207,186	20.13	1,603,478	26.73	6,002,334
1855	3,552,943	53.77	1,284,113	19.43	1,771,511	26.80	6,608,567
1856	3,603,029	52.91	1,351,970	19.52	1,972,581	28.47	6,927,580
1857	3,373,797	50.77	1,318,541	19.84	1,952,603	29.39	6,644,941
1858	3,273,245	47.86	1,380,030	20.18	2,186,094	31.96	6,839,369
1859	3,448,708	44.16	1,628,311	20.86	2,731,236	34.98	7,808,255
1860	3,749,632	44.04	1,821,674	21.40	2,941,817	34.56	8,513,123
1861	3,160,747	39.74	1,738,377	21.85	3,055,140	38.41	7,954,264
1862	3,372,583	42.86	1,351,054	17.17	3,145,770	39.97	7,869,407
1863	3,911,683	40.90	1,894,713	19.80	3,759,610	39.30	9,566,006
1864	4,161,970	40.89	2,054,669	20.19	3,960,836	38.92	10,177,475
1865	4,356,959	45.14	2,040,913	21.14	3,254,519	33.72	9,652,391
1866	5,787,902	45.56	2,179,364	17.15	4,736,616	37.29	12,703,882
1867	5,161,671	39.74	2,502,054	19.27	5,325,000	40.99	12,988,725
1868	5,330,737	38.52	2,502,582	18.13	5,968,146	43.25	13,801,465
1869	5,775,138	41.66	1,949,673	14.06	6,141,369	44.28	13,866,180
1870	4,968,157	30.70	3,239,374	20.02	7,974,660	49.28	16,182,191
1871	6,552,772	41.74	2,235,707	14.24	6,911,242	44.02	15,699,721
1872	6,694,890	34.03	3,873,339	19.70	9,101,549	46.27	19,669,778
1873	7,212,601	33.97	3,705,596	17.46	10,309,755	48.57	21,227,952

Annual shipments from the Schuylkill, Lehigh, and Wyoming regions from 1820 to 1900—Continued.

Year.	Schulykill region.		Lehigh region.		Wyoming region.		Total.
	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.
1874	6,866,877	34.09	3,773,836	18.73	9,504,408	47.18	20,145,121
1875	6,281,712	31.87	2,834,605	14.38	10,596,155	53.75	19,712,472
1876	6,221,934	33.63	3,854,919	20.84	8,424,158	45.53	18,501,011
1877	8,195,042	39.35	4,332,760	20.80	8,300,377	39.85	20,828,179
1878	6,282,226	35.68	3,237,449	18.40	8,085,587	45.92	17,605,262
1879	8,960,829	34.28	4,595,567	17.58	12,586,293	48.14	26,142,689
1880	7,554,742	32.23	4,463,221	19.05	11,419,279	48.72	23,437,242
1881	9,253,958	32.46	5,294,676	18.58	13,951,383	48.96	28,500,017
1882	9,459,288	32.48	5,689,437	19.54	13,971,371	47.98	29,120,096
1883	10,074,726	31.69	6,113,809	19.23	15,604,492	49.08	31,793,027
1884	9,478,314	30.85	5,562,226	18.11	*a* 15,677,753	51.04	30,718,293
1885	9,488,426	30.01	5,898,634	18.65	*a* 16,236,470	51.34	31,623,530
1886	9,381,407	29.19	5,723,129	17.89	*a* 17,031,826	52.82	32,136,362
1887	10,609,028	30.63	4,347,061	12.55	*a* 19,684,929	56.82	34,641,018
1888	10,654,116	27.93	5,639,236	14.78	*a* 21,852,366	57.29	38,145,718
1889	10,486,185	29.28	6,294,073	17.57	*a* 19,036,835	53.15	35,817,093
1890	10,867,822	29.68	6,329,658	17.28	*a* 19,417,979	53.04	36,615,459
1891	12,741,258	31.50	6,381,838	15.78	21,325,240	52.72	40,448,336
1892	12,626,784	30.14	6,451,076	15.40	22,815,480	54.46	41,893,340
1893	12,357,444	28.68	6,892,352	15.99	23,839,741	55.33	43,089,537
1894	12,035,005	29.08	6,705,434	16.20	22,650,761	4.72	41,391,200
1895	14,269,932	30.68	7,298,124	15.69	24,943,421	56.63	46,511,477
1896	13,097,571	30.34	6,490,441	15.03	23,589,473	54.63	43,177,485
1897	12,181,061	29.26	6,249,540	15.00	23,207,263	55.74	41,637,864
1898	12,078,875	28.83	6,253,109	14.92	23,567,767	56.25	41,899,751
1899	14,199,009	29.79	6,887,909	14.45	26,578,286	55.76	47,665,204
1900	13,502,732	29.94	6,918,627	15.33	24,686,125	54.73	45,107,484
Total	393,453,367	....	201,356,844	....	577,202,437	....	1,172,012,648

a Includes Loyalsock field.

As is well known, anthracite coal is prepared for market in a number of sizes, the divisions recognized at the present time in the trade being lump, steamboat, broken or grate, egg, stove, chestnut, pea, buckwheat No. 1, buckwheat No. 2, buckwheat No. 3, and culm.

The sizes broken to chestnut, inclusive, are known as the domestic prepared sizes, and up to a comparatively recent time constituted the bulk of the sales of anthracite coal. In 1875, for instance, the proportion of these sizes amounted to over 75 per cent of the total tonnage shipped; pea to about 6½ per cent, and sizes below pea to practically nothing. There has been, however, a great increase in the use of the smaller sizes; in the case of pea for both domestic and steam purposes, and in the case of buckwheat for steam, so that at present the prepared sizes constitute only about 60 per cent of the total, while the pea amounts to over 14 per cent, and sizes smaller than pea to over 21 per cent.

It is proper to state here that a large proportion of the increase in the small sizes is furnished by the washeries, which have multiplied very rapidly in recent years both in numbers and in output, their output in 1900 being 1,700,000 tons, while in 1895 it was 1,100,000 tons, and in 1890 only 42,000 tons.

These washeries get their supplies from the culm banks, and very little of their product is larger than pea, most of it being buckwheat, which is consumed by manufacturing plants, sometimes mixed with bituminous coal.

As has been customary in previous reports, a tabular arrangement of the various sections of the anthracite fields is given below, and a list of railroads entering the territory:

Geological field or basin.	*Local district.*	*Trade region.*
Northern	Carbondale	Wyoming.
	Scranton	
	Pittston	
	Wilkesbarre	
	Plymouth	
	Kingston	
Eastern middle	Green Mountain	Lehigh.
	Black Creek	
	Hazleton	
	Beaver Meadow	
Southern	Panther Creek	Schuylkill.
	East Schuylkill	
	West Schuylkill	
	Lorberry	
	Lykens Valley	
Western middle	East Mahanoy	
	West Mahanoy	
	Shamokin	

The above-named fields comprise an area of something over 480 square miles, and are located in the eastern middle part of the State, in the counties of Carbon, Columbia, Dauphin, Lackawanna, Luzerne, Northumberland, Schuylkill, and Susquehanna, and are classed under three general divisions, viz, Wyoming, Lehigh, and Schuylkill regions. Geologically they are divided into fields or basins, which are again subdivided into districts.

The Bernice field, in Sullivan County, is not included in any of these regions. The classification of the product of this field is a matter of some contention. The fracture of the coal and some of its physical characteristics are more like some bituminous or semianthracite coals than strict anthracite, but on account of its high percentage of fixed carbon and low percentage of moisture it is classed as anthracite by the Second Pennsylvania Geological Survey, and the product is so included in this report.

The above territory is reached by eleven so-called initial railroads, as follows:

Philadelphia and Reading Railway Company.
Lehigh Valley Railroad Company.
Central Railroad Company of New Jersey.[1]
Delaware, Lackawanna and Western Railroad Company.
Delaware and Hudson Company's Railroad.
Pennsylvania Railroad Company.
Erie and Wyoming Valley Railroad Company.[2]
Erie Railroad Company.
New York, Ontario and Western Railway Company.
Delaware, Susquehanna and Schuylkill Railroad Company.
New York, Susquehanna and Western Railroad Company.[2]

In accordance with the mention in the beginning of the report that some consideration would be given the subject of the general strike last fall, an account thereof is given herewith.

Previous to this strike there was not much organization among the anthracite miners in so far as the United Mine Workers' Union was concerned, although this body was thoroughly organized in many of the bituminous districts throughout the country. In 1900 this organization made a very determined effort to extend its power to the anthracite regions, and succeeded in gaining a considerable membership, although previous to the time of declaring the strike it is not believed it had a large proportion of the miners as members, whatever may have been their sympathies.

The union formulated certain demands, which were made generally on the anthracite producers, with the alternative of a strike. In general these demands were as follows:

The abolition of the company-store system, a reduction in the price of powder to $1.50 per keg, the abolition of company doctors, abolition of sliding scale now in practice in the Lehigh and Schuylkill regions, compliance with the semimonthly pay law, and that all employees be paid in cash; that 2,240 pounds constitute a ton in mining; that an advance of 20 per cent be paid all classes of men now receiving less than $1.50 per day; that all classes of day labor now receiving $1.50, and not exceeding $1.75, shall receive 15 per cent over present wages; that all day labor now receiving more than $1.75 shall be advanced 10 per cent; that no miner shall have at any time more than one breast, gang, or other class of work, and shall get only his legal share of cars.

These demands were formulated on the 27th of August, at a meeting at which the anthracite operators had been asked to send delegates, which was not done.

In addition to the above, mining scales of prices were agreed upon for the several districts, which were to be a part of the above demands.

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[1] Controlled by Philadelphia and Reading Railway Company.
[2] Controlled by Erie Railroad.

After a publication of the demands of the United Mine Workers, a committee representing the mine owners and operators prepared and published the following answers:

The United Mine Workers and their leaders are composed of soft-coal men not familiar with the conditions of anthracite mining. The soft-coal interests would reap the benefit of any trouble or strikes in the anthracite region, and our judgment in refusing to confer with these foreign interests is shown by the methods they pursue and the misstatements they make.

First. That wages have been reduced. The scale of wages paid anthracite miners has not been reduced in over twenty years, notwithstanding numerous periods of business depression and repeated reductions in soft-coal mining regions. Instead, advances have been made in many anthracite mines to meet changing conditions, and this year the anthracite miners have been getting more days of work, and consequently larger earnings, than in many years. In some collieries the miner is paid by the car, the price depending on the character of the vein and size of the car, and consequently varying at different collieries. Other collieries pay by weight, and the price is fixed on the basis of the amount required to make a ton of prepared coal. This takes as much as 3,200 pounds in some cases. The full weight of prepared coal is seldom realized.

Second. The statement that the market prices of coal are higher than in years is false. The average prices are not higher now than in recent years, and are much lower than in 1892. Profits in mining have decreased, owing to increased cost of getting coal from deeper workings, and recently by higher cost of materials. We can not increase the price of coal to the public in order to increase wages, owing to the competition of bituminous coal.

Third. Regarding the price of powder, it is true that the price charged the miner is much above present cost, but the wages of the miner to-day are no less than was agreed when the price of powder was fixed. A miner paying $2.75 per keg for powder gets net earnings as large as the miner in another district paying only $1.50 per keg. Any reduction in the price of powder is equivalent to an advance in wages.

Fourth. The statement that the necessities of life have advanced 30 per cent is also untrue. A careful comparison recently made in the mining region covering a period of ten years shows that prices are generally lower than they were, and as low as they were two years ago.

Fifth. As regards company stores, none of the large companies, such as the Delaware, Lackawanna and Western, Lehigh Valley, Reading, Lehigh and Wilkesbarre, Coxe Brothers, Delaware and Hudson, or Hillside Coal and Iron Company, have any connection with or collect for such stores. The men are paid in cash between the 1st and 20th of each month for the preceding month, and no compulsory collections are made for stores or doctors from the miners. Some small companies having mines at isolated points maintain stores for the convenience of the men. The companies do not force men to pay doctors, but annually contribute to the support of hospitals and relief funds. Wages of miners average $2 to $4 per day, being as high as rates paid for the same class of labor by railroads and other industries.

Sixth. Our investigations show that only about 10 per cent of the laborers employed in the entire anthracite regions are members of the United Mine Workers, and the conservative element among our employees does not desire a strike. We would be pleased if conditions warranted a general advance in wages. Unfortunately they do not. We feel that the United Mine Workers are liable to precipitate an unfortunate and costly struggle between us and our employees, who have in the past met and discussed and adjusted grievances without dictation from outside influences.

Years of experience and practice have made the wages and basis in the different anthracite mines practically uniform in the net wages earned by the miners. We do not court a strike, and would gladly avoid it, and trust that our men will consider carefully before being led further along by promises that can never be realized. Our position is taken after due deliberation and we believe is for the best interests of the workman, his family, the business interests, and ourselves.

On September 8th the officials of the United Mine Workers, at their headquarters at Indianapolis, authorized President Mitchell of that organization to use his judgment in the matter of calling a strike in case their demands were not acceded to, and on the 12th he issued an order to the effect that the men should not go to work September 17th if the demands were not met by the operators.

All outside attempts at arbitration having proved unsuccessful, and the operators declining to meet the demands of the men, the strike was inaugurated on the 17th. Many of the men in the Wyoming region stopped before this, and on this date probably 100,000 out of 140,000 were idle, the Wyoming region being almost wholly shut down. The same was largely true of the Lehigh region, while in the Schuylkill region probably not over 25 per cent of the men stopped work. However, from this time on there were constant accessions to the ranks of the mine workers, and the first week in October saw practically all mines except the Panther Creek operations of the Lehigh Coal and Navigation Company closed down.

About this time some of the larger mining companies posted notices that they would pay a 10 per cent advance in wages, and in cases where the powder question was involved would reduce the price to $1.50 per keg, this reduction, however, to be figured in the 10 per cent advance.

At a convention of delegates representing the United Mine Workers and the miners of the anthracite region, held in Scranton on October 13, the following resolution was adopted:

We would recommend that this convention accept the 10 per cent advance, provided the operators will continue its payment until April 1, 1901, and will abolish the sliding scale in the Lehigh and Schuylkill regions; the scale of wages in the two last-named districts to remain stationary at 10 per cent above the present basis price, and that the companies agree to adjust other grievances complained of with committees of their own employees.

Should this proposition be unacceptable to the operators, we recommend that the convention propose that all questions at issue be submitted to a fair and impartial board of arbitration.

We would further recommend that under no circumstances whatever should there be a resumption of work at any of the collieries until the operators signify their acceptance of this proposition.

A meeting of representatives from the principal coal-mining and transportation companies was held in Philadelphia on October 17. After the meeting the Philadelphia and Reading Coal and Iron Company issued the following statement:

The company hereby withdraws the notice posted October 3, and to bring about practical uniformity in the advance of wages in the several coal regions gives notice that it will suspend the operation of the sliding scale, will pay 10 per cent advance on September wages till April 1, 1901, and thereafter until further notice, and will take up with its mine employees any grievances which they may have.

Later it was announced that the Lehigh Valley Company would issue a similar notice, and that the independent firm of Calvin Pardee & Co. would give out similar statements.

On October 25 President Mitchell issued a statement to the effect that it was considered wise to accept the companies' offer of a 10 per cent advance in wages and the abolition of the sliding scale for paying wages, which had been in operation for many years, and advised the men to return to work October 28 in all cases where the companies employing them agreed to the above terms, provided they should continue to April 1, 1901, and in cases where they did not to stay out until such an agreement was reached.

This practically ended the strike, which lasted from September 17 to October 27, for although there were a number of individual cases where agreements were not reached for some time, the great majority of the men returned to work on the date set.

It will be seen that the mine workers gained only a part of their original demands; in fact, the settlement was a compromise. However, the gain of 10 per cent advance in wages was in itself a substantial one, and with the continued steady employment since that time has resulted in substantial returns to them. But it should be borne in mind that a considerable time must elapse before the loss from a month's idleness is made up by such an advance.

More space has been given to this strike than was originally intended, but as it was the most important one which ever occurred in the anthracite regions, and involved directly and indirectly more than half a million people, and as its effects are likely to be felt for a long time to come, it having in many ways changed the relations of the miners to their employers, it was thought advisable to give, in general, the points involved in the controversy.

PENNSYLVANIA BITUMINOUS COAL.

Total product, 79,842,326 short tons; spot value, $77,438,545.

The most notable feature in connection with the production of coal in Pennsylvania in 1900 was the advance in values. As compared with 1899 the amount of coal produced in 1900 shows an increase of 5,692,151 short tons, or 7.7 per cent. This increase in production, however, falls into insignificance when compared with the increase in value, which rose from $56,247,791 in 1899 to $77,438,545 in 1900, a net gain of $21,190,754, or 37.7 per cent. The average price per ton obtained in 1900 was 97 cents, as compared with 76 cents in 1899. The price obtained in 1900 was the largest recorded in fifteen years, the nearest approach being in 1888, when bituminous coal in Pennsylvania brought an average of 95 cents per ton. From 1888 and during a period of ten years prices gradually declined until, in 1898, the low figure of 67 cents was recorded. A glance at the following tables will show that the increases were general throughout the State. There was not a county in which the price did not advance in 1900, as compared with 1899 or any preceding year of which there are any records, in some cases nearly as much as 50 per cent. The increase in the value of the bituminous coal product of Pennsylvania was greater than the entire coal product of any other coal-producing State, with the exception of Illinois. How much of the advanced price in 1900 was due to consolidations, how much to advanced prices of labor, and how much to the abnormal increase in demand, it is, of course, impossible to determine with any degree of accuracy, but from the general distribution of the increased values it would seem that the prosperous trade conditions reflected in the increased demand are most largely responsible.

As stated before, the total increase in the amount of bituminous coal produced in Pennsylvania in 1900 over 1899 was 5,692,151 short tons. Of this increase 4,866,331, or over 80 per cent, was in the increased product obtained by the use of machines. The machine-mined bituminous product in 1900 in Pennsylvania amounted to 26,867,053 short tons, a little over 50 per cent of the total machine-mined product in the United States. In 1899 the product mined by machines in Pennsylvania was 22,000,722 short tons, and in 1898 it was 16,512,480 short tons. The number of mining machines in use increased from 1,343 to 1,786. The records for 1900 show that there were 73 firms or corporations using machines, as against 103 in 1899. This apparent decrease is to be attributed to the consolidations effected by the formation of the Monongahela River Consolidated Coal and Coke Company and the Pittsburg Coal Company, the former having control of nearly all the river mines and the latter nearly all of the railroad mines in the Pittsburg district. If the mines now under the control of these two companies were to be counted independently, as they were in 1899, the number of establishments for 1900 would be about 147, or double the number shown by the statistics. In 1899 29.67 per cent of the Pennsylvania bituminous coal product was undercut by machines. In 1900 nearly 34 per cent of the product was machine mined. Of the 1,786 machines in use in 1900, 1,199 were pick machines, 585 were chain machines, and 2 were of the long-wall pattern.

The labor troubles which occurred in the bituminous coal mines of Pennsylvania in 1900 were comparatively unimportant. There were 61 mines in which strikes occurred. In one of these the strike lasted but one day. The strike of longest duration was one of sixty days, in the mines of the Merchant Coal Company, Somerset County. The average number of days lost for each man in the bituminous mines of the State was twenty-nine. The number of men made idle was 7,574, about 7 per cent of the total number of men employed in the bituminous coal mines of the State.

PRODUCTION BY COUNTIES.

The counties of Fayette and Westmoreland, constituting the Connellsville coking region, continued at the head of the coal-producing counties of the State. The combined production of these two counties in 1900 amounted to a little over 30,000,000 tons, or about 37½ per cent of the total bituminous product of the State. Fayette County continued to hold first place, although the production in 1900 was only 75,000 tons more than that of Westmoreland County, which comes second. Allegheny County, third in importance in 1900, had a production of 10,051,905 tons, and Cambria County, fourth, is credited with an output in 1900 of 8,190,366 tons. The condition of the iron and steel making industry is reflected very closely in the production of these four counties. A large amount of the coke produced in the Connellsville region is consumed in the Pittsburg district, and a large amount of the coal produced in Allegheny County is also consumed in the Pittsburg district, while the iron and steel establishments at Johnstown draw their supply of fuel largely from Cambria County. The combined product of these four counties in 1900 amounted to 48,278,048 short tons, about 60 per cent of the total product of the State of Pennsylvania, and equivalent to nearly one-fourth of the total bituminous product of the United States. The total increase of these four counties in 1900 over 1899 amounted to 2,306,596 short tons, or a little over 40 per cent of the total increase in the State.

The most important increase in 1900, both in amount and percentage, was made by Somerset County, whose product in 1900 was 1,828,964 short tons, or 62 per cent larger than that of the preceding year. Indiana County was second in the percentage of increase, the product of this county showing a gain of 307,871 tons, or 50 per cent over 1899. Cambria County was second in amount of increase, and Westmoreland County came third. There were four counties in which a decreased production is shown in 1900. These were Elk, with a loss of 295,576 tons, and Washington, with a loss of 131,222 tons, and small losses in Lycoming and McKean counties.

There were nine counties in the State whose production in 1900 exceeded 1,000,000 tons. Eight of these exceeded 4,000,000 tons, six exceeded 5,000,000, and three exceeded 10,000,000 tons each.

Statistics of production by counties in 1899 and 1900, with the distribution of the product for consumption, are shown in the following tables:

Bituminous coal product of Pennsylvania in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Allegheny	9,605,292	299,894	64,469	2,405	9,972,060	$7,390,534	$0.74	224	12,751
Armstrong	1,038,808	9,327	6,254	....	1,054,389	767,634	.73	268	1,364
Beaver	248,722	8,557	1,187	....	258,466	255,486	.99	271	438
Bedford	405,926	3,549	4,066	80,424	493,965	371,113	.75	238	777
Blair	327,881	2,379	4,309	72,787	407,356	325,883	.80	237	639
Butler	204,896	9,100	903	....	214,899	154,890	.72	205	356
Cambria	6,613,653	120,877	63,796	410,508	7,208,834	5,571,157	.77	261	9,188
Center	908,113	2,981	1,554	....	912,648	675,031	.74	218	1,170
Clarion	285,610	1,663	2,480	....	289,753	196,758	.68	239	536
Clearfield	5,808,125	27,297	81,589	334,431	6,251,442	4,319,916	.69	239	7,961
Elk	1,198,411	12,454	11,114	....	1,221,979	697,356	.57	261	1,837
Fayette	4,886,253	134,100	211,137	9,377,799	14,609,289	10,709,428	.73	279	11,517
Huntingdon	338,985	3,336	7,117	8,374	357,812	280,365	.78	256	528
Indiana	557,870	5,383	1,908	51,750	616,911	436,687	.71	210	712
Jefferson	4,698,941	15,539	125,508	1,001,972	5,841,960	3,553,306	.61	228	6,018
Lawrence	178,663	4,374	518	....	183,555	163,364	.89	263	332
Mercer	463,387	4,897	14,440	4,000	486,724	394,644	.81	217	787
Somerset	2,864,116	20,865	31,353	34,009	2,950,343	2,079,466	.70	261	3,575
Tioga	650,562	15,293	4,271	....	670,126	773,208	1.15	164	2,070
Washington	4,909,654	41,146	36,560	....	4,987,360	3,668,194	.74	222	5,648
Westmoreland	7,105,563	177,474	296,943	6,601,289	14,181,269	12,485,659	.88	258	13,939
Bradford, Clinton	252,509	384	516	....	253,409	229,663	.91	274	362
Lycoming, McKean	120,023	4,903	700	....	125,626	148,049	1.18	241	307
Small mines	....	600,000	....	....	600,000	600,000	....	....	....
Total	53,671,963	1,525,772	972,692	17,979,748	74,150,175	56,247,791	.76	245	82,812

Bituminous coal product of Pennsylvania in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Allegheny	9,712,280	234,620	105,005	....	10,051,905	$10,183,414	$1.01	220	14,127
Armstrong	1,239,128	58,747	15,313	....	1,313,188	1,177,681	.90	268	2,000
Beaver	246,270	14,021	2,107	....	262,398	305,424	1.16	241	421
Bedford	395,323	4,974	5,997	163,761	570,055	565,944	.99	206	1,002
Blair	381,913	2,248	4,743	108,088	496,992	522,856	1.05	231	773
Butler	204,425	16,534	745	....	221,704	203,110	.91	220	410
Cambria	7,562,722	130,068	84,639	412,937	8,190,366	8,300,949	1.01	246	10,634
Center	928,366	2,305	1,594	....	932,265	814,801	.87	212	1,314
Clarion	399,712	933	3,994	....	404,639	357,750	.88	234	706
Clearfield	6,194,459	51,440	70,574	304,361	6,620,834	5,846,367	.88	232	8,994
Elk	884,549	25,244	14,029	2,581	926,403	752,140	.81	222	1,375
Fayette	5,247,981	118,263	267,499	9,421,499	15,055,242	14,284,688	.95	251	12,111
Huntingdon	359,539	2,708	6,695	....	368,942	389,941	1.06	243	599
Indiana	825,314	4,002	4,529	90,937	924,782	894,157	.97	237	1,354
Jefferson	5,022,691	26,790	116,024	1,033,785	6,199,290	4,616,225	.74	249	5,913
Lawrence	181,677	5,413	720	....	187,810	216,267	1.15	261	459
Mercer	505,693	5,385	16,992	....	528,070	513,467	.97	227	837
Somerset	4,685,574	11,755	49,430	32,548	4,779,307	4,877,466	1.02	260	5,369
Tioga	909,503	15,952	5,846	....	931,301	1,195,046	1.28	247	1,975
Washington	4,781,072	20,948	54,118	....	4,856,138	4,721,424	.97	217	6,109
Westmoreland	7,596,390	148,241	234,895	7,001,009	14,980,535	15,645,834	1.04	262	15,648
Bradford Clinton	318,819	273	1,854	....	320,946	303,747	.95	296	322
Lycoming McKean	112,700	5,914	600	....	119,214	149,847	1.26	242	240
Small mines	....	600,000	....	....	600,000	600,000	......	....	....
Total	58,696,100	1,506,778	1,067,942	18,571,506	79,842,326	77,438,545	.97	242	92,692

In the following table are exhibited the total production by counties during the last five years, and the increases and decreases in 1900 as compared with 1899:

Bituminous coal product of Pennsylvania since 1896, by counties.

[Short tons.]

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.	Per cent of increase.	Per cent of decrease.
Allegheny	7,856,867	7,216,039	8,889,997	9,972,060	10,051,905	79,845	....	0.8	....
Armstrong	614,932	857,637	818,404	1,054,389	1,313,188	258,799	....	24.5	....
Beaver	127,290	99,546	223,855	258,466	262,398	3,932	....	1.5	....
Bedford	237,414	436,619	456,507	493,965	570,055	76,090	....	15.4	....
Blair	360,987	492,975	404,043	407,356	496,992	89,636	....	20.0	....
Bradford	53,519	41,588	22,508	31,835	32,065	230	....	0.7	....
Butler	230,336	233,689	161,312	214,899	221,704	6,805	....	3.2	....
Cambria	4,649,819	5,416,950	6,740,461	7,208,834	8,190,366	981,532	....	13.6	....
Center	251,665	521,100	714,175	912,648	932,265	19,617	....	2.1	....
Clarion	371,749	247,839	278,131	289,753	404,639	114,886	....	39.6	....
Clearfield	4,812,017	5,479,047	6,055,739	6,251,442	6,620,834	369,392	....	5.9	....
Clinton	134,569	157,333	166,250	221,574	288,881	67,307	....	30.4	....
Elk	807,886	969,503	873,485	1,221,979	926,403	....	295,576	....	24.2
Fayette	8,076,200	9,701,691	12,696,063	14,609,289	15,055,242	445,953	....	3.1	....
Huntingdon	339,597	303,939	312,607	357,812	368,942	11,130	....	3.1	....
Indiana	418,642	541,967	563,791	616,911	924,782	307,871	....	50.0	....
Jefferson	4,508,077	4,697,059	5,625,168	5,841,960	6,199,290	357,330	....	6.1	....
Lawrence	198,666	195,286	185,408	183,555	187,810	4,255	....	2.3	....
Lycoming	83,230	91,735	98,118	101,923	99,000	....	2,923	....	2.9
McKean	33,133	31,527	25,622	23,703	20,214	....	3,489	....	14.7
Mercer	579,069	435,772	316,669	486,724	528,070	41,346	....	8.5	....
Somerset	787,050	924,607	1,846,398	2,950,343	4,779,307	1,828,964	....	62.0	....
Tioga	825,687	938,053	921,760	670,126	931,301	261,175	....	39.0	....
Washington	4,039,976	3,862,661	4,753,673	4,987,360	4,856,138	....	131,222	....	2.6
Westmoreland	8,559,076	9,923,812	11,414,989	14,181,269	14,980,535	799,266	....	5.6	....
Small mines	600,000	600,000	600,000	600,000	600,000	....	....	....	....
Total	49,557,453	54,417,974	65,165,133	74,150,175	79,842,326	6,125,361	433,210	....	....
Net increase	*a* 659,775	4,860,521	10,746,859	8,985,042	5,692,151	5,692,151	....	7.7	....

a Decrease.

The distribution of the product for the last twelve years has been as follows:

Distribution of the bituminous coal product of Pennsylvania from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	24,059,913	1,590,651	332,937	10,190,588	36,174,089	$27,953,315	$0.77	....	53.780
1890	29,288,923	1,473,317	395,837	11,144,096	42,302,173	35,376,916	.84	232	61.333
1891	29,976,914	2,007,348	321,225	10,483,003	42,788,490	37,271,053	.87	223	63.661
1892	32,425,949	2,207,827	356,779	11,704,021	46,694,576	39,017,164	.84	223	66.655
1893	33,322,328	1,934,429	426,122	8,387,845	44,070,724	35,260,674	.80	190	71.931
1894	29,722,803	1,589,595	342,294	8,257,771	39,912,463	29,479,820	.74	165	75.010
1895	35,164,453	1,732,803	468,381	12,851,591	50,217,228	35,980,357	.72	206	71.130
1896	37,696,555	1,570,161	504,224	9,786,513	49,557,453	35,368,249	.71	206	72.625
1897	40,419,846	1,653,049	556,604	11,968,392	54,597,891	37,636,347	.69	205	77.599
1898	48,019,561	1,520,750	732,984	14,891,838	65,165,133	43,352,588	.67	229	79.611
1899	53,671,963	1,525,772	972,692	17,979,748	74,150,175	56,247,791	.76	245	82.812
1900	58,696,100	1,506,778	1,067,942	18,571,506	79,842,326	77,438,545	.97	242	92.692

The following table exhibits the total production since 1873:

Product of bituminous coal in Pennsylvania since 1873.

Year.	Short tons.	Year.	Short tons.
1873	13,098,829	1887	31,516,856
1874	12,320,000	1888	33,796,727
1875	11,760,000	1889	36,174,089
1876	12,880,000	1890	42,302,173
1877	14,000,000	1891	42,788,490
1878	15,120,000	1892	46,694,576
1879	16,240,000	1893	44,070,724
1880	21,280,000	1894	39,912,463
1881	22,400,000	1895	50,217,228
1882	24,640,000	1896	49,557,453
1883	26,880,000	1897	54,417,974
1884	28,000,000	1898	65,165,133
1885	26,000,000	1899	74,150,175
1886	27,094,501	1900	79,842,326

TENNESSEE.

Total product in 1900, 3,708,562 short tons; spot value, $4,223,082.

Since 1893 the coal production in the State of Tennessee has increased with each year, and since 1895 each year's production has been the largest obtained up to that time. The production in 1900 exhibits an increase of 377,903 tons, or 11 per cent over that of 1899, and was almost double the output of 1893. The most notable feature in regard to the production of coal in Tennessee in 1900 was that common to a number of coal-producing States in 1900—the phenomenal increase in value as compared with the increase in production. The total value of the product in 1900 was $4,223,082, a gain of $1,282,438, or 44 per cent over 1899, which in turn showed an increase of 26 per cent in the value of the product over 1898. Prior to 1900 the value of the coal product of Tennessee had not reached as high as $3,000,000 in any one year. The average price per ton in 1900 was $1.14, the highest price obtained since 1889.

The statistics for 1900 show a falling off in the use of mining machines. The number of establishments using machines decreased from 5 in 1899 to 3 in 1900, the number of machines in use decreasing from 22 to 19 and the machine-mined product from 208,033 tons to 176,872 tons. Two-thirds of the machines in use in 1900 were pick machines and one-third were chain machines.

There were 13 mines in Tennessee in which strikes occurred during 1900. The total number of men affected was 1,559 and the total amount of working time lost 67,309 days, an average of forty-three days per man.

The statistics of production during the last two years are shown in the following tables:

Coal product of Tennessee in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Anderson	599,515	32,037	5,662	....	637,214	$569,770	$0.89	266	1,417
Campbell	418,919	6,111	4,687	....	429,717	438,748	1.02	210	1,235
Claiborne	331,047	9,862	3,100	43,490	387,499	319,399	.82	223	615
Cumberland	1,000	80	....	....	1,080	1,200	1.11	11	61
Hamilton	129,172	1,676	1,360	67,022	199,230	196,135	.98	230	320
Marion	228,682	5,562	1,467	103,655	339,366	297,525	.88	264	672
Morgan	254,364	574	....	95,398	350,336	250,501	.72	271	672
Rhea	15,692	2,495	17,318	145,923	181,428	142,127	.78	257	348
Scott	113,389	16,886	6,718	20,263	157,256	151,076	.96	191	370
Grundy, Putnam, Roane, White	352,875	6,568	15,363	268,227	643,033	569,663	.89	309	1,239
Small mines	....	4,500	....	....	4,500	4,500	....	....	....
Total	2,444,655	86,351	55,675	743,978	3,330,659	2,940,644	.88	252	6,949

Coal product of Tennessee in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Anderson	659, 371	6, 725	6, 656	....	672, 752	$718, 113	$1.07	234	1, 580
Campbell	491, 014	8, 243	3, 734	....	502, 991	613, 891	1.22	199	1, 287
Claiborne	333, 567	11, 100	4, 700	43, 332	392, 699	411, 775	1.05	227	625
Hamilton	139, 964	1, 894	1, 870	83, 335	227, 063	278, 661	1.23	236	490
Marion	226, 216	1, 616	3, 092	79, 806	310, 730	408, 658	1.32	233	667
Morgan	301, 809	1, 002	500	84, 831	388, 142	394, 122	1.02	280	683
Rhea	40, 758	2, 075	2, 606	165, 089	210, 528	199, 417	.95	264	697
Scott	69, 901	11, 840	5, 000	13, 597	100, 338	110, 679	1.10	238	368
Cumberland, Grundy, and Putnam	347, 148	3, 213	7, 120	149, 080	506, 561	603, 469	1.19	242	1, 051
Roane and White	198, 505	14, 112	17, 173	162, 468	392, 258	479, 797	1.22	281	798
Small mines	....	4, 500	....	....	4, 500	4, 500	......	....	....
Total	2, 808, 253	66, 320	52, 451	781, 538	3, 708, 562	4, 223, 082	1.14	240	8, 246

The distribution of the product for consumption in the last twelve years was as follows:

Distribution of the coal product of Tennessee from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	1, 334, 424	29, 101	23, 034	539, 130	1, 925, 689	$2, 238, 309	$1.21	....	4, 108
1890	1, 482, 357	41, 932	23, 583	621, 713	2, 169, 585	2, 395, 746	1.10	263	5, 082
1891	1, 626, 964	100, 478	33, 302	652, 934	2, 413, 678	2, 668, 188	1.105	230	5, 097
1892	1, 448, 262	55, 452	17, 037	571, 313	2, 092, 064	2, 355, 441	1.13	240	4, 926
1893	1, 427, 219	42, 560	20, 921	411, 558	1, 902, 258	2, 048, 449	1.08	232	4, 976
1894	1, 571, 406	59, 985	28, 993	520, 495	2, 180, 879	2, 119, 481	.97	210	5, 542
1895	1, 808, 056	51, 923	25, 477	650, 188	2, 535, 644	2, 349, 032	.93	224	5, 120
1896	1, 990, 538	43, 752	40, 343	588, 473	2, 663, 106	2, 281, 295	.86	211	6, 531
1897	2, 150, 179	37, 620	39, 275	661, 775	2, 888, 849	2, 329, 534	.81	221	6, 337
1898	2, 199, 075	37, 971	52, 523	733, 327	3, 022, 896	2, 337, 512	.77	234	6, 643
1899	2, 444, 655	86, 351	55, 675	743, 978	3, 330, 659	2, 940, 644	.88	252	6, 949
1900	2, 808, 253	66, 320	52, 451	781, 538	3, 708, 562	4, 223, 082	1.14	240	8, 246

Below is given the output, by counties, during the last five years, with the increases and decreases in 1900 as compared with 1899.

Coal product of Tennessee since 1896, by counties.

[Short tons.]

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Anderson	456,510	557,696	578,866	637,214	672,752	35,538	....
Campbell	384,337	328,494	325,757	429,717	502,991	73,274	....
Claiborne	203,926	270,927	298,574	387,499	392,699	5,200	....
Cumberland	120	....	....	1,080	199,088	198,008	....
Grundy	330,648	317,924	251,806	305,736	300,198	....	5,538
Hamilton	163,810	211,959	199,828	199,230	227,063	27,833	....
Marion	294,895	312,241	309,665	339,366	310,730	....	28,636
Morgan	217,948	301,694	339,292	350,336	388,142	37,806	....
Putnam	10,900	10,816	11,450	8,586	7,275	....	1,311
Rhea	91,615	139,072	184,239	181,428	210,528	29,100	....
Roane	169,255	173,383	170,556	162,441	181,753	19,312	....
Scott	188,476	88,312	145,216	157,256	100,338	....	56,918
White	146,166	171,831	203,047	166,270	210,505	44,235	....
Other counties and small mines	4,500	4,500	4,600	4,500	4,500	....	....
Total	2,663,106	2,888,849	3,022,896	3,330,659	3,708,562	470,306	92,403
Net increase	127,462	225,743	134,047	307,763	377,903	....	....

The annual output of the State since 1873 has been as follows:

Coal product of Tennessee from 1873 to 1900.

Year.	Short tons.	Year.	Short tons.
1873	350,000	1887	1,900,000
1874	350,000	1888	1,967,297
1875	360,000	1889	1,925,689
1876	550,000	1890	2,169,585
1877	450,000	1891	2,413,678
1878	375,000	1892	2,092,064
1879	450,000	1893	1,902,258
1880	641,042	1894	2,180,879
1881	750,000	1895	2,535,644
1882	850,000	1896	2,663,106
1883	1,000,000	1897	2,888,849
1884	1,200,000	1898	3,022,896
1885	1,440,957	1899	3,330,659
1886	1,714,290	1900	3,708,562

TEXAS.

Total product in 1900, 968,373 short tons; spot value, $1,581,914.

During the last nine years the coal production of Texas has shown an annual increase, the product in 1900 being twice that of 1895, more than three times that of 1893, and more than five times that of 1890.

As compared with 1899 the production in 1900 shows an increase of 84,541 tons, or 9.5 per cent. As was the case in nearly every other coal-producing State, there was an advance in the average price per ton in 1900 as compared with 1899, and the total value shows an increase of $247,019, a little over 18 per cent. During 1897 and 1898 there was one concern which made use of five mining machines, but no machines were reported in use in 1899 or 1900.

There are twelve counties in the State in which coal is produced, but, with the exception of Milam County, there are not more than two mines in any one county. Bituminous coal is produced in the following seven counties: Coleman, Erath, Maverick, Palo Pinto, Parker, Webb, and Wise. Lignite coal is produced in five counties, which are as follows: Bastrop, Medina, Milam, Robertson, and Wood. The total production of bituminous coal in 1900 was 715,461 tons, valued at $1,350,607, against 687,411 short tons, valued at $1,188,177, in 1899. The production of lignite was 252,912 tons, valued at $231,307, against 196,421 tons, valued at $146,718, in the preceding year. The statistics of production in 1899 and 1900 are shown in the following tables:

Coal product of Texas in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bituminous:								
Coleman, Erath, Maverick, Palo Pinto, Parker, Webb, Wise	681,285	350	5,776	687,411	$1,188,177	$1.73	260	2,087
Lignite:								
Bastrop, Medina, Milam, Robertson, Wood	157,881	34,340	4,200	196,421	146,718	.75	229	323
Total	839,166	34,690	9,976	883,832	1,334,895	1.51	256	2,410

Coal product of Texas in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*				
Bituminous:								
Coleman								
Erath								
Maverick								
Palo Pinto	706,033	3,573	5,855	715,461	$1,350,607	$1.89	247	2,443
Parker								
Webb								
Wise								
Lignite:								
Bastrop								
Medina								
Milam	248,488	745	3,679	252,912	231,307	.91	238	401
Robertson								
Wood								
Total	954,521	4,318	9,534	968,373	1,581,914	1.63	246	2,844

In the following table is shown the record of production since 1889:

Coal product of Texas since 1889.

Distribution.	1889.	1890.	1891.	1892.	1893.	1894.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Loaded at mines for shipment	120,602	180,800	169,300	241,005	300,064	417,281
Sold to local trade and used by employees	6,552	1,840	900	4,460	462	2,412
Used at mines for steam and heat	1,062	1,800	1,900	225	1,680	1,155
Total	128,216	184,440	172,100	245,690	302,206	420,848
Total value	$340,617	$465,900	$412,300	$569,333	$688,407	$976,458

Distribution.	1895.	1896.	1897.	1898.	1899.	1900.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
Loaded at mines for shipment	475,157	522,177	621,635	678,732	839,166	954,521
Sold to local trade and used by employees	7,705	12,846	8,357	3,247	34,690	4,318
Used at mines for steam and heat	2,097	8,992	9,349	4,755	9,976	9,534
Total	484,959	544,015	639,341	686,734	883,832	968,373
Total value	$913,138	$896,251	$972,323	$1,139,763	$1,334,895	$1,581,914

UTAH.

Total product in 1900, 1,147,027 short tons; spot value, $1,447,750.

The coal product of Utah in 1900 exceeded a total of 1,000,000 tons for the first time in the history of the State. As compared with 1899 the production in 1900 shows an increase of 360,978 short tons, or nearly 46 per cent, this being, with one exception, the largest percentage of increase made by any of the important coal-producing States. The value of the product increased in slightly less proportion from $997,271 to $1,447,750, a gain of $450,479, or 45 per cent. The average price per ton declined from $1.27 in 1899 to $1.26 in 1900.

Carbon County is by far the most important coal-producing county in the State, 95 per cent of the total product being mined in this county. The statistics of production are shown in the following tables:

Coal product of Utah in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Carbon	719,544	4,972	10,000	5,819	740,335	$926,523	$1.25	283	610
Iron		629			629	1,442	2.29	55	7
Summit	31,262	1,554	3,046		35,862	50,748	1.41	209	78
Uinta		5,478			5,478	12,214	2.23	156	35
Emery, Sanpete	3,075	670			3,745	6,744	1.69	216	13
Total	753,881	13,303	13,046	5,819	786,049	997,271	1.27	265	743

Coal product of Utah in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Carbon	1,036,951	7,145	14,965	28,299	1,087,360	$1,360,835	$1.25	253	1,168
Iron		661	10		671	1,527	2.28	50	11
Summit	42,222	4,818	3,650		50,690	70,404	1.39	250	89
Uinta		3,816	25		3,841	6,504	1.69	122	20
Emery, Sanpete	3,550	915			4,465	8,480	1.90	181	20
Total	1,082,723	17,355	18,650	28,299	1,147,027	1,447,750	1.26	248	1,308

The distribution of the product since 1891 and the total output since 1885 are shown in the following tables:

Distribution of the coal product of Utah since 1891.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1891	315,711	8,233	21,650	25,451	371,045	$666,646	$1.80	....	621
1892	321,431	6,775	6,509	26,298	361,013	562,625	1.56	230	646
1893	350,423	7,649	4,258	50,875	413,205	611,092	1.48	226	576
1894	364,675	11,173	6,892	48,810	431,550	603,479	1.40	199	671
1895	376,479	25,097	7,253	63,027	471,836	617,349	1.31	203	670
1896	340,338	9,171	7,411	61,707	418,627	500,547	1.20	202	679
1897	424,770	22,667	9,198	64,925	521,560	618,230	1.19	204	704
1898	485,716	11,542	9,845	86,606	593,709	752,252	1.27	243	739
1899	753,881	13,303	13,046	5,819	786,049	997,271	1.27	265	743
1900	1,082,723	17,355	18,650	28,299	1,147,027	1,447,027	1.26	246	1,308

Coal product of Utah since 1885.

Year.	Short tons.	Year.	Short tons.
1885	213,120	1893	413,205
1886	200,000	1894	431,550
1887	180,021	1895	471,836
1888	258,961	1896	418,627
1889	236,651	1897	521,560
1890	318,159	1898	593,709
1891	371,045	1899	786,049
1892	361,013	1900	1,147,027

VIRGINIA.

Total product in 1900, 2,393,754 short tons; spot value, $2,123,222.

Virginia belongs in the number of coal-producing States whose output in the last year of the century exceeded that of any year in her previous history. In 1899 the State exceeded for the first time a total of 2,000,000 short tons, and the product for 1900 exceeded that of 1899 by 287,963 tons, or 13.7 per cent. There are only two really important coal-producing counties in the State, Tazewell and Wise. The former increased its production in 1900 by 126,839 tons, and the latter by 130,937 tons, so that the increased tonnage was nearly equally divided. The value of the product in 1900 advanced $818,981, or 62.8 per cent, the average price per ton showing an increase of nearly 50 per cent over that of the preceding year, or from 62 cents in 1899 to 91 cents in 1900. Virginia's coal product in 1900 was more than three times that of either 1890 or 1891. The statistics of the production of coal in Virginia during the last two years are shown in the following tables:

Coal product of Virginia in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Montgomery	7,230	12,785	523	....	20,538	$40,781	$1.99	152	70
Tazewell	603,916	4,127	10,920	225,064	844,027	461,288	.54	219	730
Wise	557,202	5,265	7,561	662,585	1,232,613	793,174	.64	284	1,113
Henrico, Pulaski	7,156	1,457	....	....	8,613	8,998	1.04	110	47
Total	1,175,504	23,634	19,004	887,649	2,105,791	1,304,241	.62	252	1,960

Coal product of Virginia in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Montgomery	6,065	3,594	155	....	9,814	$20,589	$2.10	186	55
Tazewell	722,160	4,310	10,876	233,520	970,866	869,066	.90	222	850
Wise	574,171	37,576	12,592	739,231	1,363,570	1,144,715	.84	245	2,633
Chesterfield, Henrico, Pulaski	32,263	225	17,016	....	49,504	88,852	1.79	255	93
Total	1,334,659	45,705	40,639	972,751	2,393,754	2,123,222	.89	239	3,631

Since 1889 the distribution of the coal product of Virginia has been as follows:

Distribution of the coal product of Virginia from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	732,881	13,179	7,516	112,210	865,786	$804,475	$0.93	....	1,555
1890	608,641	17,002	4,908	153,460	784,011	589,925	.75	296	1,295
1891	583,082	16,685	3,178	133,454	736,399	611,654	.83	246	820
1892	527,304	20,721	6,611	120,569	675,205	578,429	.86	192	836
1893	714,188	20,578	4,609	80,964	820,339	692,748	.84	253	961
1894	1,015,713	21,162	4,690	187,518	1,229,083	933,576	.76	234	1,635
1895	1,024,200	15,173	22,338	306,613	1,368,324	869,873	.63	225	2,158
1896	824,042	40,951	38,540	351,190	1,254,723	848,851	.68	198	2,510
1897	969,973	29,017	43,087	486,225	1,528,302	1,021,918	.67	213	2,344
1898	1,029,185	19,564	16,234	750,291	1,815,274	1,070,417	.59	230	1,855
1899	1,175,504	23,634	19,004	887,649	2,105,791	1,304,241	.62	252	1,960
1900	1,334,659	45,705	40,639	972,751	2,393,754	2,123,222	.89	239	3,631

In the following table is shown the total amount of coal produced in Virginia since 1880:

Coal product of Virginia since 1880.

Year.	Short tons.	Value.	Average price per ton.	Average number of days active.	Average number of employees.
1880	112,000				
1881	112,000				
1882	112,000				
1883	252,000				
1884	336,000				
1885	567,000				
1886	684,951				
1887	825,263				
1888	1,073,000				
1889	865,786	$804,475	$0.93		1,555
1890	784,011	589,925	.75	296	1,295
1891	736,399	611,654	.83	246	820
1892	675,205	578,429	.86	192	836
1893	820,339	692,748	.84	253	961
1894	1,299,083	933,576	.76	234	1,635
1895	1,368,324	869,873	.63	225	2,158
1896	1,254,723	848,851	.68	198	2,510
1897	1,528,302	1,021,918	.67	213	2,344
1898	1,815,274	1,070,417	.59	230	1,855
1899	2,105,791	1,304,241	.62	252	1,960
1900	2,393,754	2,123,222	.89	239	3,631

WASHINGTON.

Total product in 1900, 2,474,093 short tons; spot value, $4,700,068.

Washington is the only one of the Pacific Coast States whose coal product amounts to as much as 1 per cent of the total bituminous output of the United States. It is also the only one of the Pacific Coast States producing true bituminous coal, the entire output of both California and Oregon being of lignite. Some of the Washington coals are also true coking coals, 59,288 tons of the product in 1900 being merged into coke. Some of the coals produced in Washington approach anthracite in character, and some natural coke has also been observed. The production of this State has increased annually since 1894. The output in 1900 was 444,212 tons, or about 22 per cent larger than that of 1899. The value increased from $3,603,989 to $4,700,068, a gain of $1,096,079, or a little over 30 per cent. The average price per ton advanced from $1.78 in 1899 to $1.90 in 1900.

A small amount of coal is mined by the use of machines in this State. The number of machines in use was two, both in 1899 and 1900. The machine-mined product in 1900 was 10,000 short tons, as compared with 14,640 tons in 1899. The statistics of production in 1899 and 1900 are shown in the following tables:

Coal product of Washington in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
King	795,512	10,982	40,809	....	847,303	$1,786,033	$2.11	238	1,434
Kittitas	648,820	5,934	6,456	....	661,210	811,597	1.23	272	912
Pierce	446,429	2,915	12,360	44,681	506,385	969,564	1.91	278	919
Cowlitz, Lewis	150	450	180	......	780	1,620	2.08	62	8
Skagit, Whatcom	7,051	....	1,638	5,514	14,203	35,175	2.48	289	57
Total	1,897,962	20,281	61,443	50,195	2,029,881	3,603,989	1.78	259	3,330

Coal product of Washington in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
King	940,637	18,227	44,237	....	1,003,101	$2,137,380	$2.13	267	1,580
Kittitas	857,808	4,570	11,373	....	873,751	1,313,477	1.50	308	1,105
Pierce	508,250	2,433	13,304	53,140	577,127	1,192,321	2.07	280	911
Cowlitz, Lewis, Skagit, and Whatcom	12,202	890	874	6,148	20,114	56,890	2.83	288	74
Total	2,318,897	26,120	69,788	59,288	2,474,093	4,700,068	1.90	289	3,670

The distribution of the product from 1889 to 1900 has been as follows:

Distribution of the coal product of Washington from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	956,046	15,574	19,958	39,000	1,030,578	$2,393,238	$2.32	....	2,657
1890	1,212,621	17,249	17,019	16,800	1,263,689	3,426,590	2.71	270	2,206
1891	1,008,496	12,025	20,428	15,300	1,056,249	2,437,270	2.31	211	2,447
1892	1,150,865	9,802	40,085	12,675	1,213,427	2,763,547	2.28	247	2,564
1893	1,186,109	18,888	48,506	11,374	1,264,877	2,920,876	2.31	241	2,757
1894	1,030,232	10,822	56,853	8,563	1,106,470	2,578,441	2.33	207	2,662
1895	1,108,868	16,320	43,249	22,973	1,191,410	2,577,958	2.16	224	2,840
1896	1,095,484	16,722	44,613	38,685	1,195,504	2,396,078	2.00	221	2,622
1897	1,347,915	7,149	39,902	39,146	1,434,112	2,777,687	1.94	236	2,739
1898	1,748,411	30,636	56,966	48,558	1,884,571	3,352,798	1.78	270	3,145
1899	1,897,962	20,281	61,443	50,195	2,029,881	3,603,989	1.78	259	3,330
1900	2,318,897	26,120	69,788	59,288	2,474,093	4,700,068	1.90	289	3,670

It will be observed in the following table that there was no county in the State whose production in 1900 was less than that of 1899. The table also shows the production, by counties, during the last six years:

Product of coal in Washington since 1895, by counties.

[Short tons.]

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.
Cowlitz	....	1,263	1,248	1,088	480	500	20
King	435,971	481,710	583,488	785,806	847,303	1,003,101	155,798
Kittitas	281,534	265,953	370,657	566,396	661,210	873,751	212,541
Lewis	....	....	....	760	300	300	....
Pierce	437,029	419,568	458,394	509,142	506,385	577,127	70,742
Skagit	20,326	18,548	13,825	12,226	6,755	10,130	3,375
Whatcom	*a* 16,550	8,462	*a* 6,500	9,153	7,448	9,184	1,736
Total	1,191,410	1,195,504	1,434,112	1,884,571	2,029,881	2,474,093	444,212

a Including Thurston County.

The total production for the State since 1885 has been as follows:

Product of coal in Washington since 1885.

Year.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.				
1885	380,250	....	....	....	....
1886	423,525	$952,931	$2.25	....	....
1887	772,601	1,699,746	2.19	....	1,571
1888	1,215,750	3,647,250	3.00	....	....
1889	1,030,578	2,393,238	2.32	....	2,657
1890	1,263,689	3,426,590	2.71	270	2,006
1891	1,056,249	2,437,270	2.31	211	2,447
1892	1,213,427	2,763,547	2.28	247	2,564
1893	1,264,877	2,920,876	2.31	241	2,757
1894	1,106,470	2,578,441	2.33	207	2,662
1895	1,191,410	2,577,958	2.16	224	2,840
1896	1,195,504	2,396,078	2.00	221	2,622
1897	1,434,112	2,777,687	1.94	236	2,739
1898	1,884,571	3,352,798	1.78	270	3,145
1899	2,029,881	3,603,989	1.78	259	3,330
1900	2,474,093	4,700,068	1.90	289	3,670

WEST VIRGINIA.

Total product in 1900, 22,647,207 short tons; spot value, $18,416,871.

Compared with 1899 the coal production of West Virginia in 1900 shows an increase of 3,394,212 short tons, or 17.6 per cent. The value increased a little over 50 per cent, from $12,053,268 in 1899 to $18,416,871 in 1900, a gain of $6,363,603.

The development of West Virginia as a coal-producing State has been one of the most remarkable features of the coal-mining industry in the last twenty years. During this entire period there was only one year in which the coal production of West Virginia showed a decrease as compared with the preceding year. This was in 1895 and was due to a general strike which prevailed in the Pocahontas region and which caused a loss of about 1,150,000 tons in the two counties, McDowell and Mercer, which constitute West Virginia's portion of that region. The increase in the production of the other counties of the State was not sufficient to offset the decrease in the output of the Pocahontas district. Had it not been for this strike the production of West Virginia would have shown an uninterrupted annual increase for twenty years. As it is the increase has amounted to an average of more than 1,000,000 tons per year during the last twenty years. This State has been gradually approaching the second place as a coal-producing State. It surpassed Ohio as the third coal-producing State in 1895, and has continued in the third place since that date, although in point of value Ohio continues to lead West Virginia. The increased production of West Virginia in 1900 was distributed over almost the entire State, there being only five out of the twenty-one counties in which the production in 1900 was less than that of 1899. These counties were all comparatively unimportant producers, and the total decrease in the five counties was less than 150,000 tons. The largest increase in production in 1900 was in Fayette County, which also is the most important coal-producing county in the State. The next largest increase was in McDowell County, which is the second county in producing importance. Kanawha County, the fourth in rank, was the third in increased production, and Marion County, the third in production, was fourth in the amount of increase. These four counties altogether contributed 2,398,760 tons out of the 3,394,212 tons total increase for the State. The largest percentage of increase was made by Randolph County, whose 1900 product was 3.8 times that of 1899. Barbour County was second in the percentage of increase, the product in 1900 being nearly 2.7 times that of the preceding year.

The use of mining machines showed a substantial increase in West Virginia in 1900. The number of firms using machines increased from 38 in 1899 to 55 in 1900. The number of machines in use was more than doubled, from 154 to 327, and the machine-mined product increased from 1,181,125 tons to 3,418,377 tons.

The coal-mining industry of West Virginia was comparatively undisturbed by labor troubles during 1900. Out of the 265 coal-mining plants in the State strikes occurred in but 12, and most of these were of short duration. The total number of men made idle by reason of strikes was 1,883, the total number of working days lost by them being 44,318, an average of 23.5 days per man. The total amount of time lost in the State on account of strikes in 1900 was less than two-thirds of 1 per cent of the total time made.

In the following tables are shown the statistics of production in 1899 and 1900, with the distribution of the product for consumption:

Coal product of West Virginia in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Barbour	65,255	1,321	396	12,763	79,735	$54,031	$0.68	186	145
Brooke	64,982	12,189	75	....	77,246	56,536	.73	208	141
Fayette	4,118,101	54,526	36,071	831,117	5,039,815	3,197,411	.63	231	7,098
Harrison	597,854	4,737	3,681	34,750	641,022	347,507	.54	230	1,007
Kanawha	1,420,006	40,115	3,859	41,161	1,505,141	1,149,562	.76	198	2,893
McDowell	2,763,298	21,337	11,591	1,494,686	4,290,912	2,366,576	.55	245	3,702
Marion	2,285,972	16,117	7,530	423,542	2,733,161	1,671,061	.61	286	2,651
Marshall	224,127	13,526	1,783	....	239,436	166,008	.69	283	280
Mason	52,540	42,576	2,117	....	97,233	77,610	.80	206	278
Mercer	636,242	5,035	3,020	254,108	898,405	503,874	.56	264	1,016
Mineral	623,380	2,987	2,172	....	628,539	458,346	.73	277	530
Mingo	475,326	4,144	1,680	....	481,150	298,861	.62	276	704
Ohio	70,487	68,514	1,220	19,636	159,857	116,262	.73	226	201
Preston	244,799	1,248	905	34,462	281,414	202,525	.72	262	359
Putnam	207,179	3,042	600	....	210,821	158,116	.75	215	553
Randolph	44,641	2,550	100	....	47,291	44,684	.94	218	72
Taylor	372,485	6,280	....	....	378,765	191,730	.51	218	628
Tucker	693,814	6,538	9,774	447,344	1,157,470	825,703	.71	302	1,130
Hancock, Monongalia, Raleigh	83,784	45,214	448	51,136	180,582	141,865	.79	224	227
Small mines	....	125,000	....	....	125,000	125,000	....	....	....
Total	15,044,272	476,996	87,022	3,644,705	19,252,995	12,053,268	.63	242	23,625

Coal product of West Virginia in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Barbour	189,031	1,796	3,050	22,354	216,231	$146,149	$0.68	150	689
Brooke	46,905	13,965	100	....	60,970	54,364	.89	270	91
Fayette	4,896,223	47,903	39,560	758,452	5,742,138	5,028,501	.88	235	7,779
Harrison	912,837	11,227	9,092	12,799	945,955	687,882	.74	178	1,969
Kanawha	1,930,930	38,704	11,991	81,116	2,062,741	1,883,095	.91	232	3,501
McDowell	3,203,626	26,510	22,181	1,668,918	4,921,235	3,873,297	.80	246	4,452
Marion	2,806,370	17,173	24,652	393,480	3,241,675	2,570,780	.79	246	3,355
Marshall	209,296	17,417	4,858	....	231,571	219,949	.95	275	277
Mason	112,953	28,710	546	....	142,209	129,036	.91	252	250
Mercer	744,604	5,977	3,941	255,014	1,009,536	762,351	.76	241	995
Mineral	609,412	31,522	222	....	641,156	446,854	.70	220	589
Mingo	567,338	4,914	1,904	....	574,156	425,144	.74	261	995
Monongalia	71,766	616	1,386	13,632	87,400	97,375	1.11	191	108
Ohio	84,577	51,964	1,255	....	137,796	127,073	.92	177	260
Preston	369,960	1,148	3,203	7,636	381,947	299,033	.78	245	512
Putnam	137,285	185	400	....	137,870	154,502	1.12	191	386
Randolph	159,108	443	765	19,272	179,588	117,620	.65	257	325
Taylor	514,330	7,696	1,232	....	523,258	392,317	.75	182	810
Tucker	711,898	42,866	11,313	413,976	1,180,053	782,764	.66	235	1,588
Hancock and Raleigh	69,713	18,315	420	16,274	104,722	93,785	.90	249	232
Small mines	....	125,000	....	....	125,000	125,000	....	....	....
Total	18,348,162	494,051	142,071	3,662,923	22,647,207	18,416,871	.81	231	29,163

The distribution of the total product since 1889 has been as follows:

Distribution of the coal product of West Virginia from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	4,764,900	493,287	37,368	936,325	6,231,880	$5,086,584	$0.82	....	9,952
1890	5,614,752	438,527	30,594	1,310,781	7,394,654	6,208,128	.84	227	12,236
1891	6,887,151	429,878	47,163	1,856,473	9,220,665	7,359,816	.80	237	14,227
1892	7,560,790	441,159	49,563	1,687,243	9,738,755	7,852,114	.80	228	14,867
1893	8,591,962	390,689	46,898	1,679,029	10,708,578	8,251,170	.77	219	16,524
1894	9,116,314	428,202	64,126	2,019,115	11,627,757	8,706,808	.75	186	17,824
1895	8,858,256	445,023	50,595	2,034,087	11,387,961	7,710,575	.68	195	19,159
1896	9,838,053	426,441	56,395	2,555,407	12,876,296	8,336,685	.65	201	19,078
1897	11,312,408	446,795	58,694	2,430,262	14,248,159	8,987,393	.63	205	20,504
1898	12,965,903	471,796	61,176	3,202,124	16,700,999	10,131,264	.61	218	21,607
1899	15,044,272	476,996	87,022	3,644,705	19,252,995	12,053,268	.63	242	23,625
1900	18,348,162	494,051	142,071	3,662,923	22,647,207	18,416,871	.81	231	29,163

In the following table is shown the production in West Virginia, by counties, during the last five years, together with the increases and decreases in 1900 as compared with 1899:

Coal product of West Virginia from 1896 to 1900, by counties.

[Short tons.]

County.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.	Per cent of increase.	Per cent of decrease.
Barbour	24,064	56,054	35,643	79,735	216,231	136,496		171.2	
Brooke	43,424	49,453	78,055	77,246	60,970		16,276		21.1
Fayette	3,533,572	4,001,540	4,592,772	5,039,815	5,742,138	702,323		13.9	
Grant	8,720	28	560						
Harrison	231,687	334,817	410,942	641,022	945,955	304,933		47.6	
Kanawha	1,116,883	920,161	1,354,500	1,505,141	2,062,741	557,600		37.0	
McDowell	2,883,686	3,235,344	3,904,976	4,290,912	4,921,235	630,323		14.7	
Marion	1,511,903	1,739,846	2,114,352	2,733,161	3,241,675	508,514		18.6	
Marshall	181,610	147,532	195,232	239,436	231,571		7,865		3.3
Mason	100,136	120,945	116,026	97,233	142,209	44,976		46.3	
Mercer	939,082	915,691	834,169	898,405	1,009,536	111,131		12.4	
Mineral	556,586	580,520	586,345	628,539	641,156	12,617		2.0	
Mingo	211,593	368,520	377,531	481,150	574,156	93,006		19.3	
Monongalia	43,297	51,307	35,750	51,520	87,400	35,880		69.6	
Ohio	133,525	111,909	136,929	159,857	137,796		22,061		13.8
Preston	139,759	169,610	232,603	281,414	381,947	100,533		35.7	
Putnam	185,953	110,971	206,407	210,821	137,870		72,951		34.6
Raleigh	92,136	83,178	99,852	86,088	90,507	4,419		5.1	
Randolph			17,080	47,291	179,588	132,297		279.8	
Taylor	123,354	281,227	260,146	378,765	523,258	144,493		38.1	
Tucker	688,426	844,506	945,217	1,157,470	1,180,053	22,583		2.0	
Wayne	1,900								
Other counties and small mines	125,000	125,000	165,912	167,974	139,215		28,759		17.1
Total	12,876,296	14,248,159	16,700,999	19,252,995	22,647,207	a3,394,212		17.6	

a Net increase.

It will be observed that out of twenty-one counties in the State which produced coal in 1900, the production increased in all but five. The largest increase was in Fayette County, which is also the largest coal-producing county in the State, and the next largest increase was in McDowell County, which is the second county in producing importance. Following these, Kanawha, Marion, and Harrison counties, in the order named, take rank in coal-producing importance. All of these counties, with the exception of Harrison County, increased their production in 1900 over 500,000 tons.

The principal coal-producing regions of West Virginia may be divided into four distinct districts, and these may be designated by certain geographic or physiographic features pertaining thereto. They do not include all of the coal-producing counties of the State, but do embrace the more important coal-producing counties and contribute nearly 90 per cent to the total output of the State. Two of these districts are in the northern part of the State and two in the southern portion. They have been designated, respectively, as the Fairmont or Upper Monongahela district, the Upper Potomac or Elk Garden district, the Pocahontas or Flat Top, and the New and Kanawha River district. The first two districts are the ones in the northern portion of the State. The Upper Potomac region is reached by the Baltimore and Ohio and the West Virginia Central and Pittsburg railroads. The Upper Monongahela sends its coal to market over the Baltimore and Ohio Railroad. The New and Kanawha River district is named from the two rivers which drain it, the coal being shipped partly by the Chesapeake and Ohio Railroad and partly by the Kanawha River. The Pocahontas or Flat Top region is penetrated by the main branch of the Norfolk and Western Railroad. The most important of the four districts is that included in the New and Kanawha River region, which embraces the counties of Fayette and Kanawha. The coal from these two counties is drawn from two different areas, most of the coal from Kanawha County being from a lower geological horizon than that of Fayette County, but the district is practically compact and continuous, is drained by the same waters and reached by the same railroad, so the two areas are considered as one district in this report.

The production of the two counties in 1900 amounted to 7,818,734 short tons, as compared with 6,544,956 tons in 1899. The output in 1900 was about three and a half times what it was in 1886.

The Pocahontas or Flat Top district embraces the counties of McDowell and Mercer in West Virginia and Tazewell County in Virginia. The openings to the mines in Tazewell County are in Virginia, and it has been customary to credit that county and State with the total product, although it is known that most of the coal is taken from the West Virginia side of the line. Because of this the production of Tazewell County has been included in the Pocahontas or Flat Top district.

Prior to 1889 all of the coal from this district was mined in Mercer County, W. Va., and Tazewell County, Va. The development of the district began in 1881, but it was not until 1883 that any coal was shipped out of the Pocahontas region. In that year the combined product of Tazewell County, Va., and Mercer County, W. Va., was 105,805 tons. In 1888 the product had increased to 1,376,010 tons, and in 1889, when some of the mines in McDowell County were opened, the product increased 2,292,288 tons. In 1891 McDowell County produced more than either of the other two counties, and since 1893 has produced more than one-half of the total tonnage of the district. There has been only one year since the district was first opened that the production was less than in the preceding one. This was in 1895, and was due to a prolonged strike of the miners in the district. The total production of this district in 1900 was 6,901,637 short tons, an increase of about 15 per cent over the 6,033,344 tons produced in 1899. The Fairmont region, which embraces Harrison and Marion counties, and includes the mines around Clarksburg and Fairmont, has shown the largest ratio of increase of all the coal-producing districts of West Virginia. The output of this district in 1900 was more than ten times that of 1886, and nearly four times that of 1891. The production in 1900 amounted to 4,187,630 short tons, an increase of 813,447 short tons, or 21 per cent over that of 1899.

The upper Potomac or Elk Garden district belongs to an isolated basin, and is, in fact, the southern extension in West Virginia of the Cumberland or George's Creek district of Maryland. Although comparatively limited in area, it is an important producer. Most of the coal in the district is drawn from the "Big Vein," which has furnished the greater part of Maryland's product. The counties included in the district are Mineral, Tucker, and Randolph. The production in 1900 amounted to 1,999,797 short tons, as against 1,786,009 short tons in 1899.

The production of the four principal districts in West Virginia since 1886 is shown in the following tables:

Coal product of the principal districts of West Virginia.

Year.	New and Kanawha River district.	Pocahontas or Flat Top district.	Fairmont or Upper Monongahela district.	Upper Potomac or Elk Garden district.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
1886	2,290,563	968,484	406,976	383,712
1887	2,379,296	1,357,040	520,064	503,343
1888	2,840,630	1,912,695	473,489	518,878
1889	2,669,016	2,290,270	456,582	666,956
1890	3,012,414	2,702,092	600,131	819,062
1891	3,632,209	3,137,012	1,150,569	1,052,308
1892	3,773,021	3,503,260	1,141,430	942,154
1893	4,099,112	3,815,280	1,255,956	1,129,397
1894	3,650,971	5,059,025	1,655,532	927,220
1895	4,399,623	4,044,998	1,550,256	1,125,601
1896	4,650,455	4,608,113	1,743,590	1,245,012
1897	4,921,701	4,859,373	2,074,663	1,425,026
1898	5,947,272	5,521,160	2,525,294	1,531,562
1899	6,544,956	6,033,344	3,374,183	1,786,009
1900	7,818,734	6,901,637	4,187,630	1,999,797

In order to show how steady and regular has been the growth of the coal-mining industry of West Virginia the following table has been prepared, exhibiting the increases each year since 1880. There has been only one break in the series, and the average annual increase has exceeded 1,000,000 short tons.

Annual increase in the coal product of West Virginia since 1880.

Year.	Short tons.	Year.	Short tons.
1881 over 1880	112,000	1894 over 1893	919,179
1882 over 1881	560,000	Total increase in fourteen years.	10,059,757
1883 over 1882	95,833	Decrease in 1895	239,796
1884 over 1883	1,024,167		
1885 over 1884	9,062	Total increase in fifteen years.	9,819,961
1886 over 1885	636,734	1896 over 1895	1,488,335
1887 over 1886	875,824	1897 over 1896	1,371,863
1888 over 1887	617,180	1898 over 1897	2,452,840
1889 over 1888	733,080	1899 over 1898	2,551,996
1890 over 1889	1,162,774	1900 over 1899	3,394,212
1891 over 1890	1,826,011	Total increase in twenty years.	21,079,207
1892 over 1891	518,090		
1893 over 1892	969,823	Average annual increase	1,053,960

The annual product of coal in West Virginia is shown in the following table:

Coal product of West Virginia since 1873.

Year.	Short tons.	Year.	Short tons.
1873	672,000	1887	4,881,620
1874	1,120,000	1888	5,498,800
1875	1,120,000	1889	6,231,880
1876	896,000	1890	7,394,654
1877	1,120,000	1891	9,220,665
1878	1,120,000	1892	9,738,755
1879	1,400,000	1893	10,708,578
1880	1,568,000	1894	11,627,757
1881	1,680,000	1895	11,387,961
1882	2,240,000	1896	12,876,296
1883	2,335,833	1897	14,248,159
1884	3,360,000	1898	16,700,999
1885	3,369,062	1899	19,252,995
1886	4,005,796	1900	22,647,207

WYOMING.

Total product in 1900, 4,014,602 short tons; spot value, $5,457,953.

Wyoming ranks second among the coal-producing States in the Rocky Mountain region, and third among all the States west of the Mississippi River. The production in 1900 exceeded 4,000,000 tons for the first time in its history. As compared with 1899 there was an increase in 1900 of 177,210 short tons, and as compared with 1898 an increase of 1,150,790 tons. The value of the product in 1900 exceeded that of 1899 by $715,428. Wyoming shared with most of the other coal-producing States an advanced price for its coal product in 1900, the average price increasing from $1.24, in 1899, to $1.36, in 1900. The price received in 1900 was the highest since 1891.

The number of mining machines in use in 1900 was 69, as against 56 in 1899, and 48 in 1898. There was, however, a decrease in the amount of coal won by machines, the machine-mined product in 1900 being 653,314, as against 693,712 tons in 1899.

No strikes were reported in any of the coal mines of Wyoming during 1900. The statistics of production for the past two years are shown in the following table:

Coal product in Wyoming in 1899, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Carbon	446,668	6,083	17,410	....	470,161	$644,830	$1.37	248	594
Converse	51,886	900	6,000	....	58,786	74,082	1.26	267	65
Fremont	600	3,468	150	....	4,218	8,686	2.06	191	13
Sweetwater	1,531,158	5,504	98,100	....	1,634,762	1,961,059	1.20	274	1,805
Uinta	1,024,442	8,882	22,543	....	1,055,867	1,166,539	1.10	233	1,377
Crook, Johnson, Natrona	12,328	4,187	497	....	17,012	22,116	1.30	157	58
Sheridan, Weston	517,585	3,405	43,496	32,100	596,586	865,213	1.45	298	785
Total	3,584,667	32,429	188,196	32,100	3,837,392	4,742,525	1.24	261	4,697

Coal product of Wyoming in 1900, by counties.

County.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
Carbon	497,596	3,703	29,360	....	530,659	$747,221	$1.41	263	663
Converse	41,980	1,500	5,750	....	49,230	83,821	1.70	227	76
Crook	21,233	278	528	....	22,039	44,580	2.02	303	71
Sweetwater	1,555,492	5,768	62,776	....	1,624,036	2,268,181	1.40	280	2,152
Uinta	1,103,721	12,018	30,690	....	1,146,429	1,375,374	1.20	232	1,619
Fremont, Johnson, Natrona	3,324	3,800	....	....	7,124	15,148	2.13	164	21
Sheridan, Weston	553,608	1,352	47,665	32,460	635,085	923,628	1.45	306	730
Total	3,776,954	28,419	176,769	32,460	4,014,602	5,457,953	1.36	266	5,332

The distribution of the product since 1889 has been as follows:

Distribution of the coal product of Wyoming from 1889 to 1900.

Year.	Loaded at mines for shipment.	Sold to local trade and used by employees.	Used at mines for steam and heat.	Made into coke.	Total product.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*				
1889	1,354,443	15,433	19,071	....	1,388,947	$1,748,617	......	....	2,675
1890	1,835,299	28,540	6,527	....	1,870,366	3,183,669	......	246	3,272
1891	2,229,401	33,558	60,392	4,490	2,327,841	3,555,275	$1.53	....	3,411
1892	2,378,657	27,054	96,128	2,000	2,503,839	3,168,776	1.27	225	3,133
1893	2,280,685	64,188	87,086	7,352	2,439,311	3,290,904	1.35	189	3,378
1894	2,309,934	21,482	72,362	13,685	2,417,463	3,170,392	1.31	190	3,032
1895	2,106,937	35,628	81,065	23,281	2,246,911	2,977,901	1.33	184	3,449
1896	2,102,468	17,867	68,251	41,038	2,229,624	2,904,185	1.30	209	2,949
1897	2,435,091	17,845	93,974	50,976	2,597,886	3,136,694	1.21	219	3,137
1898	2,698,326	21,655	108,447	35,384	2,863,812	3,664,190	1.28	242	3,475
1899	3,584,667	32,429	188,196	32,100	3,837,392	4,742,525	1.24	261	4,697
1900	3,776,954	28,419	176,769	32,460	4,014,602	5,457,953	1.36	266	5,332

The output, by counties, during the last six years, with the increases and decreases in 1900 as compared with 1899, is presented in the following table:

Coal product of Wyoming since 1895, by counties.

[Short tons.]

County.	1895.	1896.	1897.	1898.	1899.	1900.	Increase, 1900.	Decrease, 1900.
Carbon	350,504	363,257	403,891	372,350	470,161	530,659	60,498	....
Converse	65,090	78,000	79,000	54,818	58,786	49,230	....	9,556
Sweetwater	1,158,125	1,047,042	1,133,434	1,245,875	1,634,762	1,624,036	....	10,726
Uinta	230,684	313,433	417,984	593,833	1,055,867	1,146,429	90,562	....
Weston	348,611	371,528	498,997	508,199	542,649	509,085	....	33,564
Other counties	93,897	56,364	64,580	88,737	75,167	155,163	79,996	....
Total	2,246,911	2,229,624	2,597,886	2,863,812	3,837,392	4,014,602	*a* 177,210	....

a Net increase.

In the following table is shown the total product for the State each year since 1868:

Total product of coal in Wyoming.

Year.	Short tons.	Value.
1868	6,925	...
1869	49,382	...
1870	105,295	...
1871	147,328	...
1872	221,745	...
1873	259,700	...
1874	219,061	...
1875	300,808	...
1876	334,550	...
1877	342,853	...
1878	333,200	...
1879	400,991	...
1880	527,811	...
1881	628,181	...
1882	707,764	...
1883	779,689	...
1884	902,620	...
1885	807,328	$2,421,984
1886	829,355	2,488,065
1887	1,170,318	3,510,954
1888	1,481,540	4,444,620
1889	1,388,276	1,748,617
1890	1,870,366	3,183,669
1891	2,327,841	3,555,275
1892	2,503,839	3,168,776
1893	2,439,311	3,290,904
1894	2,417,463	3,170,392
1895	2,246,911	2,977,901
1896	2,229,624	2,904,185
1897	2,597,886	3,136,694
1898	2,863,812	3,664,190
1899	3,837,392	4,742,525
1900	4,014,602	5,457,953

COKE.

By Edward W. Parker.

[The unit used in this report is uniformly the ton of 2,000 pounds.]

INTRODUCTION.

The use of the word "coke" in this report is limited to the product obtained by the distillation or by the partial combustion of bituminous coal in retorts or ovens, and which is generally known as "oven coke." The ordinary gas coke, obtained as a by-product in the manufacture of illuminating gas, is not here considered. It is deemed necessary, however, to include in this discussion the product of retort ovens, although the coke itself may be, as it is in some cases, the secondary product, with illuminating and fuel gases as the primary product. The coke obtained from the distillation of coal in retorts where the gases and other by-products are saved is a metallurgical coke, and it is considered, therefore, as coming within the scope of this investigation. Whether the coke is a primary or secondary product is determined by the location of the plant and the demands of the particular locality.

Three systems of by-product coke manufacture are used in the United States. These are the Otto-Hoffman, the Semet-Solvay, and the Newton-Chambers. The first two are properly retort ovens, and the process is essentially one of distillation. The Newton-Chambers ovens are beehive ovens, with a recovery apparatus for saving the by-products contained in the gases thrown off during the process of combustion. As the development of the use of mechanical methods for the mining of bituminous coal has marked an important step in the economical development of that industry, so the development of the by-product oven in the United States may be considered one of the most, if not the most, interesting, feature in connection with the coking industry; and particular attention is invited to the statistics of by-product coke manufacture presented in another part of this report. All of the Semet-Solvay ovens so far constructed in this country have been for the production of metallurgical coke as a primary product, with the gases, tar, and ammonia as by-products; and with the exception of the initial plant erected at Syracuse, N. Y., all of the Semet-

Solvay ovens are operated in connection with some metallurgical establishment. The few Newton-Chambers ovens which have been constructed in the United States are also operated for the production of metallurgical coke. Two plants of the Otto-Hoffman ovens, one at Johnstown, Pa., and one at Otto, Pa., are also operated with the coke as a primary product, while the plant at Everett, Mass., makes gas the primary and coke the secondary product. Four other plants of Otto-Hoffman ovens were in course of construction at the close of 1900, two of which will be operated in connection with iron-making establishments and will have coke as the primary product; the other two plants—one of 50 ovens, at Hamilton, Ohio, and one of 100 ovens, at Camden, N. J.—will be operated with gas as the primary product. The coke product from any of these plants is certainly not to be considered in the same category as gas-house coke. The product is essentially a blast-furnace or foundry coke, although in some cases used for locomotives or for manufacturing purposes. It is not possible, however, to separate the portion of the product used for such fuel purposes, and the entire product is considered as if manufactured for metallurgical use. Against this must be set also the amount of beehive-oven coke which is used for domestic purposes. A large amount of this coke is now specially prepared for household use, and it is not possible, on account of these developments, to confine this report strictly to the product used in iron and other metal furnaces.

The statistics presented in the following pages deal primarily with the production of coke in 1900, with a résumé of the industry in the preceding years for which statistics are available.

The coal used in the manufacture of coke in the United States is drawn from all the five great bituminous coal fields, which are (1) the Appalachian, (2) the Central, (3) the Western, (4) the Rocky Mountain, and (5) the Pacific coast. No coke is produced from the coal of the Triassic fields in North Carolina and eastern Virginia, or of the northern field in Michigan. Fully 95 per cent of the total production is taken from the Appalachian fields, which embrace the great coking regions of Pennsylvania, West Virginia, Alabama, Virginia, and Tennessee, and less important districts in Ohio and eastern Kentucky. About 3½ per cent of the total product is from the Rocky Mountain States, leaving only 1½ per cent to be distributed among the other three fields.

The work of compiling the returns from the coke producers and of preparing the numerous tables contained in the following pages has been performed by Miss Belle Hill, of Pittsburg, Pa. Miss Hill was associated with the late Joseph D. Weeks for a number of years prior to his death, and as assistant to Mr. Weeks prepared the tables each year on the production of coke, natural gas, and petroleum. Since Mr. Weeks's death Miss Hill has continued to do this work for the

Geological Survey. Her ability, knowledge, and experience have been the chief factors in securing the accuracy and completeness of these reports, and her services in connection with the coke report merit special recognition.

PRODUCTION.

The production of coke in the United States in 1900 amounted to 20,533,348 short tons, valued at $47,443,331, against 19,668,569 short tons, valued at $34,670,417 in 1899, and 16,047,209 short tons, valued at $25,586,699, in 1898. As compared with 1899, the production in 1900 exhibited an increase of 864,779 short tons, or 4.4 per cent, in amount, and of $12,772,914, or 37 per cent, in value.

The extraordinary demand for coke which developed in 1899 continued during the earlier months of 1900, but the demand and the production both fell off during the summer months, in sympathy with the unfavorable condition of the iron and steel trade, and prices were greatly reduced. Notwithstanding this depression during the summer months, the total production for the year and the average price obtained exceeded all previous records. The value of the product in 1900 was more than double that of any year prior to 1898. During the spring Connellsville furnace coke was quoted at from $4 to $4.25 per ton, with foundry coke from $4.25 to $4.50, figures almost unprecedented in the history of the region. The unsettled condition of the iron trade precipitated by speculative interests in the summer of 1900 shut off the demand for coke and prices were reduced until Connellsville coke was sold at one-half the figures obtained in March and April. With improved conditions of the iron and steel trade during the late fall and winter, the coke industry rallied somewhat, but prices did not show any conspicuous advance until after the close of the year, The brisk demand which prevailed in 1899 and the earlier months of 1900 caused an active search for new coking coal fields, which resulted in the development of a new area in Fayette County, Pennsylvania. This region promises to be one of the most important coke-producing districts of the State. It is located a short distance west of the southern end of the Connellsville basin, from which it is separated by what has been designated by Mr. M. R. Campbell, of the United States Geological Survey, as the Fayette anticline. About 1,500 ovens were completed in this district in 1900, and 1,112 more were in course of construction at the end of the year.

The increased activity in the coking industry was general throughout all the coke-producing States. This is shown by the fact that the total number of coke ovens in existence increased from 49,667 in 1899 to 58,484 in 1900, while there were 5,804 additional ovens in course of construction at the end of the year. This increase in ovens built, and also the number of ovens in course of construction, were unprecedented.

The number of coke-making establishments shown by the returns for 1900 was 388, as against 344 in 1899, a gain of 44. The ovens operated in 1900 included 345 Semet-Solvay, 680 Otto-Hoffman, and 60 Newton-Chambers ovens, a total of 1,085 by-product ovens. The number of by-product ovens included in those building at the close of the year was 1,096, 11 more than the total number of by-product ovens in existence on December 31.

In the following tables is shown a statement of the production of coke by States and Territories during 1899 and 1900:

Manufacture of coke in the United States, by States and Territories, in 1899.

State or Territory.	Establishments.	Ovens.		Coal used.	Yield of coal in coke.	Coke produced.	Total value of coke.	Value of coke per ton.
		Built.	Building.					
				Short tons.	*Per cent.*	*Short tons.*		
Alabama	25	5,599	850	3,028,472	59	1,787,809	$3,634,471	$2.03
Colorado (*a*)	12	1,243	50	898,207	59	530,424	1,333,769	2.51
Georgia	2	350	100	78,098	65.2	50,907	116,917	2.30
Illinois	3	130	26	4,217	56.2	2,370	5,565	2.35
Indiana	2	52	0					
Indian Territory	3	130	100	59,255	41	24,339	71,965	2.96
Kansas	9	95	0	26,988	53.6	14,476	30,817	2.13
Kentucky	6	300	130	151,503	53.5	81,095	161,454	1.99
Massachusetts (*b*)	1	400	0					
Missouri	4	12	0	5,320	53.8	2,860	5,520	1.93
Montana	3	303	0	110,274	51	56,376	356,190	6.32
New Mexico	2	126	0	68,594	64.3	44,134	99,217	2.25
New York (*b*)	1	25	5					
Ohio	8	385	0	142,678	58.8	83,878	255,129	3.04
Pennsylvania	150	27,591	1,666	19,930,419	68.1	13,577,870	22,881,910	1.69
Tennessee	14	2,040	62	779,995	55.8	435,308	850,686	1.95
Utah (*a*)	1	104	0					
Virginia	6	1,588	429	994,635	62.2	618,707	1,071,284	1.73
Washington	2	90	0	50,813	59.8	30,372	151,216	4.98
West Virginia	87	8,846	619	3,802,825	60	2,278,577	3,480,408	1.53
Wisconsin	1	120	0	54,950	60.8	33,437	125,389	3.75
Wyoming	1	74	0	32,100	48.7	15,630	38,510	2.46
Total	343	*c* 49,603	*d* 4,037	30,219,343	65.1	19,668,569	34,670,417	1.76

a Colorado includes production of Utah.
b Production included in Pennsylvania.
c Includes 280 Semet-Solvay, 680 Otto-Hoffman, and 60 Newton-Chambers by-product ovens.
d Includes 65 Semet-Solvay ovens.

Manufacture of coke in the United States, by States and Territories, in 1900.

State or Territory.	Establishments.	Ovens.		Coal used.	Yield of coal in coke.	Coke produced.	Total value of coke.	Value of coke per ton.
		Built.	Building.					
				Short tons.	*Per cent.*	*Short tons.*		
Alabama	30	6,529	690	3,582,547	58.9	2,110,837	$5,629,423	$2.667
Colorado (*a*)	13	1,488	0	997,861	62	618,755	1,746,732	2.82
Georgia	2	480	0	140,988	52.4	73,928	210,646	2.849
Illinois	3	154	0	4,605	57.1	2,631	9,335	3.548
Indiana	1	54	0					
Indian Territory	3	230	0	79,534	48	38,141	152,204	3.99

a Colorado includes production of Utah.

Manufacture of coke in the United States, by States and Territories, in 1900—Continued.

State or Territory.	Establishments.	Ovens.		Coal used.	Yield of coal in coke.	Coke produced.	Total value of coke.	Value of coke per ton.
		Built.	Building.					
				Short tons.	*Per cent.*	*Short tons.*		
Kansas	9	91	0	10,303	57.7	5,948	14,985	$2.52
Kentucky	5	458	3	190,268	50.2	95,532	235,505	2.465
Massachusetts (*b*)	1	400	0					
Michigan	1	0	30					
Missouri	3	10	0	3,775	55.3	2,087	5,268	2.52
Montana	3	342	111	108,710	50.3	54,731	337,079	6.159
New Jersey	1	0	100					
New Mexico	2	126	0	74,261	60.3	44,774	130,251	2.909
New York (*b*)	2	30	564					
Ohio	8	369	50	115,269	62.5	72,116	194,042	2.69
Pennsylvania	169	32,548	2,310	20,831,196	66.2	13,798,893	30,853,449	2.236
Tennessee	14	2,107	340	854,789	55.6	475,432	1,269,555	2.67
Utah (*a*)	1	204	0					
Virginia	7	2,331	300	1,083,827	63.2	685,156	1,464,556	2.137
Washington	2	90	0	54,310	61.5	33,387	160,165	4.797
West Virginia	106	10,249	1,306	3,868,840	60.9	2,358,499	4,746,633	2.01
Wisconsin	1	120	0	80,000	60	48,000	240,000	5.00
Wyoming	1	74	0	32,460	44.7	14,501	43,503	3.00
Total	388	*c* 58,484	*d* 5,804	32,113,543	63.9	20,533,348	47,443,331	2.31

a Colorado includes production of Utah.
b Production included in Pennsylvania.
c Includes 345 Semet-Solvay, 680 Otto-Hoffman, and 60 Newton-Chambers by-product ovens.
d Includes 150 Semet-Solvay and 946 Otto-Hoffman by-product ovens.

The increases and decreases in the several States during 1900, as compared with 1899, are shown in the following table:

Increases and decreases in coke production, by States, in 1900, as compared with 1899.

State or Territory.	Increase.		Decrease.	
	Quantity.	Per cent.	Quantity.	Per cent.
	Short tons.		*Short tons.*	
Alabama	323,028	18.07		
Colorado (*a*)	88,331	16.65		
Georgia	23,021	45.22		
Illinois / Indiana	261	11.01		
Indian Territory	13,802	56.7		
Kansas			8,528	58.91
Kentucky	14,437	17.8		
Missouri			773	27.03
Montana			1,645	2.92
New Mexico	640	1.45		
Ohio			11,762	14.02
Pennsylvania, New York, and Massachusetts	221,023	1.63		
Tennessee	40,124	9.22		
Virginia	66,449	10.74		
Washington	3,015	9.93		
West Virginia	79,922	3.51		
Wisconsin	14,563	43.55		
Wyoming			1,129	7.22
Total	864,779	4.397		

a Including Utah

In the following table are consolidated the statistics of the manufacture of coke in the United States from 1880 to 1900, inclusive:

Statistics of the manufacture of coke in the United States, 1880 to 1900, inclusive.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per ct.*
1880	186	12,372	1,159	5,237,741	3,338,300	$6,631,267	$1.99	63
1881	197	14,119	1,005	6,546,662	4,113,760	7,725,175	1.88	63
1882	215	16,356	712	7,577,648	4,793,321	8,462,167	1.77	63
1883	231	18,304	407	8,516,670	5,464,721	8,121,607	1.49	64
1884	250	19,557	812	7,951,974	4,873,805	7,242,878	1.49	61
1885	233	20,116	432	8,071,126	5,106,696	7,629,118	1.49	63
1886	222	22,597	4,154	10,688,972	6,845,369	11,153,366	1.63	64
1887	270	26,001	3,584	11,859,752	7,611,705	15,321,116	2.01	64
1888	261	30,059	2,587	12,945,350	8,540,030	12,445,963	1.46	66
1889	252	34,165	2,115	15,960,973	10,258,022	16,630,301	1.62	64
1890	253	37,158	1,547	18,005,209	11,508,021	23,215,302	2.02	64
1891	243	40,245	911	16,344,540	10,352,688	20,323,216	1.97	63
1892	261	42,002	1,893	18,813,337	12,010,829	23,536,141	1.96	64
1893	258	44,201	717	14,917,146	9,477,580	16,523,714	1.74	63.5
1894	260	44,772	591	*a*14,348,750	9,203,632	*a*12,328,856	1.34	64
1895	265	45,565	638	20,848,323	13,333,714	*b*19,234,319	1.44	64
1896	341	46,944	383	18,694,422	11,788,773	21,660,729	1.837	63
1897	336	47,668	575	20,907,319	13,288,984	22,102,514	1.663	63.5
1898	341	48,383	1,048	25,249,570	16,047,209	25,586,699	1.594	63.6
1899	343	49,603	4,037	30,219,343	19,668,569	34,670,417	1.76	65.1
1900	388	58,484	5,804	32,113,543	20,533,348	47,443,331	2.31	63.9

a Excluding New York. *b* Excluding New York and Texas.

TOTAL NUMBER OF COKE WORKS IN THE UNITED STATES.

The total number of establishments manufacturing coke in the United States for each year since 1880 is shown in the following table, together with those reported for the census years ending June 30, 1850, 1860, 1870, and 1880. For the details in regard to the number of establishments in each State the reader is referred to the discussion of the production of coke by States in the subsequent part of this report.

Number of coke establishments in the United States since 1850.

Year.	Number.	Year.	Number.
1850 (census year)	4	1889, December 31	253
1860 (census year)	21	1890, December 31	253
1870 (census year)	25	1891, December 31	243
1880 (census year)	149	1892, December 31	261
1880, December 31	186	1893, December 31	258
1881, December 31	197	1894, December 31	260
1882, December 31	215	1895, December 31	265
1883, December 31	231	1896, December 31	341
1884, December 31	250	1897, December 31	336
1885, December 31	233	1898, December 31	341
1886, December 31	222	1899, December 31	343
1887, December 31	270	1900, December 31	388
1888, December 31	261		

It will be seen from the above table that the number of establishments in the United States in 1896 showed a phenomenal increase over 1895. This increase is only apparent. Prior to 1896 it was customary to include under one establishment all the coke works reported from one general office. Since 1896 the word "establishment" is used to designate the number of ovens which were in operation, whether reported from one central office or separately.

In the following tables is presented a statement of the number of coke ovens in existence in each State and Territory on December 31 of each year since 1896 and the total number of ovens in existence at the same period since 1880. It will be observed from these tables that the total number of ovens in existence has increased from 49,603 in 1899 to 58,484 in 1900, a gain of 8,881, or 16 per cent. This is the largest gain in any one year in the history of the industry. The total number of ovens includes 1,085 by-product ovens.

Number of coke ovens in each State at the close of each year since 1896.

State or Territory.	1896.	1897.	1898.	1899.	1900.
Alabama	5,363	5,365	5,456	5,599	6,529
Colorado	1,275	1,273	1,253	1,243	1,488
Georgia	334	300	350	350	480
Illinois	127	126	126	130	154
Indiana	94	94	94	52	54
Indian Territory	130	130	130	130	230
Kansas	55	57	47	95	91
Kentucky	264	268	292	300	458
Massachusetts	....	....	....	400	400
Missouri	7	15	8	12	10
Montana	303	303	318	303	342
New Mexico	50	126	126	126	126
New York	25	25	25	25	30
Ohio	431	433	441	385	369
Pennsylvania	26,658	26,910	27,157	27,591	32,548
Tennessee	1,861	1,948	1,949	2,040	2,107
Texas	60	20	0	0	0
Utah	104	104	104	104	204
Virginia	1,138	1,453	1,564	1,588	2,331
Washington	120	120	90	90	90
West Virginia	8,351	8,404	8,659	8,846	10,249
Wisconsin	120	120	120	120	120
Wyoming	74	74	74	74	74
Total	46,944	47,668	48,383	49,603	58,484

Number of coke ovens in the United States on December 31 of each year from 1880 to 1900.

Year.	Number.	Year.	Number.	Year.	Number.
1880	12,372	1887	26,001	1894	44,772
1881	14,119	1888	30,059	1895	45,565
1882	16,356	1889	34,165	1896	46,944
1883	18,304	1890	37,158	1897	47,668
1884	19,557	1891	40,057	1898	48,383
1885	20,116	1892	42,002	1899	49,603
1886	22,597	1893	44,201	1900	58,484

While the above table shows that there were 58,484 ovens in existence at the close of the year, it does not mean that there were that many in active operation. Of the 388 establishments in existence on December 31, 9 did not begin operations until after the close of the year, and 34 establishments, with a total of 1,682 ovens, were idle throughout the entire year. In addition to this there were portions of other plants which were not operated during 1900. The average number of ovens in operation during the whole year was reported as 43,039, or 73.6 of the total number in existence. Nearly all of the plants which were idle were small concerns. The largest establishment had 125 ovens, and the average number of the 34 idle establishments was 50 ovens, while the average number of ovens to the 354 establishments that were in operation during the year was 160.

In this connection it is interesting to note the increase in the productive capacity of the coke ovens in the United States. It is not possible to compare the number of ovens in actual operation in each year, and the averages must be based upon the number of ovens in existence at the close of each year, as shown by the tables presented in this report. In 1880 the number of ovens in existence was 12,372 and the total coke production was 3,338,300 short tons, an average of 278 tons of coke per oven. In 1890 the total number of ovens reported was 37,158 and the production of coke 11,508,021 short tons, an average of 310 tons of coke per oven. In 1900 the total number of ovens reported was 58,484, the production 20,533,348 short tons, an average of 351 tons of coke per oven. The number of ovens in use in 1900 was 4.7 times those in existence in 1880. The output of coke in 1900 was 6.2 times that of 1880.

When the production per establishment is taken as a basis of comparison, the differences are made much more noticeable. The statistics for 1900 show that there were 388 coke-making establishments in the United States, but it must be remembered that during the last five years the word "establishment" has been used with a different significance from that previously employed. Prior to 1896 the word "establishment" was used to designate the number of firms or corporations engaged in the manufacture of coke, although a number of different plants might have been reported from one central office. During the last five years the term "establishment" has been applied to the number of banks or batteries of ovens from which reports were received. If one firm or corporation reported more than one bank of ovens, each has been considered a separate establishment. The number of individuals, firms, and corporations engaged in the manufacture of coke in 1900 was 287, whereas the number of establishments was 388. Taking the number of firms, etc., as a basis for comparison, it is shown that in 1880 there were 186 concerns manufacturing coke, the average production per firm in that year being 17,948 short tons; in 1890 there were 253 concerns, with an annual average production per firm of 41,534 short tons of coke. In 1900 the total number of coke-making firms in the United States was 287 and the average yearly production of each firm was 71,545 short tons of coke. From this it is shown that while the number of firms has increased only 54 per cent in twenty years, the production per firm has increased 300 per cent.

While the total number of ovens in existence at the close of 1900 was 58,484, the average number in actual operation throughout the year was only 43,039, from which it is shown that the average production per active oven throughout the year was 477 tons, as against an average of 351 tons per oven when the total number of ovens is taken as a basis for obtaining the average. Prior to 1900 the statistics as to the actual number of ovens in operation during the year were not obtained, so that it is not possible to compare the statement for 1900 with any previous year.

Statement of production of coke by active ovens in 1900.

State or Territory.	Average number of ovens in operation.	Production of coke.	Number of tons per oven.
		Short tons.	*Short tons.*
Alabama	5,838	2,110,837	362
Colorado (*a*)	1,482	618,755	417
Georgia	175	73,928	422
Illinois Indiana	9	2,631	292
Indian Territory	185	38,141	206
Kansas	15	5,948	396
Kentucky	296	95,532	323
Massachusetts (*b*)	....	....	....
Missouri	6	2,087	348
Montana	200	54,731	274
New Mexico	126	44,774	355
New York (*b*)	....	....	....
Ohio	212	72,116	340
Pennsylvania	24,140	13,798,893	572
Tennessee	1,552	475,432	306
Utah (*a*)	....	....	....
Virginia	1,822	685,156	376
Washington	60	33,387	556
West Virginia	6,729	2,358,499	350
Wisconsin	118	48,000	407
Wyoming	74	14,501	196
Total	43,039	20,533,348	477

a Colorado includes production of Utah.
b Production included in Pennsylvania.

In the following table is shown the total number of ovens in existence in each State during 1900, the average number in operation throughout the year, and the percentage of the active ovens to the total. The table shows also the number of ovens abandoned during 1900.

Total number of coke ovens and number in operation and abandoned in 1900, by States and Territories.

State or Territory.	Total number of ovens.	Average number of ovens in operation throughout the year.	Per cent of active ovens.	Ovens abandoned.
Alabama	6,529	5,838	89.4	0
Colorado	1,488	1,382	92.9	0
Georgia	480	175	36.5	0
Illinois	154	4	2.6	0
Indiana	54	5	9.3	40
Indian Territory	230	185	80.4	0
Kansas	91	15	16.5	0
Kentucky	458	296	64.6	0
Massachusetts	400	400	100	0
Missouri	10	6	60	0
Montana	342	200	58.5	0
New Mexico	126	126	100	0
New York	30	30	100	0
Ohio	369	212	57.4	0
Pennsylvania	32,548	23,710	72.9	84
Tennessee	2,107	1,552	73.6	1
Utah	204	100	49	0
Virginia	2,331	1,822	78.2	0
Washington	90	60	66.7	0
West Virginia	10,249	6,729	65.6	107
Wisconsin	120	118	98.3	0
Wyoming	74	74	100	0
Total	58,484	43,039	73.6	232

In the following table is presented a statement as to the number of ovens in course of construction at the end of each year since 1880. This table does not represent the increase in new ovens from year to year, nor does it include the new ovens completed during any one year. It is intended merely to show the condition of the industry at the close of each year as represented by the works under construction. The table shows that on December 31, 1900, there were 5,804 ovens building. This was not only the largest number reported in the course of construction at the end of any one year, but was more than the combined ovens building on December 31 of 1897, 1898, and 1899. Of the new ovens in course of construction on December 31, 1900, 1,096, or nearly 20 per cent, were by-product retort ovens.

Number of coke ovens building in the United States at the close of each year from 1880 to 1900.

Year.	Ovens.	Year.	Ovens.	Year.	Ovens.
1880	1,159	1887	3,594	1894	591
1881	1,005	1888	2,587	1895	638
1882	712	1889	2,115	1896	383
1883	407	1890	1,375	1897	575
1884	812	1891	911	1898	1,048
1885	432	1892	1,893	1899	4,037
1886	4,154	1893	717	1900	5,804

PRODUCTION IN PREVIOUS YEARS.

A statement of the amount of coke produced in each State and Territory from 1896 to 1900 is shown in the following table. This is followed by a statement of the total coke production since 1880. The growth of the industry since 1880 is noticeable. It is shown that the output of coke in 1900 was more than six times that of 1880.

Amount of coke produced in the United States from 1896 to 1900, inclusive, by States and Territories.

[Short tons.]

State or Territory.	1896.	1897.	1898.	1899.	1900.
Alabama	1,479,437	1,443,017	1,663,020	1,787,809	2,110,837
Colorado (*a*)	343,313	319,036	445,982	*a* 530,424	618,755
Georgia	53,673	33,000	49,529	50,907	73,928
Illinois	2,600	1,549	2,325	2,370	2,631
Indiana	4,353	2,904	1,825		
Indian Territory	21,021	30,364	34,110	24,339	38,141
Kansas	4,785	6,181	4,180	14,476	5,948
Kentucky	27,107	32,117	22,242	81,095	95,532
Massachusetts (*b*)	....	....	....	(*a*)	(*a*)
Missouri	2,500	2,593	740	2,860	2,087
Montana	60,078	67,849	52,009	56,376	54,731
New Mexico	24,228	1,438	6,980	44,134	44,774
New York	(*b*)	(*b*)	(*b*)	(*b*)	(*b*)
Ohio	80,868	95,087	85,535	83,878	72,116
Pennsylvania	*c* 7,356,502	*c* 8,966,924	*c* 10,715,302	*c* 13,577,870	*c* 13,798,893
Tennessee	339,202	368,769	394,545	435,308	475,432
Texas	....	394	....	....	....
Utah	20,447	23,617	28,826	(*a*)	(*a*)
Virginia	268,081	354,067	531,161	618,707	685,156
Washington	25,949	26,189	30,197	30,372	33,387
West Virginia	1,649,755	1,472,666	1,925,071	2,278,577	2,358,499
Wisconsin	5,332	17,216	35,280	33,437	48,000
Wyoming	19,542	24,007	18,350	15,630	14,501
Total	11,788,773	13,288,984	16,047,209	19,668,569	20,533,348

a Colorado includes Utah.
b Included with Pennsylvania.
c Includes production of New York, and for Massachusetts also in 1899 and 1900.

Amount of coke produced in the United States from 1880 to 1900.

Year.	Short tons.	Year.	Short tons.	Year.	Short tons.
1880	3,338,300	1887	7,611,705	1894	9,203,632
1881	4,113,760	1888	8,540,030	1895	13,333,714
1882	4,793,321	1889	10,258,022	1896	11,788,773
1883	5,464,721	1890	11,508,021	1897	13,288,984
1884	4,873,805	1891	10,352,688	1898	16,047,209
1885	5,106,696	1892	12,010,829	1899	19,668,569
1886	6,845,369	1893	9,477,580	1900	20,533,348

VALUE OF COKE PRODUCT.

In the following tables are presented statements of the value of the coke made in the last five years and the value of the total product for each year since 1880. Comparing these tables with the preceding ones, it is seen that the value of the coke in 1900 was more than seven times the value of the product in 1880, while the output had increased only six times.

Total value, at the ovens, of the coke made in the United States from 1896 to 1900, inclusive, by States and Territories.

State or Territory.	1896.	1897.	1898.	1899.	1900.
Alabama	$3,064,960	$3,094,461	$3,378,946	$3,634,471	$5,629,423
Colorado	*a*1,046,306	*a*999,216	*a*1,230,428	*a*1,333,769	*a*1,746,732
Georgia	68,486	42,240	77,230	116,917	210,646
Illinois	5,200	2,895	4,686	5,565	9,335
Indiana	8,647	5,795	3,194		
Indian Territory	73,574	104,725	96,639	71,965	152,204
Kansas	8,676	9,272	6,455	30,817	14,985
Kentucky	42,062	45,454	32,213	161,454	235,505
Massachusetts	....	....	....	(*b*)	(*b*)
Missouri	4,131	3,890	1,050	5,520	5,268
Montana	425,483	467,481	359,174	356,190	337,079
New Mexico	48,453	3,232	14,625	99,217	130,251
New York	(*b*)	(*b*)	(*b*)	(*b*)	(*b*)
Ohio	208,789	235,784	211,558	255,129	194,042
Pennsylvania	*c*13,182,859	*c*13,727,966	*c*16,078,505	*d*22,881,910	*d*30,853,449
Tennessee	624,011	667,656	642,920	850,686	1,269,555
Utah	(*e*)	(*e*)	(*e*)	(*e*)	(*e*)
Virginia	404,573	495,864	699,781	1,071,284	1,464,556
Washington	104,894	115,754	128,933	151,216	160,165
West Virginia	2,259,999	1,933,808	2,432,657	3,480,408	4,746,633
Wisconsin	21,000	75,000	123,480	125,389	240,000
Wyoming	58,626	72,021	64,225	38,510	43,503
Total	21,660,729	22,102,514	25,586,699	34,670,417	47,443,331

a Includes value of Utah coke.
b Included with Pennsylvania.
c Includes value of New York coke.
d Includes Massachusetts and New York.
e Included with Colorado.

Total value, at the ovens, of the coke made in the United States from 1880 to 1900, inclusive.

Year.	Value.	Year.	Value.	Year.	Value.
1880	$6,631,265	1887	$15,321,116	1894	$12,328,856
1881	7,725,175	1888	12,445,963	1895	19,234,319
1882	8,462,167	1889	16,630,301	1896	21,660,729
1883	8,121,607	1890	23,215,302	1897	22,102,514
1884	7,242,878	1891	20,393,216	1898	25,586,699
1885	7,629,118	1892	23,536,141	1899	34,670,417
1886	11,153,366	1893	16,523,714	1900	47,443,331

From the preceding statements, showing the amount of coke produced and its value, the following table has been prepared. It shows the average price per ton received for coke sold in each State and Territory since 1896, and also the average for the total product since 1880. This average price is obtained by dividing the amount of coke produced or sold into the total value. While these figures may be accepted as showing the general tendency of prices, they do not always represent the exact selling value of the coke, for the reason that some of the largest of the coke producers consume their own coke product in their own blast furnaces. In some such cases the actual cost of producing the coke is given as the value; in other cases it is stated as the cost vulue, plus a percentage of profit on the coking operations, while still other cases are based upon the average selling value to other cokes of the same quality in the same market. These conditions, however, do not change from one year to another, so that the tendency of prices as presented in this table would not be materially affected by them. It is shown that the average price in 1900 was the highest obtained within a period of twenty years, being $2.31 per short ton. The lowest price recorded was in 1894, when it fell as low as $1.34 per short ton. There were only two years in addition to 1900 in which the price exceeded $2 per ton. These were 1887 and 1890, when the figures were $2.01 and $2.02, respectively. There has been no uniformity in the tendency of prices one way or the other, and they have varied largely from year to year, according usually to the general conditions affecting the iron and steel trade.

Average value per short ton at the ovens of the coke made in the United States from 1896 to 1900, inclusive, by States and Territories.

State or Territory.	1896.	1897.	1898.	1899.	1900.
Alabama	$2.07	$2.14	$2.03	$2.03	$2.667
Colorado	*a* 2.88	*a* 2.916	*a* 2.59	*a* 2.51	*a* 2.82
Georgia	1.276	1.28	1.56	2.30	2.849
Illinois	2.00	1.87	2.02	2.35	3.548
Indiana	1.99	1.995	1.75		
Indian Territory	3.50	3.45	2.833	2.96	3.99

a Average value, including Utah.

Average value per short ton at the ovens of the coke made in the United States from 1896 to 1900, inclusive, by States and Territories—Continued.

State or Territory.	1896.	1897.	1898.	1899.	1900.
Kansas	$1.813	$1.50	$1.544	$2.13	$2.52
Kentucky	1.55	1.41	1.448	1.99	2.465
Massachusetts *a*	....	....	....	....	....
Missouri	1.65	1.50	1.42	1.93	2.52
Montana	7.08	6.89	6.906	6.32	6.159
New Mexico	2.00	2.25	2.095	2.25	2.909
New York *b*	....	....	....	....	....
Ohio	2.58	2.48	2.47	3.04	2.69
Pennsylvania *b*	1.792	1.53	1.50	1.69	2.236
Tennessee	1.84	1.81	1.63	1.95	2.67
Utah *c*	....	....	....	....	....
Virginia	1.509	1.40	1.317	1.73	2.137
Washington	4.04	4.42	4.27	4.98	4.797
West Virginia	1.37	1.31	1.26	1.53	2.01
Wisconsin	3.94	4.36	3.50	3.75	5.00
Wyoming	3.00	3.00	3.50	2.46	3.00
Average	1.837	1.663	1.594	1.76	2.31

a Included with Pennsylvania.
b Average value, including New York, and in 1899 and 1900 Massachusetts also.
c Included with Colorado.

Average value per short ton at the ovens of the coke made in the United States from 1880 to 1900, inclusive.

Year.	Value.	Year.	Value.	Year.	Value.
1880	$1.99	1887	$2.01	1894	$1.34
1881	1.88	1888	1.46	1895	1.44
1882	1.77	1889	1.62	1896	1.837
1883	1.49	1890	2.02	1897	1.663
1884	1.49	1891	1.97	1898	1.594
1885	1.49	1892	1.96	1899	1.76
1886	1.63	1893	1.74	1900	2.31

RANK OF COKE-PRODUCING STATES.

The following table gives the relative rank of the States and Territories in the production of coke from 1880 to 1900, inclusive:

Rank of the States and Territories in production of coke from 1880 to 1900.

State or Territory.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Pennsylvania	1	1	1	1	1	1	1	1	1	1
West Virginia	2	2	2	2	3	3	4	2	2	3
Alabama	5	5	4	3	2	2	2	4	3	2
Colorado	7	6	6	5	5	5	5	5	5	5
Tennessee	3	3	3	4	4	4	3	3	4	4
Virginia	......	......	......	8	7	7	6	6	6	6
Ohio	4	4	5	6	8	8	8	7	8	8
Montana	......	......	......	......	15	15	......	16	12	10
Georgia	6	7	7	7	6	6	7	8	7	7
Kentucky	9	10	10	11	12	13	14	12	9	12
Washington	......	......	......	......	14	14	15	11	10	17

Rank of the States and Territories in production of coke from 1880 to 1900—Continued.

State or Territory.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
New Mexico	......	......	12	12	9	9	10	13	14	18
Indian Territory	11	11	11	13	13	12	12	14	15	15
Utah	12	......	13	......	......	......	......	......	......	19
Wisconsin	......	......	......	......	......	......	......	......	18	9
Kansas	10	9	9	10	11	11	9	10	11	11
Indiana	......	......	......	......	......	......	13	9	13	14
Illinois	8	8	8	9	10	10	11	15	16	13
Missouri	......	......	......	......	......	......	......	17	17	16
Texas	......	......	......	......	......	......	......	......	......	......

State or Territory.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Pennsylvania	1	1	1	1	1	1	1	1	1	1	1
West Virginia	3	3	3	3	2	3	2	2	2	2	2
Alabama	2	2	2	2	3	2	3	3	3	3	3
Virginia	6	6	6	6	6	6	6	5	4	4	4
Colorado	5	5	4	4	4	5	4	6	5	5	5
Tennessee	4	4	5	5	5	4	5	4	6	6	6
Massachusetts	......	......	......	......	......	......	......	......	......	7	7
Kentucky	11	10	9	8	9	9	10	10	15	9	8
Georgia	7	7	7	7	7	7	9	9	9	11	9
Ohio	8	8	8	10	8	8	7	7	7	8	10
Montana	10	11	10	9	10	10	8	8	8	10	11
Wisconsin	9	9	11	12	18	17	17	16	10	13	12
New Mexico	19	20	......	18	15	14	12	21	17	12	13
Indian Territory	14	13	16	15	19	16	13	11	11	17	14
Utah	13	14	13	11	12	11	14	15	13	16	15
New York	......	......	......	13	11	12	16	12	14	15	16
Washington	17	16	15	16	16	13	11	13	12	14	17
Wyoming	......	19	......	20	17	18	15	14	16	18	18
Kansas	12	12	12	14	13	15	18	17	18	19	19
Missouri	15	15	14	17	20	21	21	19	21	20	20
Indiana	16	18	17	19	14	19	19	18	20	21	21
Illinois	18	17	18	21	21	20	20	20	19	22	22
Texas	......	......	......	......	......	22	22	22	......	......	......

COAL CONSUMED IN THE MANUFACTURE OF COKE.

It is not always possible to obtain the exact amount of coal used in the manufacture of coke, and in many cases it is necessary to estimate on this factor. There are but few works in the United States where the coal is weighed before being charged into the ovens, but a great deal of the coke made is from "run-of-mine" coal; that is, all of the product just as it comes from the mine, and if no coal is sold as coal it is comparatively easy to ascertain from the amounts paid for mining the quantity of the coal which is charged into the ovens; but even in such cases the figures are not always exact, for the reason that the miner is frequently paid by the measured bushel or ton, or by the pit car, and these differ somewhat from the weighed ton or bushel. There are other instances in which the coal is washed before coking. In some of these cases the weight of the coal before washing is given, and in others the weight after washing. There are still other instances in which the only use made of the coke ovens is for the utilization of the slack coal which would otherwise be wasted. No account is taken of the weight of this product, and the amount used is in nearly every case an estimate. It must be stated, therefore, that the figures given in the following tables are necessarily only approximate, but the same differences would appear in the figures for each year, so that for purposes of comparison they are sufficiently accurate.

Attention is here called also to what appears to be marked discrepancies between the statements in this table and that contained in the report on the production of coal, which appears as a separate chapter. The figures in the following table show in most cases a larger amount of coal consumed in the manufacture of coke than the amount so reported in the chapter on coal production. This is due to the fact that in many instances the ovens are located at a considerable distance from the mines, in which case the coal so used would be reported among the shipments and not as coal made into coke. In the report on the production of coal, the coal made into coke includes only that which is consumed at or in the immediate vicinity of the coal mines.

Amount of coal used in the manufacture of coke in the United States from 1896 to 1900, inclusive, by States and Territories.

[Short tons.]

State or Territory.	1896.	1897.	1898.	1899.	1900.
Alabama	2,573,713	2,451,475	2,814,615	3,028,472	3,582,547
Colorado	*a*639,238	*a*616,592	*a*803,686	*a*898,207	*a*997,861
Georgia	109,655	67,000	81,108	78,098	140,988
Illinois	3,900	3,591	6,650	4,217	4,605
Indiana	8,956	7,022	4,065		
Indian Territory	53,028	68,495	73,330	59,255	79,534
Kansas	8,940	11,772	7,856	26,988	10,303
Kentucky	55,719	64,234	44,484	151,503	190,268
Massachusetts	....	....	(*b*)	(*b*)	(*b*)
Missouri	4,471	4,627	1,500	5,320	3,775
Montana	113,165	139,907	92,552	110,274	108,710
New Mexico	39,286	2,585	12,557	68,594	74,261
New York	(*b*)	(*b*)	(*b*)	(*b*)	(*b*)
Ohio	128,923	151,545	134,757	142,678	115,269
Pennsylvania	*c*11,124,610	*c*13,538,646	*c*16,307,841	*d*19,930,419	*d*20,831,196
Tennessee	600,379	667,996	722,356	779,995	854,789
Texas	0	700	0	0	0
Utah	(*e*)	(*e*)	(*e*)	(*e*)	(*e*)
Virginia	454,964	574,542	852,972	994,635	1,083,827
Washington	38,685	39,124	48,559	50,813	54,310
West Virginia	2,687,104	2,413,283	3,145,398	3,802,825	3,868,840
Wisconsin	8,648	29,207	59,900	54,950	80,000
Wyoming	41,038	54,976	35,384	32,100	32,460
Total	18,694,422	20,907,319	25,249,570	30,219,343	32,113,543

a Includes coal consumed in Utah.
b Included with Pennsylvania.
c Includes New York.
d Includes Massachusetts and New York.
e Included with Colorado.

Amount of coal used in the manufacture of coke in the United States from 1880 to 1900, inclusive, by States and Territories.

Year.	Short tons.	Year.	Short tons.	Year.	Short tons.
1880	5,237,741	1887	11,859,752	1894	14,348,750
1881	6,546,762	1888	12,945,350	1895	20,848,323
1882	7,577,646	1889	15,960,973	1896	18,694,422
1883	8,516,670	1890	18,005,209	1897	20,907,319
1884	7,951,974	1891	16,344,540	1898	25,249,570
1885	8,071,126	1892	18,813,337	1899	30,219,343
1886	10,688,972	1893	14,917,146	1900	32,113,543

AMOUNT AND VALUE OF COAL USED IN COKE MAKING.

The amount and value of the coal used in making coke in 1899 and 1900, together with the amount and value of coal used per ton of coke, by States, are shown in the following tables. The amount of coal used in 1900 was 32,113,543 tons, as compared with 30,219,343 tons in 1899. The value of the coal used in 1900 was $28,134,756, while in 1899 it was $18,290,453. It will be seen from this that whereas the value of the coke product in 1900 was $12,772,914 in excess of that of 1899, the value of the coal used in the manufacture of the coke in 1900 was $9,844,303 more than the preceding year, so that the enhanced value of the coke, outside of the coal value, was only $2,928,611.

Amount and value of coal used in the manufacture of coke in the United States in 1899, and amount and value of same per ton of coke.

State or Territory.	Coal used.	Total value of coal.	Value of coal per ton.	Amount of coal per ton of coke.	Value of coal to a ton of coke.
	Short tons.			*Short tons.*	
Alabama	3,028,472	$2,596,718	$0.857	1.69	$1.45
Colorado *a*	898,207	544,772	.607	1.69	1.03
Georgia	78,098	62,893	.805	1.53	1.24
Illinois } Indiana }	4,217	2,520	.598	1.78	1.06
Indian Territory	59,255	29,396	.496	2.43	1.21
Kansas	26,988	26,079	.97	1.86	1.80
Kentucky	151,503	72,196	.477	1.87	.89
Missouri	5,320	2,256	.424	1.86	.79
Montana	110,274	189,232	1.716	1.96	3.36
New Mexico	68,594	35,229	.514	1.55	.80
Ohio	142,678	102,540	.719	1.70	1.22
Pennsylvania *b*	19,930,419	11,514,614	.578	1.47	.85
Tennessee	779,995	530,774	.68	1.79	1.22
Virginia	994,635	523,979	.53	1.61	.85
Washington	50,813	79,770	1.57	1.67	2.63
West Virginia	3,802,825	1,869,110	.49	1.67	.82
Wisconsin	54,950	93,415	1.70	1.64	2.79
Wyoming	32,100	14,960	.466	2.05	.96
Total and averages	30,219,343	18,290,453	.605	1.54	.93

a Figures given for Colorado include the statistics of Utah.

b Figures for Pennsylvania include the statistics of New York and Massachusetts.

Amount and value of coal used in the manufacture of coke in the United States in 1900, and amount and value of same per ton of coke.

State or Territory.	Coal used.	Total value of coal.	Value of coal per ton.	Amount of coal per ton of coke.	Value of coal to a ton of coke.
	Short tons.			*Short tons.*	
Alabama	3,582,547	$3,968,305	$1.108	1.697	$1.88
Colorado *a*	997,861	715,737	.717	1.612	1.156
Georgia	140,988	89,734	.636	1.907	1.213
Illinois Indiana	4,605	3,282	.713	1.75	1.248
Indian Territory	79,534	49,147	.618	2.085	1.288
Kansas	10,303	9,889	.96	1.732	1.663
Kentucky	190,268	115,497	.607	2	1.214
Missouri	3,775	1,996	.529	1.809	.957
Montana	108,710	249,133	2.29	1.99	4.557
New Mexico	74,261	47,307	.637	1.66	1.057
Ohio	115,269	133,347	1.157	1.598	1.849
Pennsylvania *b*	20,831,196	18,061,349	.867	1.51	1.309
Tennessee	854,789	867,089	1.014	1.798	1.823
Virginia	1,083,827	914,310	.844	1.582	1.335
Washington	54,310	100,319	1.847	1.626	3.003
West Virginia	3,868,840	2,622,485	.678	1.64	1.112
Wisconsin	80,000	169,600	2.12	1.666	3.532
Wyoming	32,460	16,230	.50	2.24	1.12
Total	32,113,543	28,134,756	.876	1.57	1.375

a Figures given for Colorado include the statistics of Utah.
b Figures for Pennsylvania include the statistics of New York and Massachusetts.

In the following table is shown an approximate statement as to the amount of coal required to produce a ton of coke in each year since 1880:

Coal required to produce a ton of coke, in tons or pounds.

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1880	1.57	3,140	1891	1.58	3,160
1881	1.59	3,180	1892	1.57	3,140
1882	1.58	3,160	1893	1.57	3,140
1883	1.56	3,120	1894	1.56	3,120
1884	1.63	3,260	1895	1.56	3,120
1885	1.58	3,160	1896	1.58½	3,170
1886	1.56	3,120	1897	1.57	3,140
1887	1.56	3,120	1898	1.57	3,140
1888	1.51	3,020	1899	1.54	3,080
1889	1.55	3,100	1900	1.57	3,140
1890	1.56	3,120			

YIELD OF COAL IN COKE.

The following table exhibits the percentage yield of coal in the manufacture of coke for the years 1880 to 1900, inclusive. By the "yield" is meant the percentage of the constituents of the coal that remains as coke after the process of coking. The table shows that the general average for most of the years given is about 64 per cent, but it is believed that even this is a little too high. It is not possible to acquire exact information on this point, for the reason that in many instances the coal is not weighed before being charged into the ovens. As stated in regard to the table showing the amount of coal made into coke, the percentage yield, like the amount, is largely estimated. Probably the actual yield of coke throughout the United States, if the actual weight of the coal charged into the ovens and the actual weight of the coke drawn had been taken, would not have exceeded 60 or 61 per cent.

Percentage yield of coal in the manufacture of coke for the years 1880 to 1900, inclusive.

Year.	Percentage yield of coal.	Year.	Percentage yield of coal.	Year.	Percentage yield of coal.
1880	63	1887	64.2	1894	64
1881	63	1888	66	1895	64
1882	63	1889	64	1896	63
1883	64	1890	64	1897	63.5
1884	61	1891	63	1898	63.6
1885	63	1892	64	1899	65.1
1886	64	1893	63.5	1900	63.9

The following table shows the percentage yield of coal in coke in each State during the last five years:

Percentage yield of coal in coke, 1896 to 1900.

State or Territory.	1896.	1897.	1898.	1899.	1900.
Alabama	57.5	58.8	59	59	58.9
Colorado *a*	56.9	55.6	59.1	59	62
Georgia	49	49.3	61	65.2	52.4
Illinois	66.7	43	35	56.2	57.1
Indiana	49	41.4	44.9		
Indian Territory	40	44.3	46.5	41	48
Kansas	53.5	52.5	53	53.6	57.7
Kentucky	48.6	50	50	53.5	50.2
Massachusetts	....	....	....	....	....
Missouri	55.9	56	49.3	53.8	55.3
Montana	53	48.5	56	51	50.3
New Mexico	61.7	55.6	55.6	64.3	60.3
New York	....	....	....	....	....
Ohio	62.7	62.7	63.5	58.8	62.5
Pennsylvania *b*	66.1	66.2	65.7	68.1	66.2
Tennessee	56.5	55	54.6	55.8	55.6
Texas	0	56.3	0	0	0
Utah	....	....	....	....	....
Virginia	58.9	61.6	62	62.2	63.2
Washington	67	67	62.2	59.8	61.5
West Virginia	61.4	61	61.2	60	60.9
Wisconsin	62	59	59	60.8	60
Wyoming	47.6	43.7	51.9	48.7	44.7
Total average	63	63.5	63.6	65.1	63.9

a Average, including Utah. *b* Average, including New York, also Massachusetts for 1899 and 1900.

CONDITION IN WHICH COAL IS CHARGED INTO OVENS.

In the following tables will be found a statement of the condition of the coal when charged into ovens; that is, as to whether run-of-mine or slack, and whether either is washed or unwashed before coking. The statement is given for each State during 1899 and 1900, and the total for each year since 1890. The headings explain themselves. It is only necessary to state that the run-of-mine washed coal includes that of run-of-mine coal which is crushed before being washed. It will be observed that there has been a considerable increase in the percentage of slack coal used during the last ten years. In 1890, of the amount of coal used for coke making, 80 per cent was run-of-mine and 20 per cent slack. In 1900, 70 per cent of the coal used was run-of-mine and 30 per cent slack. A considerable increase is also shown in the percentage of washed coal used. In 1890 the amount of washed coal used was equivalent to 7 per cent of the total, while in 1900 the washed coal was 16 per cent of the total amount used.

Character of coal used in the manufacture of coke in 1900.

[Short tons.]

State or Territory.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
Alabama	1,729,882	152,077	165,418	1,535,170	3,582,547
Colorado *a*	229,311	0	316,527	452,023	997,861
Georgia	0	68,988	0	72,000	140,988
Illinois Indiana	0	0	689	3,916	4,605
Indian Territory	0	0	20,832	58,702	79,534
Kansas	0	3,786	6,517	0	10,303
Kentucky	6,043	17,717	78,583	87,925	190,268
Massachusetts	....	....	....	....	....
Missouri	0	0	2,680	1,095	3,775
Montana	0	74,475	0	34,235	108,710
New Mexico	10,611	0	27,604	36,046	74,261
New York	....	....	....	....	....
Ohio	68,175	0	17,094	30,000	115,269
Pennsylvania *b*	17,737,204	647,045	1,300,796	1,146,151	20,831,196
Tennessee	150,697	349,448	24,122	330,522	854,789
Utah	....	....	....	....	....
Virginia	620,207	0	463,620	0	1,083,827
Washington	0	48,162	0	6,148	54,310
West Virginia	509,960	8,000	3,140,064	10,816	3,668,840
Wisconsin	0	0	80,000	0	80,000
Wyoming	0	0	32,460	0	32,460
Total	21,062,090	1,369,698	5,677,006	4,004,749	32,113,543

a Includes Utah. *b* Includes Massachusetts and New York.

Character of coal used in the manufacture of coke in 1899.

[Short tons.]

State or Territory.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
Alabama	1,656,226	725,238	9,898	637,110	3,028,472
Colorado *a*	125,322	0	468,196	304,689	898,207
Georgia	0	48,521	0	29,577	78,098
Illinois / Indiana	300	0	404	3,513	4,217
Indian Territory	0	0	0	59,255	59,255
Kansas	0	6,210	20,778	0	26,988
Kentucky	21,600	0	30,263	99,640	151,503
Massachusetts	....	....	....	....	....
Missouri	0	0	5,320	0	5,320
Montana	0	0	0	110,274	110,274
New Mexico	0	0	68,594	0	68,594
New York	....	....	....	....	....
Ohio	88,721	0	23,907	30,000	142,678
Pennsylvania *b*	16,854,706	366,206	1,824,784	884,723	19,930,419
Tennessee	140,804	267,105	31,850	340,236	779,995
Utah	....	....	....	....	....
Virginia	612,267	0	225,118	157,250	994,635
Washington	0	44,681	0	6,132	50,813
West Virginia	1,336,239	0	2,215,255	251,331	3,802,825
Wisconsin	34,680	0	20,270	0	54,950
Wyoming	0	0	32,100	0	32,100
Total	20,870,915	1,457,961	4,976,737	2,913,730	30,219,343

a Includes Utah. *b* Includes Massachusetts and New York.

In the following table the statistics regarding the character of the coal for the years 1890 to 1900, inclusive, are consolidated:

Character of coal used in the manufacture of coke in the United States since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	14,060,907	338,563	2,674,492	931,247	18,005,209
1891	12,255,415	290,807	2,945,359	852,959	16,344,540
1892	14,453,638	324,050	3,256,493	779,156	18,813,337
1893	10,306,082	350,112	3,049,075	1,211,877	14,917,146
1894	9,648,750	405,266	3,102,652	1,192,082	14,348,750
1895	15,609,875	237,468	3,052,246	1,948,734	20,848,323
1896	11,307,905	763,244	4,685,832	1,937,441	18,694,422
1897	13,234,985	1,037,830	4,180,575	2,453,929	20,907,319
1898	16,758,244	1,672,972	4,487,949	2,330,405	25,249,570
1899	20,870,915	1,457,961	4,976,737	2,913,730	30,219,343
1900	21,062,090	1,369,698	5,677,006	4,004,749	32,113,543

BY-PRODUCT COKE MAKING IN 1900.

In 1900 the development of coke manufacture in retort ovens constructed for the recovery of the by-product was noticeable rather for the increase in the number of new plants and of ovens in course of construction at the close of the year than by any increase in the number of completed ovens or increase in production. As compared with the preceding year, there was a gain of 65 in the total number of ovens in use, all of this increase being in Semet-Solvay ovens, 5 ovens being added to the plant at Syracuse, N. Y., and 60 to that at Benwood, near Wheeling, W. Va. Production increased from 906,534 short tons of coke in 1899 to 1,075,727 short tons in 1900. In this connection it is interesting to note the difference between the average yearly product per oven of the retort ovens when compared with that of the total average for the United States. As has been previously shown, taking only the average number of ovens that were in active operation throughout the year (43,039), the average product per oven for the year was 477 tons; whereas the 1,085 by-product ovens produced a total of 1,075,727 short tons of coke, or practically 1,000 tons of coke per oven, from which it appears that the average productive capacity of the retort ovens is a little more than double that of the beehive ovens.

A glance at the following table will indicate the growth of the use of by-product ovens in the United States since the first plant was constructed in 1893. The most interesting feature of this table is the large number of ovens which were in course of construction at the close of 1900, the ovens building at that time being 1,096, or 11 more than the total number completed during the eight years in which by-product coke has been manufactured in the United States. From this it is fair to assume that the production of by-product coke in 1901 will be nearly, if not quite, double that of 1900.

Reduced to tabular form the record of by-product coke making in the United States since 1893, when the first plant was constructed at Syracuse, has been as follows:

Record of by-product coke making since 1893.

Year.	Ovens.		Product.
	Built.	Building.	
			Short tons.
1893	12	0	12,850
1894	12	60	16,500
1895	*a* 72	60	18,521
1896	160	120	83,038
1897	280	240	261,912
1898	*b* 520	*c* 500	294,445
1899	*d* 1,020	*e* 65	906,534
1900	*f* 1,085	*g* 1,096	1,075,727

a Sixty of these ovens did not begin making coke until 1896.
b Includes 280 Semet-Solvay, 180 Otto-Hoffman, and 60 Newton-Chambers.
c All Otto-Hoffman.
d Includes 280 Semet-Solvay, 680 Otto-Hoffman, and 60 Newton-Chambers.
e Semet-Solvay.
f Includes 345 Semet-Solvay, 680 Otto-Hoffman, and 60 Newton-Chambers.
g Includes 150 Semet-Solvay and 946 Otto-Hoffman.

The number of completed ovens at the close of 1900 included 345 Semet-Solvay, 680 Otto-Hoffman, and 60 Newton-Chambers, distributed as follows:

Semet-Solvay ovens.—Syracuse, N. Y., 30; Dunbar, Pa., 50; Sharon, Pa., 25; Ensley, Ala., 120; Benwood, W. Va., 120. Of the Semet-Solvay ovens there were building at the close of the year 120 additional at Ensley, Ala., and 30 at Del Ray, Mich.

Otto-Hoffman ovens.—Johnstown, Pa., 160; Otto, near Pittsburg, Pa., 120; Everett, near Boston, Mass., 400. There were building of this type of ovens at the close of the year 50 at Hamilton, Ohio, 564 at Buffalo, N. Y., 232 at Lebanon, Pa., and 100 at Camden, N. J.

Newton-Chambers ovens.—Pocahontas, Va., 60.

With the exception of the 30 ovens at Syracuse, N. Y., all of the Semet-Solvay ovens constructed in the United States are operated in connection with iron or steel making establishments which consume the coke and surplus gas. The Otto-Hoffman plant at Johnstown, Pa., is owned and operated by the Cambria Steel Company, which manufactures coke for its own blast furnaces and uses the surplus in the steel works. The plants in course of construction at Buffalo, N. Y., and Lebanon, Pa., will be owned and operated by steel companies, and the coke and gas will be consumed by them in their blast furnaces and steel works. The plant at Otto, near Pittsburg, manufactures metallurgical and domestic coke, and sells the surplus gas to adjacent rolling mills. The Everett plant manufactures coke for domestic purposes and for locomotive and factory use, and sells the surplus illuminating gas to the Boston gas companies. All of the surplus gas of this plant is illuminating gas. The plant in course of construction at Hamilton, Ohio, will manufacture foundry and domestic coke and sell the surplus gas to the Hamilton Gas Company. The plant at Camden, N. J., will also manufacture foundry and domestic coke and sell illuminating gas.

In addition to the Otto-Hoffman ovens which were completed or in course of construction at the close of 1900 and which have been enumerated above, a contract was entered into during the year for the construction of 200 ovens at Sparrow's Point, Md., to be operated in connection with the Maryland Steel Company. The coke product from these ovens will be a blast-furnace coke, and the gas used for both illuminating and fuel. These ovens will be of an improved type, the improvements being embodied in a patent recently issued (No. 673928). The plant will consist of four batteries of 50 ovens each. One of the principal differences between these ovens and the other types will be the placing of the entire oven structure upon steel columns, making the oven accessible from every point beneath. The heating of the ovens will be based upon the Siemens regenerative principles, by which it is claimed that a uniform heat distribution will be assured. The ovens will be of larger capacity than any by-product ovens heretofore constructed. Their daily carbonizing capacity will be 8 short tons of coal, from which it is estimated that 6 short tons of coke will be obtained. The plant will be equipped throughout with labor-saving machinery and modern gas and by-product apparatus.

In the following table is shown the record of by-product coke ovens by States at the close of 1900:

Record of by-product ovens by States.

State.	Ovens December 31, 1900.		State.	Ovens December 31, 1900.	
	Completed.	Building.		Completed.	Building.
Alabama	120	120	Pennsylvania	355	232
Massachusetts	400	0	Virginia	60	0
Michigan	0	30	West Virginia	120	0
New Jersey	0	100	Total	1,085	1,096
New York	30	564			
Ohio	0	50			

In connection with the production of coke in by-product ovens, it is interesting to consider the amount of by-products obtained in the process. Owing to the fact that a large part of the gas obtained is not measured before use, but is carried directly from the ovens to the rolling mills, etc., it is not possible to give an accurate statement in regard to this item. The following table shows the amount of tar and ammonia produced in by-product coke ovens in 1899 and 1900. In 1899 the tar produced was reported in pounds; in 1900 it was reported in gallons. The production of ammonium sulphate in 1900 includes also the sulphate contained in ammoniacal liquor. A large portion of the sulphate contained in ammoniacal liquor was reported separately in 1899.

Amount of gas, tar, and ammonia recovered in by-product coke making in 1899 and 1900.

By-product.	1899.	1900.
Tar ... pounds..	104,687,330	a 11,937,448
Ammonia liquor ... gallons..	1,572,325	90,112
Ammonium sulphate ... pounds..	11,984,931	26,366,600

a Gallons.

In the early stages of the development of by-product coke ovens in the United States one of the objections advanced against their use was the claim that there would be no profitable market for the by-products, and that consequently the higher cost of construction of the by-product ovens would wipe out any advantage in the higher percentage of coke obtained from the coal. It was thought that, the chemical industry of the United States being comparatively insignificant, there would be no means of disposing of the tar and ammonia. Such fears have not been realized. No sooner was the supply available than the demand was created. There has been a steady and remunerative demand for all the ammonia produced, and the large output from the various coking plants does not seem to have materially affected the market price.

Ammonia is obtained in the form of a weak liquor containing ammonium sulphide and ammonium carbonate. It is concentrated into a crude, impure liquor containing from 20 to 25 per cent NH_3, 40 to 45 grams per liter of H_2S, and from 100 to 120 grams per liter of CO_2. Some of this liquor is sold as ammonia liquor and some is worked up into various ammonium compounds, such as ammonium chloride, ammonium carbonate, ammonium sulphate, aqua ammonia, and anhydrous ammonia.

At some works all the liquor is worked up into ammonium sulphate and sold as such.

Considerable quantities of ammonium chloride and carbonate are imported into the United States, the former being used for galvanizing and electrical purposes and the latter in the manufacture of baking powders, etc. With a regular supply of these compounds from domestic sources, which will be provided by the extension of the use of by-product ovens, a decrease in the importations may be anticipated. Aqua and anhydrous ammonia are used extensively for refrigerating purposes. Recent discoveries have shown that potassium cyanide, largely used in the treatment of certain classes of gold ores, can be profitably made from ammonia. Any excess of production will be readily taken, though at lower prices, for fertilizing purposes.

Another important by-product, a constituent of the gas, and thus far not yet recovered, is cyanogen. It is an impurity in the gas and may be removed by the use of an alkaline iron salt. The cyanogen is formed into a ferrocyanide of potassium or sodium in solution; the solution is evaporated to the crystallizing point and the crystals then purified. The amount of cyanogen obtained varies according to the amount of volatile matter in the coal and the percentage of nitrogen and the temperature to which the ovens are heated, high temperature tending to increase the cyanogen in the gas.

At present the principal use made of coal tar is in the manufacture of roofing paper, the creosoting of lumber, and for street paving. With the development of the chemical manufacturing industry in the United States the demand for coal tar will be accelerated and prices probably advanced. Chemical manufacturers who use coal tar as a crude material in the manufacture of aniline colors, salts, etc., are now assured of a steady supply of raw material. The statistics of the imports of coal-tar products into the United States are themselves sufficient argument in favor of the utilization of our coal tar in this manner. The value of the coal-tar products imported into the United States in 1896 was $4,713,200, upon which a duty of $729,583 was paid, making a total first cost at ports of entry, exclusive of freights, of $5,442,783. In 1900 the value of the coal-tar products imported into the United States for the fiscal year ending June 30, was $6,773,152, upon which the duty paid was $1,516,689. The total value at the ports of entry, exclusive of freight charges, was $8,289,841. The steady increase in the imports of these products from 1896 to 1900 is shown in the following table:

Coal-tar products imported into the United States during the fiscal years 1896 to 1900.

Fiscal year.	Salicylic.		Alizarine and colors or dyes, natural and artificial.		Aniline salts.		Coal-tar colors or dyes, not specially provided for.	
	Value.	Duty.	Value.	Duty.	Value.	Duty.	Value.	Duty.
1896	$138,013	Free.	$994,395	Free.	$662,459	Free.	$2,918,333	$729,583
1897	201,980	Free.	1,023,425	Free.	812,884	Free.	3,163,182	790,796
1898	28,688	$6,794	886,349	Free.	1,087,704	Free.	3,723,288	1,098,532
1899	57,192	18,536	700,786	Free.	743,130	Free.	3,900,099	1,170,030
1900	89,175	24,069	771,336	Free.	537,812	Free.	4,792,103	1,437,631

Fiscal year.	Coal-tar, all preparations, not colors or dyes.		Coal-tar products, not medicinal, not dyes, known as benzol, toluol, etc.		Total.	
	Value.	Duty.	Value.	Duty.	Value.	Duty.
1896					$4,713,200	$729,583
1897					5,201,471	790,796
1898	$134,416	$26,883	$228,037	Free.	6,088,482	1,132,209
1899	221,101	44,220	393,602	Free.	6,015,910	1,232,786
1900	274,946	54,989	307,780	Free.	6,773,152	1,516,689

THE HEMINGWAY COKING PROCESS.

Mention was made in the report for 1899 of the completion of an experimental plant of four ovens by the Illinois Fuel Company, of Chicago, Ill., and it was stated that 26 additional ovens were at that time in course of construction. The 26 ovens were added to the plant because of the success which had been attained by the experimental plant previously constructed. It was claimed that with these ovens it was possible to produce a good metallurgical coke from the dry coals of the central and western coal fields which had previously been considered as noncoking coal. The following description of the Hemingway method has been furnished for this report by Mr. Joseph Leiter, vice-president of the Illinois Fuel Company. The 30 ovens now being operated by this company are located at the corner of Thirty-fourth and Iron streets, Chicago.

The standard beehive is the type of oven adopted in connection with the Hemingway process.

A superheater built outside of the ovens and consisting of a furnace and a checkerwork of fire brick is connected with the ovens by pipes, through which heated air may be supplied. There is also connected with each oven a pipe through which cold air may be furnished. The supply of hot and cold air is regulated by valves at each oven.

After an oven is charged air is forced by means of a blower through the superheater and into the oven at a temperature of from 500 to 700° F., which hastens the evolution of the volatile matter from the coal. When the gases begin to pass off freely, cold air is forced into the oven by the same blower to produce a rapid combustion of these gases. The intense heat thus obtained quickly raises the temperature of the oven to a high degree. The heat is forced through the coal from the top by the pressure of the air entering the oven above the charge, or by pressure from the bottom entering through ducts extending under the oven. The penetration of the mass of coal is thus more quickly accomplished than in the ordinary beehive oven, and the process of coking is consequently shortened.

The by-products can be saved in connection with the process. From Illinois coals it has been found that 4,000 cubic feet of gas of 16-candle power, 25 gallons of ammonia liquor, and from 4 to 5 gallons of tar could be saved, and a merchantable domestic coke produced.

In the treatment of Western or noncoking coals the best results have been obtained by crushing the coal before coking, a more regular coke being secured.

While the process is claimed to be adapted to the treatment of all classes of coals, and the time required for coking materially reduced, it has been particularly successful in the treatment of what is known as noncoking coals and lignites. The only coals from which satisfactory results have not been obtained are those containing too small an amount of volatile matter to admit of the temperature being raised to the point at which the particles of the charge would fuse and agglutinate. In mixing them, however, with a coal containing a greater percentage of volatile matter coke has been produced.

The following results have been obtained under the Hemingway process:

Results obtained in Hemingway coking ovens.

	Moisture.	Volatile matter.	Fixed corbon.	Ash.	Sulphur.
Illinois coal:	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Coal	1.35	33.14	58.13	7.38	1.12
Coke *a*	.65	1.76	87.26	10.00	.85
Utah lignite:					
Lignite	6.60	48.79	36.49	8.12	3.16
Coke	.65	....	84.84	14.51	.469

a Crushing strength of coke across grain, 1,803 pounds per square inch; crushing strength of coke with grain, 3,172 pounds per square inch.

Results obtained in Hemingway coking ovens—Continued.

	Moisture.	Volatile matter.	Fixed carbon.	Ash.	Sulphur.
Wyoming lignite:	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Coal	8.35	40.90	46.95	3.80	.86
Coke	2.40	5.30	85.20	7.10	.99
Wyoming coal:					
Coal	7.15	41.55	37.10	14.20	4.36
Coke	.70	....	74.75	24.55	3.23
Indiana coal:					
Coal	6.78	38.27	44.13	10.92	3.59
Coke	.87	1.65	80.81	16.67	2.31
Kansas coal:					
Coal [a]	4.50	36.12	52.68	6.70	3.18
Coke	.70	1.91	86.95	10.44	1.21
Michigan coal:					
Coal	7.65	31.24	52.56	8.55	1.19
Coke	1.65	....	83.90	14.45	1.11

[a] This coal was specially treated to reduce the amount of sulphur in the coke.

The Illinois coal, as shown above, was washed, as was also the Kansas coal. The percentage of sulphur and ash would have been materially reduced in the other coals if they had been washed before coking.

IMPORTS AND EXPORTS.

The following table gives the quantities and value of coke imported and entered for consumption in the United States from 1869 to 1900, inclusive. In the reports of the Treasury Department the quantities given are long tons. These have been reduced to short tons to make the tables consistent with the other tables in this report:

Coke imported and entered for consumption in the United States, 1869 to 1900, inclusive.

Year ending June 30—	Quantity.	Value.	Year ending Dec. 31—	Quantity.	Value.
	Short tons.			*Short tons.*	
1869	....	$2,053	1886	28,124	$84,801
1870	....	6,388	1887	35,320	100,312
1871	....	19,528	1888	35,201	107,914
1872	9,575	9,217	1889	28,608	88,008
1873	1,091	1,366	1890	20,808	101,767
1874	634	4,588	1891	50,753	223,184
1875	1,046	9,648	1892	27,420	86,350
1876	2,065	8,657	1893	37,183	99,683
1877	4,068	16,686	1894	32,566	70,359
1878	6,616	24,186	1895	29,622	71,366
1879	6,035	24,748	1896	43,372	114,713
1880	5,047	18,406	1897	34,937	98,077
1881	15,210	64,987	1898	46,127	142,334
1882	14,924	53,244	1899	31,197	142,504
1883	20,634	113,114	1900	115,556	371,341
1884	14,483	36,278			
1885	20,876	64,814			

The amount and value of coke exported from the United States since 1895 are shown in the following table:

Coke exported from the United States since 1895.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1895	131,368	$425,174	1898	199,562	$600,931
1896	169,189	553,600	1899	280,196	858,856
1897	173,034	546,066	1900	422,239	1,358,968

PRODUCTION OF COKE, BY STATES.

ALABAMA.

The production of coke in Alabama in 1900 amounted to 2,110,837 short tons, an increase of 323,028 short tons, or 18 per cent over the product of the preceding year, which amounted to 1,787,809 short tons. The value increased from $3,634,471 to $5,629,423, a gain of $1,994,952, or 55 per cent. The percentage of increase in value was just three times the percentage of increase in production. The average selling price for coke in Alabama in 1900 was $2.67, as compared with $2.03 in 1899 and 1898. This price was the highest recorded since 1883. Notwithstanding the largely increased production in 1900, there was a constant shortage of supply of coke in the State throughout the entire year.

Nearly 1,000 new ovens were added to the number reported in 1899, and there were 690 ovens in course of construction on December 31. The latter number included 120 Semet-Solvay by-product ovens, which are to be added to the 120 already in existence at Ensley.

As an illustration of the rapid increase of the coke-making industry in Alabama, it is noted that the production in 1900 was almost exactly double that of 1890, while in 1880 the output was less than 3 per cent of the production last year.

The coal fields of Alabama are divided into three districts, known, respectively, as the Warrior, the Coosa, and the Cahaba, the names being derived from the rivers which drain them. By far the most important of the three districts is the Warrior, the ovens in this district being located near Birmingham. Out of the 6,529 ovens in the State 6,002 are in the Warrior district. The production in this district during 1900 was 2,002,278 short tons, out of a total of 2,110,837 short tons. The Coosa district produced a small amount of coke in 1900 for the first time in a number of years.

The statistics of coke production in Alabama since 1880 are as follows:

Statistics of the manufacture of coke in Alabama from 1880 to 1900, inclusive.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per ct.*
1880	4	316	100	106,283	60,781	$183,063	$3.01	57
1881	4	416	120	184,881	109,033	326,819	3.00	59
1882	5	536	....	261,839	152,940	425,940	2.79	58
1883	6	767	122	359,699	217,531	598,473	2.75	60
1884	8	*a* 976	242	413,184	244,009	609,185	2.50	60
1885	11	1,075	16	507,934	301,180	755,645	2.50	59
1886	14	*a* 1,301	1,012	635,120	375,054	993,302	2.65	59
1887	15	1,555	1,362	550,047	325,020	775,090	2.39	59
1888	18	2,475	406	848,608	508,511	1,189,579	2.34	60
1889	19	3,944	427	1,746,277	1,030,510	2,372,417	2.30	59
1890	20	4,805	371	1,809,964	1,072,942	2,589,447	2.41	59
1891	21	5,068	50	2,144,277	1,282,496	2,986,242	2.33	60
1892	20	5,320	90	2,585,966	1,501,571	3,464,623	2.31	58
1893	23	5,548	60	2,015,398	1,168,085	2,648,632	2.27	58
1894	22	5,551	50	1,574,245	923,817	1,871,348	2.025	58.7
1895	22	5,658	50	2,459,465	1,444,339	3,033,521	2.10	58.7
1896	24	5,363	....	2,573,713	1,479,437	3,064,960	2.07	57.5
1897	25	5,365	*b* 120	2,451,475	1,443,017	3,094,461	2.14	58.8
1898	25	*c* 5,456	100	2,814,615	1,663,020	3,378,946	2.03	59
1899	25	*c* 5,599	850	3,028,472	1,787,809	3,634,471	2.03	59
1900	30	*c* 6,529	*c* 690	3,582,547	2,110,837	5,629,423	2.667	58.9

a One establishment made coke on the ground.
b Semet-Solvay ovens.
c Includes 120 Semet-Solvay ovens.

It will be observed from the following table that there was a decided decrease in the amount of washed run-of-mine coal used in coke making in 1900 as compared with the two preceding years, while there was a very large increase in the amount of slack coal used, about 90 per cent of which was washed before coking. The character of the coal used was nearly evenly distributed between run-of-mine and slack, the former being slightly in excess.

The character of the coal used in the manufacture of coke in Alabama since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Alabama since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	1,480,669	0	206,106	123,189	1,809,964
1891	1,943,469	0	192,238	8,570	2,144,277
1892	2,463,366	0	11,100	111,500	2,585,966
1893	1,246,307	51,163	292,198	425,730	2,015,398
1894	411,097	7,429	477,820	677,899	1,574,245
1895	1,208,020	0	32,068	1,219,377	2,459,465
1896	1,292,191	70,125	51,674	1,159,723	2,573,713
1897	902,310	120,420	91,200	1,337,545	2,451,475
1898	1,290,794	828,294	25,000	670,527	2,814,615
1899	1,656,226	725,238	9,898	637,110	3,028,472
1900	1,729,882	152,077	165,418	1,535,170	3,582,547

COLORADO.

Colorado holds the relative position west of the Mississippi River as a coke-producing State that the State of Pennsylvania does to the United States. Colorado also ranks fifth among all the coke-producing States, although its output of coke during 1900 was less than 5 per cent of that of Pennsylvania, only a little more than one-fourth of that of West Virginia, and less than 30 per cent of that of Alabama. It was about 10 per cent less than that of Virginia, which comes fourth in rank.

As shown in the following table, the statistics of production in Colorado in the last nine years include also that of Utah, in which State there is but one establishment.

The statistics of the production of coke in Colorado from 1880 to 1900 are given in the following table. From 1892 to 1900, both inclusive, the statements of production of coke in Utah are included in Colorado:

Statistics of the manufacture of coke in Colorado from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	1	200	50	51,891	25,568	$145,226	$5.68	49
1881	2	267	0	97,508	48,587	267,156	5.29	50
1882	5	344	0	180,549	102,105	476,665	4.67	57
1883	7	352	0	224,089	133,997	584,578	4.36	60
1884	8	409	24	181,968	115,719	409,930	3.45	64
1885	7	434	0	208,069	131,960	512,162	3.88	63
1886	7	483	0	228,060	142,797	569,120	3.99	62.6
1887	7	532	0	267,487	170,698	682,778	4.00	64
1888	7	602	100	274,212	179,682	716,305	4.00	65.6
1889	9	834	50	299,731	187,638	643,479	3.43	63

Statistics of the manufacture of coke in Colorado from 1880 to 1900—Continued.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1890	8	916	30	407,023	245,756	959,246	3.90	60
1891	7	948	21	452,749	277,074	896,984	3.24	61
1892 *a*	9	*b* 1,128	220	599,200	373,229	1,234,320	3.31	62.3
1893 *a*	8	1,154	200	628,935	362,986	1,137,488	3.13	57.7
1894 *a*	8	1,154	250	542,429	317,196	903,970	2.85	58.5
1895 *a*	9	1,169	0	580,584	340,357	940,987	2.76	58.6
1896 *a*	11	1,275	0	639,238	363,760	1,046,306	2.88	56.9
1897 *a*	12	1,273	0	616,592	342,653	999,216	2.916	55.6
1898 *a*	12	1,253	3	803,686	474,808	1,230,428	2.59	59.8
1899 *a*	12	1,243	50	898,207	530,424	1,333,769	2.51	59
1900 *a*	13	1,488	0	997,861	618,755	1,746,732	2.82	62

a Includes production and value of coke in Utah and of coal coked.
b Includes 30 gas retorts since 1892.

The production of these two States in 1900 amounted to 618,755 short tons, valued at $1,746,732 as compared with 530,424 short tons, valued at $1,333,769 in 1899; an increase of 88,331 short tons, or 16.6 per cent in amount, and of $412,963, or 31 per cent in value. The average price per ton advanced from $2.51 in 1899 to $2.82 in 1900. There was an increase of 245 in the number of ovens in 1900 as compared with the preceding year. The greater portion of the coal used in the manufacture of coke in Colorado and Utah is slack, about 60 per cent of which, in 1900, was washed before coking. The percentage of the washed slack used has shown steady increases during the last five years, it having been demonstrated that the resultant coke was improved by washing the slack coal before coking. All run-of-mine coal used is unwashed.

The character of the coal used in the manufacture of coke in Colorado and Utah since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Colorado and Utah since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	36,058	0	395,023	0	431,081
1891	93,752	0	384,278	0	478,030
1892	82,098	0	517,102	0	599,200
1893	109,915	0	519,020	0	628,935
1894	126,642	0	415,787	0	542,429
1895	119,868	0	453,597	7,119	580,584
1896	143,604	0	378,776	116,858	639,238
1897	0	0	393,214	223,378	616,592
1898	122,983	0	415,298	265,405	803,686
1899	125,322	0	468,196	304,689	898,207
1900	229,311	0	316,527	452,023	997,861

GEORGIA.

The production of coke in Georgia in 1900 amounted to 73,928 short tons; an increase of 23,021 short tons, or 45 per cent, over that of 1899. The value of the product increased from $116,917 to $210,646; a gain of nearly 90 per cent. The production was the largest obtained since 1895, while the value exceeded that of any year in the history of coke making in the State, with the exception of 1891, when the product amounted to 103,057 short tons. The average price per ton obtained in 1900 was $2.85, the highest in the history of the State.

The statistics of the production of coke in Georgia, 1880 to 1900, are as follows:

Statistics of the manufacture of coke in Georgia, 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	1	140	40	63,402	38,041	$81,789	$2.15	60
1881	1	180	40	68,960	41,376	88,753	2.15	60
1882	1	220	44	77,670	46,602	100,194	2.15	60
1883	1	264	36	111,687	67,012	147,166	2.20	60
1884	1	300	0	132,113	79,268	169,192	2.13	60
1885	2	300	0	117,781	70,669	144,198	2.04	60
1886	2	300	0	136,133	82,680	179,031	2.17	60
1887	2	300	0	158,482	79,241	174,410	2.20	50
1888	1	290	0	140,000	83,721	177,907	2.12	60
1889	1	300	0	157,878	94,727	149,059	1.57	60
1890	1	300	0	170,388	102,233	150,995	1.48	60
1891	1	300	0	164,875	103,057	231,878	2.25	62.5
1892	1	300	0	158,978	81,807	163,614	2.00	51.5
1893	1	338	0	171,645	90,726	136,089	1.50	52.8
1894	1	338	0	166,523	93,029	116,286	1.25	55.9
1895	1	330	0	118,900	60,212	70,580	1.17	50.6
1896	1	334	0	109,655	53,673	68,486	1.276	49
1897	1	300	0	67,000	33,000	42,240	1.28	49.3
1898	2	350	0	81,108	49,529	77,230	1.56	61
1899	2	350	100	78,098	50,907	116,917	2.30	65.2
1900	2	480	0	140,988	73,928	210,646	2.849	52.4

All of the coal used in the manufacture of coke in Georgia is washed, and the amounts in 1900 were nearly evenly divided between run of mine and slack.

As shown in the table following, all of the coal used in the manufacture of coke in Georgia since 1890 was washed before being coked.

Character of coal used in the manufacture of coke in Georgia since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	0	0	170,388	170,388
1891	106,131	0	0	58,744	164,875
1892	0	0	0	158,978	158,978
1893	0	0	0	171,645	171,645
1894	0	166,523	0	0	166,523
1895	0	118,900	0	0	118,900
1896	0	109,655	0	0	109,655
1897	0	67,000	0	0	67,000
1898	0	61,844	0	19,264	81,108
1899	0	48,521	0	29,577	78,098
1900	0	68,988	0	72,000	140,988

ILLINOIS AND INDIANA.

All of the coke produced in Illinois in 1900 was made by the Universal Fuel Company, operating the Hemingway coke ovens in the city of Chicago. This process has been described in some of the preceding pages. Because of the fact that the production was confined to this one establishment, the statistics of Illinois coke production for 1899 and 1900 have been combined with Indiana. The following table shows that there were three establishments and 154 ovens in the State, but two of the establishments, having 126 ovens, were idle.

Statistics of the manufacture of coke in Illinois since 1880.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	6	176	0	31,240	12,700	$41,950	$3.30	41
1881	6	176	0	35,240	14,800	45,850	3.10	42
1882	7	304	0	25,270	11,400	29,050	2.55	45
1883	7	316	0	31,170	13,400	28,200	2.10	43
1884	9	325	0	30,168	13,095	25,639	1.96	43
1885	9	320	0	21,487	10,350	27,798	2.68	48
1886	9	335	0	17,806	8,103	21,487	2.65	46
1887	8	278	0	16,596	9,108	19,594	2.13	55.5
1888	8	221	0	13,020	7,410	21,038	2.84	56.9
1889	4	149	0	19,250	11,583	29,764	2.57	60
1890	4	148	0	9,000	5,000	11,250	2.25	55
1891	1	25	0	10,000	5,200	11,700	2.25	52
1892	1	24	0	4,800	3,170	7,133	2.25	66
1893	1	24	0	3,300	2,200	4,400	2.00	66.7
1894	1	24	0	3,800	2,200	4,400	2.00	57.9
1895	3	129	0	3,600	2,250	4,500	2.00	62.5
1896	3	127	0	3,900	2,600	5,200	2.00	66.7
1897	2	126	0	3,591	1,549	2,895	1.87	43
1898	2	126	0	6,650	2,325	4,686	2.02	35
1899	3	130	26	(*a*)	(*a*)	(*a*)	....	....
1900	3	154	0	(*a*)	(*a*)	(*a*)	....	....

a Included with Indiana.

The character of the coal used in the manufacture of coke in Illinois since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Illinois since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	0	0	9,000	9,000
1891	0	0	10,000	0	10,000
1892	0	0	4,800	0	4,800
1893	0	0	0	3,300	3,300
1894	0	0	0	3,800	3,800
1895	0	0	0	3,600	3,600
1896	0	0	0	3,900	3,900
1897	0	0	3,591	0	3,591
1898	0	0	0	6,650	6,650
1899 *a*	....	....	....	....	....
1900 *a*	....	....	....	....	....

a Included with Indiana.

The statistics of coke production in Indiana include for 1899 and 1900 the output of the adjoining State of Illinois. The combined product was unimportant, amounting to 2,631 short tons, valued at $9,335.

The statistics of the manufacture of coke in Indiana from 1886 to 1900, both inclusive, are given in the following table:

Statistics of the manufacture of coke in Indiana from 1886 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1886	4	100	18	13,030	6,124	$17,953	$2.93	47
1887	4	119	0	35,600	17,658	51,141	2.81	50
1888	3	103	0	26,547	11,956	31,993	2.68	45
1889	4	111	0	16,428	8,301	25,922	3.12	51
1890	4	101	0	11,753	6,013	19,706	3.28	51
1891	2	84	0	8,688	3,798	7,596	2.00	44
1892	2	84	0	6,456	3,207	6,472	2.02	49.7
1893	2	94	0	11,549	5,724	9,048	1.58	49.6
1894	2	94	0	13,489	6,551	13,102	2.00	48.6
1895	2	94	0	9,898	4,804	9,333	1.94	48.5
1896	2	94	0	8,956	4,353	8,647	1.99	49
1897	2	94	0	7,022	2,904	5,795	1.995	41.4
1898	2	94	0	4,065	1,825	3,194	1.75	44.9
1899	2	52	0	*a* 4,217	*a* 2,370	*a* 5,565	2.35	56.2
1900	1	54	0	*a* 4,605	*a* 2,631	*a* 9,335	3.548	57.1

a Includes Illinois.

Character of coal used in the manufacture of coke in Indiana since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	0	0	11,753	11,753
1891	0	0	0	8,688	8,688
1892	0	0	0	6,456	6,456
1893	0	0	930	10,619	11,549
1894	0	0	8,689	4,800	13,489
1895	0	0	0	9,898	9,898
1896	0	0	0	8,956	8,956
1897	0	0	0	7,022	7,022
1898	0	0	0	4,065	4,065
1899 *a*	300	0	404	3,513	4,217
1900 *a*	0	0	689	3,916	4,605

a Includes Illinois.

INDIAN TERRITORY.

The 100 ovens reported as building in the Indian Territory at the close of 1899 were completed in 1900 and added to the output of coke for last year. These 100 ovens were built by the Mexican Gulf Coal and Transportation Company at Howe, the same company having already 50 ovens at Anderson. The other 80 ovens existing in the Territory are owned by the Osage Coal and Mining Company at Krebs.

The production of coke in 1900 amounted to 38,141 short tons, valued at $152,204, as compared with 24,339 short tons, valued at $71,965, in 1899. This indicated an increase of nearly 60 per cent in output, and of nearly 100 per cent in value. The average price per ton obtained during the year was $3.99, as compared with $2.96 in 1899.

The statistics of the manufacture of coke in the Indian Territory from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in the Indian Territory from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	1	20	0	2,494	1,546	$4,638	$3.00	62
1881	1	20	0	2,852	1,768	5,304	3.00	62
1882	1	20	0	3,266	2,025	6,075	3.00	62
1883	1	20	0	4,150	2,573	7,719	3.00	62
1884	1	20	0	3,084	1,912	5,736	3.00	62
1885	1	40	0	5,781	3,584	12,902	3.60	62
1886	1	40	0	10,242	6,351	22,229	3.30	62
1887	1	80	0	20,121	10,060	33,435	3.33	50
1888	1	80	0	13,126	7,502	21,755	2.90	57
1889	1	80	0	13,277	6,639	17,957	2.70	50
1890	1	80	0	13,278	6,639	21,577	3.25	50

Statistics of the manufacture of coke in the Indian Territory from 1880 to 1900—Continued.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1891	1	80	0	20,551	9,464	30,483	3.22	46
1892	1	80	0	7,138	3,569	12,402	3.47	50
1893	1	80	0	15,118	7,135	25,072	3.51	47
1894	1	80	0	7,274	3,051	10,693	3.50	42
1895	1	80	0	11,825	5,175	17,657	3.41	43.8
1896	2	130	0	53,028	21,021	73,574	3.50	40
1897	2	130	0	68,495	30,364	104,725	3.45	44.3
1898	2	130	0	73,330	34,110	96,639	2.833	46.5
1899	3	130	100	59,255	34,339	71,965	2.96	41
1900	3	230	0	79,534	38,141	152,204	3.99	48

The character of the coal used in the manufacture of coke in the Indian Territory since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in the Indian Territory since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	0	0	13,278	13,278
1891	0	0	9,500	11,051	20,551
1892	0	0	0	7,138	7,138
1893	0	0	0	15,118	15,118
1894	0	0	0	7,274	7,274
1895	0	0	0	11,825	11,825
1896	0	0	0	53,028	53,028
1897	0	6,923	0	61,572	68,495
1898	0	15,353	0	57,977	73,330
1899	0	0	0	59,255	59,255
1900	0	0	20,832	58,702	79,534

IOWA.

Up to the close of 1900 no successful attempts had been made to coke the dry coals in this State. It is reported, however, that several plants using the Hemingway process are to be erected at a number of points in the State, and it is possible that before the close of 1901 coke will be made from Iowa coals.

KANSAS.

The coke-making industry of Kansas has been of comparative insignificance, and the production in 1900 was about 60 per cent less than it was in 1899. Most of the coke produced in the State is made by the lead and zinc smelters for their own use, and the decrease in coke production in 1900 was probably due to the falling off in the production of spelter in that year. There were 91 ovens reported as existing in the State during 1900, four having been abandoned during the year. Of these 91 ovens 21 were idle throughout the entire year.

The statistics of the manufacture of coke in Kansas from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in Kansas from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	2	6	....	4,800	3,070	$6,000	$1.95	64
1881	3	15	....	8,800	5,670	10,200	1.80	64.4
1882	3	20	....	9,200	6,080	11,460	1.70	66
1883	4	23	....	13,400	8,430	16,560	1.96	62.9
1884	4	23	....	11,500	7,190	14,580	2.02	62.5
1885	4	23	....	15,000	8,050	13,255	1.65	53.7
1886	4	36	....	23,062	12,493	19,204	1.54	54.2
1887	4	39	....	27,604	14,950	28,575	1.91	54
1888	6	58	....	24,934	14,831	29,073	1.96	59.5
1889	6	68	....	21,600	13,910	26,593	1.91	64
1890	7	68	....	21,809	12,311	29,116	2.37	56
1891	6	72	....	27,181	14,174	33,296	2.35	52
1892	6	75	....	15,437	9,132	19,906	2.18	59.2
1893	6	75	0	13,645	8,565	18,640	2.18	62.8
1894	6	61	0	13,288	8,439	15,660	1.855	63.5
1895	5	55	0	8,424	5,287	11,289	2.14	62.8
1896	6	55	0	8,940	4,785	8,676	1.813	53.5
1897	4	57	0	11,772	6,181	9,272	1.50	52.5
1898	6	47	50	7,856	4,180	6,455	1.545	53
1899	9	95	0	26,988	14,476	30,817	2.13	53.6
1900	9	91	0	10,303	5,948	14,985	2.52	57.7

The character of the coal used in the manufacture of coke in Kansas since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Kansas since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	0	19,619	2,190	21,809
1891	0	0	27,181	0	27,181
1892	0	0	15,437	0	15,437
1893	0	0	12,445	1,200	13,645
1894	0	0	13,288	0	13,288
1895	0	0	8,424	0	8,424
1896	0	0	8,940	0	8,940
1897	0	0	11,772	0	11,772
1898	0	0	7,856	0	7,856
1899	0	6,210	20,778	0	26,988
1900	0	3,786	6,517	0	10,303

KENTUCKY.

The coking industry in Kentucky depends for its existence chiefly upon the utilization of the slack coal from the mines in the State. A small amount of run-of-mine coal is also used. Stimulated by the active demand for coke during 1899 and 1900, the production in Kentucky has increased notably from 22,242 tons in 1898, to 81,095 tons in 1899, and 95,532 tons in 1900. The value of the product has increased in even more pronounced degree from $32,213 in 1898 to $161,454 in 1899 and $235,505 in 1900. The amount of production in 1900 was a little more than four times what it was in 1898, while the value of the product in 1900 was more than seven times that of two years before. The average price per ton obtained in 1900 ($2.465) was the highest since 1885, and was 47 cents, or more than 25 per cent, higher than in 1899.

The statistics of the manufacture of coke in Kentucky from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in Kentucky from 1880 to 1900.

Year.	Establishment.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	5	45	....	7,206	4,250	$12,250	$2.88	59
1881	5	45	....	7,406	4,370	12,630	2.89	59
1882	5	45	....	6,906	4,070	11,530	2.83	59
1883	5	45	....	8,437	5,025	14,425	2.87	60
1884	5	45	....	3,451	2,223	8,760	3.94	64
1885	5	33	....	5,075	2,704	8,489	3.14	53
1886	6	76	2	9,055	4,528	10,082	2.23	50
1887	6	98	....	29,129	14,565	31,730	2.18	50
1888	10	132	2	42,642	23,150	47,244	2.04	54
1889	9	166	100	25,192	13,021	29,769	2.28	52
1890	9	175	103	24,372	12,343	22,191	1.80	51
1891	7	115	24	64,390	33,777	68,281	2.02	52
1892	5	287	100	70,783	36,123	72,563	2.01	51
1893	4	283	100	97,212	48,619	97,350	2.00	50
1894	6	293	0	66,418	29,748	51,566	1.73	44.8
1895	5	293	0	63,419	25,460	37,249	1.46	40.1
1896	4	264	0	55,719	27,107	42,062	1.55	48.6
1897	5	268	0	64,234	32,117	45,454	1.41	50
1898	5	292	2	44,484	22,242	32,213	1.448	50
1899	6	300	130	151,503	81,095	161,454	1.99	53.5
1900	5	458	3	190,268	95,532	235,505	2.465	50.2

The character of the coal used in the manufacture of coke in Kentucky since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Kentucky since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	3,000	2,100	19,272	24,372
1891	11,000	0	3,500	49,890	64,390
1892	0	5,955	7,883	56,945	70,783
1893	825	11,973	26,759	57,655	97,212
1894	0	2,980	7,900	55,538	66,418
1895	0	502	624	62,293	63,419
1896	16,271	0	0	39,448	55,719
1897	4,176	0	0	60,058	64,234
1898	0	1,800	0	42,684	44,484
1899	21,600	0	30,263	99,640	151,503
1900	6,043	17,717	78,583	87,925	190,268

MASSACHUSETTS.

The production of the plant of Otto-Hoffman ovens at Everett, near Boston, is included with that of Pennsylvania, in order that individual information may not be divulged.

MISSOURI.

The conditions affecting the coke industry in Missouri are similar to those mentioned in regard to Kansas. The industry is a small one and is carried on principally by the lead and zinc smelters in the manufacture of coke for their own consumption. As in Kansas, the production in 1900 shows a decrease as compared with 1899.

The statistics of the production of coke in Missouri from 1887, when coking began in this State, to 1900 are as follows:

Statistics of the manufacture of coke in Missouri from 1887 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1887	1	4	....	5,400	2,970	$10,395	$3.50	55
1888	1	4	....	5,000	2,600	9,100	3.50	52
1889	3	9	....	8,485	5,275	5,800	1.10	62
1890	3	10	....	9,491	6,136	9,240	1.51	65
1891	3	10	....	10,377	6,872	10,000	1.45	66
1892	3	10	....	11,088	7,299	10,949	1.50	65.8
1893	3	10	0	8,875	5,905	9,735	1.65	66.5
1894	3	10	0	3,442	2,250	3,563	1.58	65.4
1895	3	10	0	3,120	2,028	2,442	1.20	65
1896	3	7	0	4,471	2,500	4,131	1.65	55.9
1897	3	15	0	4,627	2,593	3,890	1.50	56
1898	3	8	0	1,500	740	1,050	1.42	49.3
1899	4	12	0	5,320	2,860	5,520	1.93	53.8
1900	3	10	0	3,775	2,087	5,268	2.52	55.3

The character of the coal used for coke in Missouri since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Missouri since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	0	9,491	0	9,491
1891	0	0	10,377	0	10,377
1892	0	0	11,088	0	11,088
1893	0	0	8,875	0	8,875
1894	0	0	3,442	0	3,442
1895	0	0	3,120	0	3,120
1896	0	0	4,471	0	4,471
1897	0	0	4,627	0	4,627
1898	0	0	1,500	0	1,500
1899	0	0	5,320	0	5,320
1900	0	0	2,680	1,095	3,775

MONTANA.

There are three coke-making establishments in Montana, consisting in 1900 of a total of 342 ovens, an increase of 39 ovens from 1899. The production slightly decreased in 1900, however, as compared with the preceding year. There were 111 new ovens in course of construction at the works of the Montana Coal and Coke Company on December 31, and it is probable that the production for 1901 will show a considerable increase. Of the 342 ovens in existence, 100 were idle during 1900.

The statistics of the manufacture of coke in Montana from 1883, when ovens were first reported, to 1900 are as follows:

Statistics of the manufacture of coke in Montana from 1883 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1883	1	2	0	0	0	0	0	0
1884	3	5	12	165	75	$900	$12.00	46
1885	2	2	0	300	175	2,063	11.72	58.5
1886	4	16	0	0	0	0	0	0
1887	2	27	0	10,800	7,200	72,000	10.00	66.7
1888	1	40	0	20,000	12,000	96,000	8.00	60
1889	2	90	50	30,576	14,043	122,023	8.69	46
1890	2	140	0	32,148	14,427	125,655	8.71	45
1891	2	140	0	61,667	29,009	258,523	8.91	47
1892	2	153	0	64,412	34,557	311,013	9.00	53.6
1893	2	153	0	61,770	29,945	239,560	8.00	48.5
1894	2	153	0	33,313	17,388	165,187	9.50	52.2
1895	3	303	0	55,770	25,337	189,856	7.49	45.4
1896	3	303	0	113,165	60,078	425,483	7.08	53
1897	3	303	0	139,907	67,849	467,481	6.89	48.5
1898	4	318	0	92,552	52,009	359,174	6.91	56
1899	3	303	0	110,274	56,376	356,190	6.32	51
1900	3	342	111	108,710	54,731	337,079	6.159	50.3

The character of the coal used in the manufacture of coke in Montana since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Montana.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	0	22,852	0	9,296	32,148
1891	0	34,000	0	27,667	61,667
1892	0	28,000	0	36,412	64,412
1893	0	44,000	0	17,770	61,770
1894	0	33,313	0	0	33,313
1895	0	0	0	55,770	55,770
1896	0	50,000	0	63,165	113.165
1897	0	75,000	0	64,907	139,907
1898	12,000	60,000	0	20,552	92,552
1899	0	0	0	110,274	110,274
1900	0	74,475	0	34,235	108,710

NEW MEXICO.

The production of coke in the Territory of New Mexico in 1900 was not materially different from that of the preceding year, the output being 44,774 short tons, as compared with 44,134 short tons in 1899. The value, however, showed a notable increase from $99,217 to $130,251, the average price per ton increasing from $2.25 to $2.91. There are only two establishments in the Territory, with a total of 126 ovens, all of which were operated to some extent in 1900.

The statistics of the production of coke in New Mexico from 1882, when coke ovens were first reported, until 1900 are as follows:

Statistics of the manufacture of coke in New Mexico from 1882 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.	Short tons.	Short tons.			Per cent.
1882	2	0	12	1,500	1,000	$6,000	$6.00	66⅔
1883	2	12	28	6,941	3,905	21,478	5.50	57¼
1884	2	70	0	29,990	18,282	91,410	5.00	57¼
1885	2	70	0	31,889	17,940	89,700	5.00	56¼
1886	2	70	0	18,194	10,236	51,180	5.00	56
1887	1	70	0	22,549	13,710	82,260	6.00	61
1888	1	70	0	14,628	8,540	51,240	6.00	58
1889	2	70	0	7,162	3,460	18,408	5.32	48
1890	2	70	0	3,980	2,050	10,025	4.89	51.5
1891	1	70	0	4,000	2,300	10,925	4.75	57.5
1892	1	50	0	0	0	0	0	0
1893	1	50	0	14,698	5,803	18,476	3.18	39.5
1894	1	50	0	13,042	6,529	28,213	4.32	50
1895	1	50	0	22,385	14,663	29,491	2.01	65.5
1896	1	50	0	39,286	24,228	48,453	2.00	61.7
1897	2	126	0	2,585	1,438	3,232	2.25	55.6
1898	2	126	0	12,557	6,980	14,625	2.095	55.6
1899	2	126	0	68,594	44,134	99,217	2.25	64.3
1900	2	126	0	74,261	44,774	130,251	2.909	60.3

The character of the coal used in the manufacture of coke in New Mexico since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in New Mexico since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	3,980	0	0	0	3,980
1891	4,000	0	0	0	4,000
1892	0	0	0	0	0
1893	14,698	0	0	0	14,698
1894	0	0	13,042	0	13,042
1895	....	....	....	....	22,385
1896	0	0	39,286	0	39,286
1897	0	0	2,585	0	2,585
1898	0	0	12,557	0	12,557
1899	0	0	68,594	0	68,594
1900	10,611	0	27,604	36,046	74,261

NEW YORK.

The production of coke at the Semet-Solvay ovens at Syracuse is included with that of Reynoldsville-Walston, the district of Pennsylvania from which the coal is drawn. There were five new ovens added to this plant in 1900, increasing the total to 30. The returns for 1900 show also that there were 564 Otto-Hoffman by-product ovens in course of construction at Buffalo. These ovens will be operated in connection with the Lackawanna Steel Company, whose plant has been moved to that city.

Statistics of the manufacture of coke in New York.

	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Establishments	1	1	1	1	1	1	1	2
Ovens built	12	12	12	25	25	25	25	30
Ovens building	13	13	13	0	0	0	5	564
Coke produced .... tons	12,850	16,500	18,521	......	......	......	......	......
Coal used .... do	15,150	....	22,207	......	......	......	......	......
Yield of coal in coke .... per cent	84.8	....	83.4	......	......	......	......	......

OHIO.

Ohio is one of the few States in which the coke production in 1900 was less than that of 1899. Notwithstanding the large amount of coke consumed in the State and the extensive fields of coal from which a good quality of coke can be made, the industry has never reached any great proportions, the iron and steel mills and other consumers depending upon the Pennsylvania and West Virginia coking fields for their supply.

In the following table the statistics of the production of coke in the two districts of Ohio for the years 1880 to 1900 are consolidated:

Statistics of the manufacture of coke in Ohio from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	15	616	25	172,453	100,596	$255,905	$2.54	58
1881	15	641	0	201,045	119,469	297,728	2.49	59
1882	16	647	0	181,577	103,722	266,113	2.57	57
1883	18	682	0	152,502	87,834	225,660	2.57	58
1884	19	732	0	108,164	62,709	156,294	2.49	58
1885	13	642	0	68,796	39,416	109,723	2.78	57
1886	15	560	0	59,332	34,932	94,042	2.69	59
1887	15	585	223	164,974	93,004	245,981	2.65	56
1888	15	547	12	124,201	67,194	166,330	2.48	54
1889	13	462	0	132,828	75,124	188,222	2.50	56
1890	13	443	1	126,921	74,633	218,090	2.92	59
1891	9	421	0	69,320	38,718	76,901	1.99	56
1892	10	436	0	95,236	51,818	112,907	2.18	54.4
1893	9	435	0	42,963	22,436	43,671	1.95	52
1894	8	363	0	55,324	32,640	90,875	2.78	59
1895	8	377	0	51,921	29,050	69,655	2.40	56
1896	9	431	0	128,923	80,868	208,789	2.58	62.7
1897	9	433	0	151,545	95,087	235,784	2.48	62.7
1898	10	441	0	134,757	85,535	211,558	2.47	63.5
1899	8	385	0	142,678	83,878	255,129	3.04	58.8
1900	8	369	50	115,269	72,116	194,042	2.69	62.5

The statistics of the manufacture of coke in the Cincinnati district from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in the Cincinnati district, Ohio, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	4	32	0	16,141	10,326	$42,255	$4.09	64
1881	4	32	0	20,607	13,237	54,439	4.11	64
1882	4	32	0	19,687	12,045	47,437	3.78	61
1883	5	57	0	33,978	20,106	65,990	3.28	59
1884	5	57	0	32,134	18,840	61,072	3.24	59
1885	5	82	0	17,480	10,962	35,873	3.27	63
1886	5	82	0	17,015	10,566	31,633	2.99	62.1
1887	5	150	20	56,723	32,894	95,754	2.91	58
1888	6	156	12	63,217	35,868	95,618	2.67	57
1889	5	146	0	75,892	45,108	120,899	2.68	59.4
1890	5	150	0	68,266	43,278	171,848	3.97	63
1891	3	130	0	13,403	9,080	31,529	3.47	67.7
1892	4	146	0	31,330	19,320	64,319	3.33	61.3
1893	3	142	0	13,700	9,000	27,000	3.00	65.7
1894	3	92	0	42,995	26,417	81,751	3.09	61
1895	3	92	0	9,628	5,657	16,971	3.00	58.8
1896	3	92	0	16,495	10,181	31,068	3.05	61.7
1897	3	92	0	40,200	23,532	67,079	2.85	59
1898	3	92	0	27,451	16,329	46,179	2.828	59.5
1899	2	92	0	34,176	20,678	69,373	3.35	60.5
1900	3	76	50	30,400	18,200	66,660	3.66	59.9

Statistics of the manufacture of coke in the Ohio district, Ohio, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	11	584	25	156,312	90,270	$213,650	$2.37	57
1881	11	609	0	180,438	106,232	243,289	2.39	59
1882	12	615	0	161,890	91,677	218,676	2.39	57
1883	13	625	0	118,524	67,728	459,670	2.36	57
1884	14	675	0	76,030	43,869	95,222	2.17	58
1885	8	560	0	51,316	28,454	73,850	2.60	55
1886	10	478	0	42,317	24,366	62,409	2.56	57.7
1887	10	435	203	108,251	60,110	150,227	2.50	55.5
1888	9	391	0	60,984	31,326	70,712	2.25	51
1889	8	316	0	56,936	30,016	67,323	2.24	52.7
1890	8	293	1	58,655	31,335	46,242	1.47	53.4
1891	6	291	0	55,917	29,638	45,372	1.53	53
1892	6	290	0	63,906	32,498	48,588	1.50	50.9
1893	6	293	0	29,263	13,436	16,671	1.24	46
1894	5	271	0	12,329	6,223	9,124	1.466	50.5
1895	5	285	0	42,293	23,393	52,684	2.25	55.3
1896	6	339	0	112,428	70,687	177,721	2.51	62.8
1897	6	341	0	111,345	71,555	168,705	2.36	64
1898	7	349	0	107,306	69,206	165,379	2.39	64.5
1899	6	293	0	108,502	63,200	185,756	2.94	58.2
1900	5	293	0	84,869	53,916	127,382	2.36	63.5

The character of the coal used in the manufacture of coke in Ohio since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Ohio since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	34,729	0	54,473	37,719	126,921
1891	5,200	0	64,120	0	69,320
1892	35,334	0	32,402	27,500	95,236
1893	0	0	24,859	18,104	42,963
1894	0	0	14,845	40,479	55,324
1895	28,053	0	10,868	13,000	51,921
1896	88,616	0	24,325	15,982	128,923
1897	92,192	0	29,353	30,000	151,545
1898	92,963	0	19,794	22,000	134,757
1899	88,771	0	23,907	30,000	142,678
1900	68,175	0	17,094	30,000	115,269

PENNSYLVANIA.

The statistics of production of coke in Pennsylvania during the last five years have included the amount made at Syracuse, N. Y., and in 1899 and 1900 the production report for Pennsylvania has included also that of Massachusetts. Including these, the production in 1900 amounted to 13,798,893 short tons of coke, valued at $30,853,449. Compared with the output for 1899, this indicates an increase of 221,023 tons. This is a comparatively small percentage of increase, compared with that of some other States, but in amount it was larger than the total product of any other coke-producing State, with the exception of Alabama, Colorado, Tennessee, Virginia, and West Virginia. The value, on the other hand, increased nearly $8,000,000 or about 35 per cent, as compared with 1.5 per cent increase in product. The inference to be drawn from this is that the enormous increase in the product of iron and steel within the last two years has taxed the coke-producing regions of Pennsylvania to their utmost capacity, although in some cases it is known that a lack of car supply has to some extent interfered with the coke shipments. These conditions resulted in an unprecedented advance in the price of Pennsylvania coke, and, as shown in the following table, the average price for all grades of coke sold during the year was $2.24, the highest figure ever reached. It was 55 cents or about 34 per cent advance over the average price for 1899, and was 33 cents above the highest point previously reached in twenty years.

That the industrial conditions in 1899 and early part of 1900 were such as to tax the capacity of the coking regions is shown by the fact that nearly 5,000 new ovens were added during the latter year to those already in existence, and that 2,310 more were in process of construction at the close of the year. This is the largest number of new ovens added during any period of similar length throughout the history of the industry.

The statistics for 1900 show that out of 32,548 ovens in existence at the close of the year, there were 699 which were idle throughout the entire year. A number of these idle ovens were newly constructed and had not been put in blast by December 31. Other ovens, portions of plants which were operated during the year, were idle a part of the time. The average number of ovens in operation throughout the year amounted to 23,710; that is to say, the total number of ovens operated at one time or another during the year would be equivalent to 23,710 ovens operated throughout the entire twelve months, or about three hundred and twelve days.

The quality of the coal produced in the principal coking regions of Pennsylvania is such that little or no preparation is necessary before charging into the ovens. For this reason it is found that by far the larger part of the coal used in coke making in Pennsylvania is unwashed run-of-mine. It is noticeable, however, that the amount of washed run-of-mine and also the amount of washed slack used in 1900 was much larger than in any preceding year.

In the following table the statistics are given of the production of coke in Pennsylvania for the years 1880 to 1900:

Statistics of the manufacture of coke in Pennsylvania from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	124	9,501	836	4,347,558	2,821,384	$5,255,040	$1.86	65
1881	132	10,881	761	5,393,503	3,437,708	5,898,579	1.70	64
1882	137	12,424	642	6,149,179	3,945,034	6,133,698	1.55	64
1883	140	13,610	211	6,823,275	4,438,464	5,410,387	1.22	65
1884	145	14,285	232	6,204,604	3,822,128	4,783,230	1.25	62
1885	133	14,553	317	6,178,500	3,991,805	4,981,656	1.25	64.6
1886	108	16,314	2,558	8,290,849	5,406,597	7,664,023	1.42	65.2
1887	151	18,294	802	8,938,438	5,832,849	10,746,352	1.84	65.3
1888	120	20,381	1,565	9,673,097	6,545,779	8,230,759	1.26	68
1889	109	22,143	567	11,581,292	7,659,055	10,743,492	1.40	66
1890	106	23,430	74	13,046,143	8,560,245	16,333,674	1.91	65.6
1891	109	25,324	11	10,588,544	6,954,846	12,679,826	1.82	66
1892	109	25,366	269	12,591,345	8,327,612	15,015,336	1.80	66.1
1893	102	25,744	19	9,386,702	6,229,051	9,468,036	1.52	66
1894	101	25,824	118	9,059,118	6,063,777	6,585,489	1.086	66.9
1895	99	26,042	170	14,211,567	9,404,215	11,908,162	1.266	66.2
1896 *a*	158	26,658	154	11,124,610	7,356,502	13,182,859	1.792	66.1
1897 *a*	153	26,910	307	13,538,646	8,966,924	13,727,966	1.53	66.2
1898 *a*	151	27,157	292	16,307,841	10,715,302	16,078,505	1.50	65.7
1899 *b*	150	27,591	1,666	19,930,419	13,577,870	22,881,910	1.69	68.1
1900 *b*	169	32,548	2,310	20,831,196	13,798,893	30,853,449	2.236	66.2

a Includes coal used, coke produced, and its value, in New York.
b Figures of last 5 columns include Massachusetts and New York.

The character of the coal used in the manufacture of coke in Pennsylvania since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Pennsylvania since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	11,788,625	303,591	630,195	323,732	13,046,143
1891	9,470,646	256,807	558,106	302,985	10,588,544
1892	11,237,253	159,698	1,059,994	134,400	12,591,345
1893	8,302,307	216,762	739,128	128,505	9,386,702
1894	8,671,534	118,279	204,811	64,494	9,059,118
1895	13,618,376	34,728	440,869	117,594	14,211,567
1896 *a*	9,289,089	273,082	1,463,047	99,392	11,124,610
1897 *a*	11,540,459	301,052	1,441,611	255,524	13,538,646
1898 *a*	14,083,073	350,153	1,472,347	402,268	16,307,841
1899 *b*	16,854,706	366,206	1,824,784	884,723	19,930,419
1900 *b*	17,737,204	647,045	1,300,796	1,146,151	20,831,196

a Includes coal used in New York.
b Includes coal used in Massachusetts and New York.

PRODUCTION BY DISTRICTS.

The coke-producing regions of Pennsylvania have been divided for the sake of convenience into districts having well-defined geographical or other specific limitations. Most of these have been described in previous volumes of Mineral Resources. A new district is added to the list for 1900. This is what has been commonly known as the Klondike district, which is an extension southwest of the Connellsville Basin. On account of its position in relation to the Connellsville district, and also from the fact that the coal is not dissimilar to the Connellsville coal, the name of Lower Connellsville has been designated as an appropriate title for this district. All of the coke ovens in this district which were in existence at the close of 1900 were completed and put in blast in that year, none being in operation more than seven months. The first coke was drawn from the first bank of ovens (that of the Colonial Coke Company, at Smock) on June 1, 1900. The largest plant in the district was in operation only a few days in 1900.

A brief statement published in the previous volumes regarding the territory included in other coking districts of the State is repeated here.

The Allegheny Mountain district includes the ovens along the line of the Pennsylvania Railroad from Gallitzin eastward over the crest of the Alleghenies to beyond Altoona. The Allegheny Valley district includes the coke works of Armstrong and Butler counties and one of those in Clarion County, the other ovens in the latter county being included in the Reynoldsville-Walston district. What was previously known as the Beaver district included the ovens in Beaver and Mercer counties, but all the ovens in Beaver County have been abandoned and the operations of the 25 Semet-Solvay ovens in Mercer County are now included in the Pittsburg district. The Blossburg and Broad Top districts embrace the Blossburg and Broad Top coal fields. The ovens of the Clearfield-Center district are chiefly in the two counties from which it derives its name. The Connellsville district is the well-known region in western Pennsylvania, in Westmoreland and Fayette counties, extending from just south of Latrobe to Fairchance. The Greensburg, Irwin, Pittsburg, and Reynoldsville-Walston districts include the ovens near the towns which have given the names to these districts. The Upper Connellsville district, sometimes called the Latrobe district, is near the town of Latrobe.

The Allegheny Valley district may be considered as practically abandoned, as no coke has been made there during the last three years.

The statistics of the coke production in Pennsylvania in 1899 and 1900 are shown in the following tables. It will be noticed that there was an advance in the average price per ton in every district in the State in which coke was produced.

Coke production in Pennsylvania in 1899, by districts.

District.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Average price per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per ct.*
Allegheny Mountain	13	*a* 1,256	8	730,843	478,340	$959,740	$2.01	65.5
Allegheny Valley	2	116	0	0	0	0	0	0
Broad Top	5	519	3	161,196	107,258	197,895	1.85	66.5
Clearfield-Center	6	450	50	198,110	130,965	234,527	1.79	66.1
Connellsville	86	*b* 19,294	792	14,974,018	10,390,335	17,075,411	1.64	69.4
Greensburg	4	307	240	173,811	110,594	247,421	2.24	63.6
Irwin	5	697	0	223,457	133,085	197,694	1.48	59.6
Pittsburg	10	*c* 1,312	505	954,028	644,467	1,189,117	1.84	67.6
Reynoldsville-Walston *d*	6	1,779	0	1,581,164	972,933	1,793,807	1.84	61.5
Upper Connellsville	13	1,861	68	933,792	609,893	986,298	1.62	65.3
Total	150	27,591	1,666	19,930,419	13,577,870	22,881,910	1.69	68.1

a Includes 160 Otto-Hoffman ovens.
b Includes 50 Semet-Solvay ovens.
c Includes 120 Otto-Hoffman and 25 Semet-Solvay ovens.
d Includes production and value of coke in Massachusetts and New York.

Coke production in Pennsylvania in 1900, by districts.

District.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Average price per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per ct.*
Allegheny Mountain	14	*a* 1,341	0	876,440	557,184	$1,260,441	$2.26	63.6
Allegheny Valley	1	66	0	0	0	0	0	0
Broad Top	6	532	*e* 232	179,088	113,448	230,580	2.03	63.3
Clearfield-Center	7	568	0	212,196	134,828	283,592	2.10	63.5
Connellsville	91	*b* 21,061	686	14,971,923	10,039,388	22,431,019	2.234	67
Greensburg	4	476	280	229,825	133,191	306,826	2.30	58
Irwin	5	697	0	93,647	61,630	153,743	2.49	65.8
Lower Connellsville	10	1,498	1,112	170,590	111,379	220,137	1.976	65.3
Pittsburg	9	*c* 2,096	0	1,246,684	826,727	1,943,544	2.35	66.3
Reynoldsville-Walston *d*	7	2,010	0	1,707,153	1,067,151	2,509,060	2.35	62.5
Upper Connellsville	15	2,203	0	1,143,650	753,967	1,514,507	2.008	65.9
Total	169	32,548	2,310	20,831,196	13,798,893	30,853,449	2.236	66.2

a Includes 160 Otto-Hoffman ovens.
b Includes 50 Semet-Solvay ovens.
c Includes 120 Otto-Hoffman and 25 Semet-Solvay ovens.
d Includes production and value of coke in Massachusetts and New York.
e Otto-Hoffman ovens at Lebanon.

Allegheny Mountain district.—This district includes the coke ovens lying along the line of the Pennsylvania Railroad east of Blairsville and those in Somerset County. The coke ovens in the vicinity of Johnstown are also included in this district. Among the Johnstown ovens are included 160 Otto-Hoffman by-product ovens, 100 of which were put in blast during 1899, and the increased production of the district in 1900 was due largely to the operations of this plant. The statistics for 1900 show an increase of 85 in the number of ovens in use over 1899, and an increase in production of 78,844 short tons of coke. Among the new ovens added to the district in 1900 there were 8 Newton-Chambers by-product beehives. All of the 14 establishments reported for the district were operated in 1900.

The statistics of the manufacture of coke in the Allegheny Mountain district from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in the Allegheny Mountain district of Pennsylvania from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	8	291	0	201,345	127,525	$289,929	$2.27	63
1881	9	371	0	225,563	144,430	329,198	2.28	64
1882	10	481	0	284,544	179,580	377,286	2.10	63
1883	10	532	0	200,343	135,342	240,641	1.78	68
1884	12	614	0	241,459	156,290	203,213	1.30	65
1885	11	523	82	327,666	212,242	286,530	1.30	65
1886	10	579	14	351,070	227,369	374,013	1.64	64.8
1887	10	694	150	461,922	297,724	671,437	2.25	64.4
1888	12	950	145	521,047	335,689	479,845	1.43	64.4
1889	16	1,069	20	564,112	354,288	601,964	1.69	63.5
1890	16	1,171	0	633,974	402,514	730,048	1.81	63.5
1891	16	1,201	0	708,528	448,067	782,175	1.75	63
1892	16	1,260	0	724,903	448,522	775,927	1.73	61.9
1893	15	1,260	0	275,865	173,131	264,292	1.53	62.8
1894	15	1,253	0	92,965	58,823	71,161	1.21	63.3
1895	13	1,233	60	271,096	173,965	214,741	1.23	64
1896	13	*a* 1,188	0	408,827	266,473	349,373	1.31	65
1897	13	*a* 1,185	0	417,470	278,578	365,191	1.31	66.7
1898	13	*a* 1,158	*b* 100	572,568	378,410	511,202	1.35	66
1899	13	*c* 1,256	8	730,843	478,340	959,740	2.01	65.5
1900	14	*d* 1,341	0	876,440	557,184	1,260,441	2.26	63.6

a Includes 60 Otto-Hoffman ovens.
b Otto-Hoffman ovens.
c Includes 160 Otto-Hoffman ovens.
d Includes 160 Otto-Hoffman and 8 Newton-Chambers ovens.

Connellsville district.—This district, which is the most famous coke region not only in the United States but in the world, is included altogether in the counties of Fayette and Westmoreland. The total production from this region has exceeded 50 per cent of the total coke product of the United States, although the production in 1900 was a little less than this proportion. There is only one year in the history of the district prior to 1900 in which the production of Connellsville coke was less than half of the total of the United States. This was in 1896, and was due to the high prices arbitrarily set on Connellsville coke by some of the larger producers, which forced many of the more important consumers to other sources of supply. As compared with 1899, the production of coke in the Connellsville region in 1900 showed a decrease of 350,947 short tons. This was due to three causes: First, a slump in the iron trade which occurred during the summer months; second, to shortage of cars during the first few months of the year, when the demand for Connellsville coke was exceedingly active; third, the utilization by the Carnegie Steel Company of the large supply of coke which had been stored at Pittsburg for several years in anticipation of an interference by strikes with the supply of fuel. This stored coke is said to have contained altogether 200,000 carloads, which at an average of 20 tons to the car would be equivalent to about 4,000,000 tons. It was stored in 1894, at a time when the average price of Connellsville coke was $1.35. It was used at a time when Connellsville coke was ranging at between $4 and $4.50 per ton.

The year 1900 opened with a continuation of the active demand for Connellsville coke which had prevailed throughout 1899, the producers complaining of the inability to secure cars in sufficient quantity to meet the trade requirements. This condition continued until the latter part of May, when the unlooked-for, and by many deemed uncalled-for, depression of the iron trade caused a sudden falling off in the demand for coke. Production was materially decreased and thousands of ovens were put out of blast. Prices dropped nearly 50 per cent as compared with the earlier months of the year, but were even then higher than the average for 1899 or any previous year. The iron trade did not recover from this depression until October, from which time until the close of the year the demand was fairly steady.

Nearly 1,800 new ovens were added to the Connellsville district in 1900, and 686 were in course of construction at the close of the year; but, owing to the causes previously mentioned, the production declined from 10,390,335 short tons in 1899 to 10,039,388 short tons in 1900. The value, however, increased from $17,079,411 to $22,431,019, a gain of $5,355,608, or more than 30 per cent. The value of the product in 1900 was nearly double that of 1898. The average price per ton realized ($2.234) was the highest ever recorded.

The following are the statistics of the manufacture of coke in the Connellsville region from 1880 to 1900:

Statistics of the manufacture of coke in the Connellsville region, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	Short tons.			Per cent.
1880	67	7,211	731	3,367,856	2,205,946	$3,948,643	$1.79	65.5
1881	70	8,208	654	4,018,782	2,639,002	4,301,573	1.63	65.7
1882	72	9,283	592	4,628,736	3,043,394	4,473,789	1.47	65.8
1883	74	10,176	101	5,355,380	3,552,402	4,049,738	1.14	66.3
1884	76	10,543	200	4,829,054	3,192,105	3,607,078	1.13	66.1
1885	68	10,471	48	4,683,831	3,096,012	3,776,388	1.22	66.1
1886	36	11,324	1,895	6,305,460	4,180,521	5,701,086	1.36	66.3
1887	73	11,923	98	6,182,846	4,146,989	7,437,669	1.79	67
1888	38	12,818	1,320	7,191,708	4,955,553	5,884,081	1.19	69
1889	29	14,458	430	8,832,371	5,930,428	7,974,633	1.34	67
1890	28	15,865	30	9,748,449	6,464,156	11,537,370	1.94	66.3
1891	33	17,551	0	7,083,705	4,760,665	8,903,454	1.87	67
1892	31	17,309	0	9,389,549	6,329,452	11,598,407	1.83	67.4
1893	28	17,504	5	7,095,491	4,805,623	7,141,031	1.49	67.7
1894	29	17,829	0	7,656,169	5,192,080	5,405,691	1.04	67.8
1895	29	18,028	80	12,174,597	8,181,179	10,122,458	1.237	67.2
1896	88	a18,347	0	8,107,536	5,462,490	10,018,946	1.834	67.4
1897	86	a18,467	92	10,243,690	6,860,826	10,662,428	1.55	67
1898	88	a18,927	20	12,454,969	8,315,350	12,626,292	1.518	66.8
1899	86	a19,294	792	14,974,018	10,390,335	17,075,411	1.64	69.4
1900	91	a21,061	686	14,971,923	10,039,388	22,431,019	2.234	67

a Includes 50 Semet-Solvay by-product ovens.

The following table, compiled by the Connellsville Courier, of Connellsville, Pa., shows the shipments of coke from the Connellsville region in 1900, by months, in cars and tons, with the average number of cars shipped each working day in the month:

Shipments of coke from the Connellsville region in 1900, by months.

Month.	Cars.	Daily average.	Tons.
January	50,939	1,887	1,001,882
February	47,889	1,995	910,729
March	52,493	1,944	1,044,588
April	49,738	1,990	982,551
May	46,410	1,720	934,186
June	42,971	1,653	872,316
July	35,436	1,363	732,981
August	34,190	1,266	698,065
September	32,982	1,319	673,336
October	35,680	1,322	734,748
November	36,020	1,385	751,443
December	39,662	1,586	829,409
Total	504,410	1,619	10,166,234

The monthly shipments of coke from this region in the years 1896, 1897, 1898, 1899, and 1900, as reported by the Courier, are given in the following table:

Monthly shipments of coke from the Connellsville region in the years 1896, 1897, 1898, 1899, and 1900.

[Short tons.]

Month.	1896.	1897.	1898.	1899.	1900.
January	617,458	485,624	727,739	779,792	1,001,882
February	529,347	466,206	667,287	699,474	910,729
March	550,470	521,484	744,987	839,763	1,044,588
April	547,625	493,027	701,317	831,964	982,551
May	528,822	501,857	680,754	804,023	934,186
June	477,227	500,483	636,877	837,123	872,316
July	470,988	583,867	646,065	883,735	732,981
August	330,468	562,703	662,880	889,078	698,065
September	257,547	625,902	644,422	813,190	673,336
October	304,998	737,498	731,602	874,357	734,748
November	323,419	700,352	844,907	935,608	751,443
December	473,296	736,049	771,275	941,657	829,409
Total	5,411,665	6,915,052	8,460,112	10,129,764	10,166,234

The total shipments as given in the foregoing tables show comparatively insignificant differences between them and the total production as compiled by the Geological Survey. The shipments for 1899 as reported by the Courier were slightly less than the production as reported to the Survey, while in 1900 the shipments exceeded the production by 1 per cent. The Courier also publishes each year a statement as to the number of cars shipped from the region to the three chief points of general distribution. The figures for 1898, 1899, and 1900, as reported to the Courier, are shown in the following tables:

Monthly shipments of coke from the Connellsville region, in cars, to points of distribution during 1898, 1899, and 1900.

[Cars.]

Month.	Pittsburg.	West.	East.	Total.	Daily average.
1898.					
January	14,051	19,044	5,253	38,348	1,475
February	12,009	17,685	5,431	35,125	1,463
March	13,323	19,257	6,414	38,994	1,451
April	12,758	18,235	5,825	36,818	1,416
May	13,047	17,347	5,387	35,781	1,376
June	12,023	16,325	5,241	33,589	1,292
July	13,201	15,655	5,492	34,348	1,321
August	13,603	15,801	5,552	34,956	1,295
September	11,856	16,547	5,448	33,851	1,302
October	13,250	19,330	5,892	38,472	1,480
November	13,387	20,923	6,681	40,991	1,576
December	14,453	18,847	6,676	39,976	1,537
Total	156,961	214,996	69,292	441,249	1,415

Monthly shipments of coke from the Connellsville region, in cars, to points of distribution during 1898, 1899, and 1900—Continued.

[Cars.]

Month.	Pittsburg.	West.	East.	Total.	Daily average.
1899.					
January	13,826	20,559	5,935	40,320	1,550
February	12,402	18,694	5,201	36,297	1,512
March	13,886	22,741	6,975	43,602	1,615
April	13,738	22,699	6,964	43,401	1,736
May	14,154	20,850	6,651	41,655	1,543
June	13,905	22,194	7,245	43,344	1,667
July	15,052	22,674	8,293	46,019	1,770
August	13,348	25,118	8,127	46,593	1,726
September	13,852	21,708	6,827	42,387	1,630
October	14,753	22,895	7,452	45,100	1,735
November	13,925	25,542	8,071	47,538	1,828
December	13,741	25,258	7,948	46,947	1,805
Total	166,582	270,932	85,689	523,203	1,676
1900.					
January	15,366	26,271	9,302	50,939	1,887
February	14,519	24,763	8,607	47,889	1,995
March	15,614	28,010	8,869	52,493	1,944
April	12,917	27,128	9,693	49,738	1,990
May	12,338	24,066	10,006	46,410	1,720
June	12,462	21,935	8,574	42,971	1,653
July	12,087	17,359	5,990	35,436	1,363
August	12,884	14,902	6,404	34,190	1,266
September	12,310	15,260	5,412	32,982	1,319
October	12,947	16,282	6,451	35,680	1,322
November	13,712	16,145	6,163	36,020	1,385
December	14,292	18,140	7,230	39,662	1,586
Total	161,448	250,261	92,701	504,410	1,619

The total shipments, in cars, for the last thirteen years were as follows:

Total and daily average shipments, in cars, from 1888 to 1900.

Year.	Daily average.	Total cars.	Year.	Daily average.	Total cars.
1888	905	282,441	1895	1,410	441,243
1889	1,046	326,220	1896	920	289,137
1890	1,147	355,070	1897	1,181	367,383
1891	884	274,000	1898	1,415	441,249
1892	1,106	347,012	1899	1,676	523,203
1893	874	270,930	1900	1,619	504,410
1894	900	281,677			

The following table shows how prices were quoted throughout the year 1900:

Average monthly prices of Connellsville coke, per short ton, during 1900.

Month.	Furnace.		Foundry.		Crushed.	
January	$2.75 to	$3.50	$3.00 to	$4.00		
February	2.75	3.50	3.00	4.00		
March	3.25	4.25	3.75	4.50		
April	3.25	4.25	3.25	4.50		
May	3.00	3.25	3.00	3.50		
June	2.50	3.00	3.00	3.25		
July	2.00	2.50	2.75	3.00	$3.00 to	$3.25
August		2.00		2.75	3.00	3.25
September		2.00	2.25	2.50	2.75	3.00
October		2.00	2.25	2.50		
November		2.00	2.25	2.50		
December	1.75	2.00	2.25	2.50		

How the above compares with the prices for the corresponding months in 1899 may be seen below:

Average monthly prices of Connellsville coke, per short ton, during 1899.

Month.	Furnace.		Foundry.		Crushed.
January		$1.60	$1.75 to	$2.30	$2.30
February		1.60	1.90	2.30	2.30
March	$1.60 to	1.75	2.00	2.30	2.30
April		1.75	2.15	2.30	2.30
May	1.75 to	2.15	2.15	2.30	2.30
June	2.15	2.25	2.15	2.30	2.30
July	2.15	2.25	2.15	2.40	2.40
August	2.25	2.50	2.30	2.50	2.50
September	2.50	2.75	2.50	3.00	3.00
October	2.50	2.75	2.75	3.00	3.00
November	2.60	3.00	2.75	3.00	3.00
December	2.65	3.00	3.00	3.25	3.25

Beaver district.—This district originally included the ovens in Beaver and Mercer counties. All the ovens in Beaver County were abandoned in 1898, and since that time the statistics of production in Mercer County have been included with the Pittsburg district.

The following are the statistics of the manufacture of coke in the Beaver district, Pennsylvania, for the years 1880 to 1897:

Statistics of the manufacture of coke in the Beaver district, Pennsylvania, from 1880 to 1897.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	5	106	....	8,013	4,880	$10,150	$2.08	61
1881	5	106	....	6,887	4,333	9,013	2.08	63
1882	5	106	....	11,699	7,960	15,124	1.90	68
1883	5	107	....	19,510	12,395	21,062	1.70	64
1884	4	89	....	2,250	1,390	2,168	1.56	62
1885	4	89	....	686	438	696	1.59	63
1886	3	87	....	698	411	646	1.57	59
1887	3	65	....	25,207	13,818	24,137	1.75	55
1888	4	145	....	262	175	260	1.48	66.6
1889	3	90	....	3,100	1,853	3,848	2.07	60
1890	3	90	....	4,010	2,148	4,564	2.12	53.5
1891	3	88	....	4,224	2,332	6,663	2.86	55
1892	2	10	0	3,925	2,154	6,270	2.91	54.9
1893	2	10	0	2,998	1,644	4,446	2.70	54.8
1894	2	8	0	2,968	1,624	4,251	2.62	54.7
1895	2	8	0	2,888	1,584	3,940	2.49	54.8
1896	3	*a*35	0	13,845	9,004	17,200	1.91	65
1897	3	*a*33	0	42,200	27,276	61,646	2.26	64.6

a Includes 25 Semet-Solvay ovens in Mercer County.

Allegheny Valley district.—All the ovens in this district have been practically abandoned, no production having been reported from either Armstrong or Butler County since 1897. Fifty ovens were abandoned during 1900.

The statistics of the manufacture of coke in the Allegheny Valley district since 1880 are as follows:

Statistics of the manufacture of coke in the Allegheny Valley district, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	5	97	0	45,355	23,470	$49,068	$2.10	52
1881	5	109	0	55,676	29,650	64,664	2.18	53
1882	6	159	0	76,000	41,897	80,294	1.92	55
1883	6	159	0	64,810	34,868	62,982	1.81	54
1884	7	209	0	55,110	31,430	54,859	1.75	57
1885	5	208	0	28,630	15,326	30,151	1.97	53.5
1886	5	208	0	51,580	28,948	44,422	1.54	56
1887	5	288	88	77,666	44,621	84,913	1.90	57.1
1888	5	376	0	37,792	21,719	36,008	1.66	57.5
1889	4	198	0	13,105	6,569	10,538	1.62	50
1890	3	148	0	33,049	18,733	40,204	2.15	56.7
1891	3	148	0	21,833	11,314	25,909	2.29	52
1892	3	148	0	0	0	0	0	0
1893	2	116	0	10,927	6,557	11,147	1.70	60

Statistics of the manufacture of coke in the Allegheny Valley district Pennsylvania, from 1880 to 1900—Continued.

Year.	Establishment.	Ovens.		Coal used.	Coke produced.	Tota value of coke at ovens.	Value of coke at ovens per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1894	2	116	0	0	0	0	0	0
1895	2	116	0	0	0	0	0	0
1896	2	116	0	12,445	7,467	14,934	2.00	60
1897	2	116	0	8,300	5,000	10,000	2.00	60.2
1898	2	116	0	0	0	0	0	0
1899	2	116	0	0	0	0	0	0
1900	1	66	0	0	0	0	0	0

Reynoldsville-Walston district.—This district includes all the ovens on the Rochester and Pittsburg Railroad, as well as those on the Low Grade Division of the Allegheny Valley Railway and the mines on the New York, Lake Erie and Western Railway. The production of the Semet-Solvay coke-oven plant at Syracuse, N. Y., has been included with this district during the last five years. For 1899 and 1900 the production of the Otto-Hoffman ovens at Everett, Mass., have also been added to the production in this district for want of a better classification.

The following are the statistics of the manufacture of coke in the Reynoldsville-Walston district for the years 1880 to 1900:

Statistics of the manufacture of coke in the Reynoldsville-Walston district, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	3	117	0	45,055	28,090	$46,359	$1.65	62
1881	4	125	2	99,489	44,260	80,785	1.85	44
1882	5	177	0	87,314	44,709	80,339	1.80	51
1883	6	229	0	76,580	37,044	65,584	1.77	48
1884	7	321	0	159,151	78,646	113,155	1.44	49
1885	8	600	143	183,806	114,409	153,795	1.35	62
1886	9	783	500	271,037	161,828	217,834	1.35	59.7
1887	11	1,492	134	507,320	316,107	592,728	1.88	62.3
1888	9	1,636	100	404,346	253,662	320,203	1.26	62.7
1889	8	1,747	0	514,461	313,011	436,857	1.40	60.8
1890	8	1,737	0	652,966	406,184	771,996	1.90	62
1891	7	1,747	0	769,100	470,479	744,098	1.58	61
1892	8	1,734	0	683,539	425,250	743,227	1.75	62.2
1893	8	1,755	0	562,033	339,314	586,212	1.73	60.4
1894	8	1,755	0	336,554	207,238	297,596	1.44	61.6
1895	8	1,637	0	504,092	296,820	357,266	1.20	58.9
1896 *a*	7	1,852	34	770,104	445,998	673,625	1.51	57.9
1897 *a*	6	1,980	0	810,808	491,267	759,609	1.55	60.6
1898 *a*	5	1,942	0	1,022,196	600,084	846,121	1.41	58.7
1899 *a*	6	1,779	0	1,581,164	972,933	1,793,807	1.84	61.5
1900 *a*	7	2,010	0	1,707,153	1,067,151	2,509,060	2.35	62.5

a Includes coal used, coke produced, and its value in New York; also in Massachusetts for 1899 and 1900.

Blossburg district.—This district, which was at one time of considerable importance as a coke producer, especially to central and western New York, has produced no coke since 1895. The ovens have been abandoned.

Statistics of the manufacture of coke in the Blossburg district, Pennsylvania, from 1880 to 1895.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	1	200	0	72,520	44,836	$134,500	$3.00	62
1881	1	200	0	88,055	56,085	168,250	3.00	64
1882	1	200	0	100,119	64,526	193,500	3.00	64
1883	2	344	0	71,028	44,690	122,450	2.74	63
1884	2	344	32	62,365	39,043	93,763	2.40	63
1885	2	296	0	46,489	26,975	59,423	2.17	58
1886	2	405	0	136,136	81,801	174,532	2.13	60
1887	2	406	0	182,623	103,873	234,622	2.26	56.9
1888	2	407	0	62,063	38,052	81,400	2.14	61
1889	2	407	0	31,806	18,422	47,765	2.59	58
1890	2	407	0	41,785	23,196	62,804	2.71	55.5
1891	2	407	0	46,084	24,351	66,195	2.72	53
1892	2	407	0	30,746	16,675	45,855	2.75	54.2
1893	2	407	0	22,176	11,463	31,427	2.74	51.7
1894	1	250	0	670	332	896	2.70	50
1895	1	200	0	976	488	1,220	2.50	50

Greensburg district.—There are four establishments in the Greensburg district, all of which made coke in 1900. The production has increased regularly during the last seven years and in 1900 amounted to 133,191 short tons, as compared with 110,594 short tons in 1899. There were 280 ovens in course of construction at the end of the year.

Statistics of the manufacture of coke in the Greensburg district, Pennsylvania, from 1889 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1889	2	50	16	32,070	20,459	$21,523	$1.05	63.8
1890	2	58	0	44,000	30,261	44,290	1.46	68.7
1891	2	58	0	38,188	22,441	36,627	1.63	59
1892	2	58	0	15,005	9,037	13,173	1.46	60.2
1893	3	88	0	29,983	18,393	26,303	1.43	61
1894	3	118	0	27,290	15,872	18,413	1.16	58.2
1895	3	118	0	31,300	20,309	22,340	1.10	65
1896	3	178	0	36,963	24,642	30,928	1.255	66
1897	3	178	0	81,927	52,495	65,619	1.25	64
1898	3	218	0	112,487	64,295	96,443	1.50	57
1899	4	307	240	173,811	110,594	247,421	2.24	63.6
1900	4	476	280	229,825	133,191	306,826	2.30	58

Pittsburg district.—Much of the coke of the Pittsburg district is made from the slack coal obtained from the mines along the several pools of the Monongahela River and brought to Pittsburg in barges. Some of the run-of-mine coal also is brought from the fourth pool of the Monongahela River for coking at Pittsburg. The district has achieved considerable prominence as a coke producer in the last few years, the production having increased steadily each year since 1890. It now ranks third among the coke-producing districts of the State. The ovens in the district include 120 Otto-Hoffman, located at Otto, and 25 Semet-Solvay, located at Sharon, in Mercer County. These latter ovens were formerly included in the Beaver district. The statistics for 1900 show that there was an increase of 60 per cent in the number of ovens in use, while the production increased from 644,467 short tons in 1899 to 826,727 short tons in 1900.

The statistics of the manufacture of coke in the Pittsburg district, Pennsylvania, for the years 1880 to 1900 are stated in the following table:

Statistics of the manufacture of coke in the Pittsburg district, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	21	534	0	194,393	105,974	$254,500	$2.40	55
1881	21	538	0	178,509	96,310	206,965	2.15	54
1882	21	557	0	114,956	64,779	134,378	2.07	56.3
1883	20	542	0	119,310	66,820	126,020	1.89	56
1884	20	535	0	97,367	53,857	99,911	1.87	55
1885	17	416	4	91,101	46,930	72,509	1.55	51.5
1886	18	730	0	228,874	138,646	221,617	1.88	60.6
1887	20	880	235	366,184	177,097	315,546	1.78	48.4
1888	22	980	0	428,899	264,156	350,818	1.33	62
1889	17	600	21	233,571	141,324	283,402	2.00	60.5
1890	14	541	0	149,230	93,984	171,465	1.82	63
1891	13	590	11	154,054	94,160	201,458	2.14	61
1892	15	725	261	292,357	176,365	376,613	2.14	60.3
1893	10	885	0	357,400	216,268	438,801	2.03	60.5
1894	9	779	104	371,569	227,100	351,825	1.55	61
1895	9	973	0	452,845	232,529	547,284	2.35	51.3
1896	11	1,264	*a* 120	583,984	368,070	941,076	2.56	63
1897	9	*b* 1,233	200	832,505	548,981	864,326	1.57	66
1898	10	*c* 1,100	168	836,948	552,742	899,537	1.627	66
1899	10	*c* 1,312	505	954,028	644,467	1,189,117	1.84	67.6
1900	9	*c* 2,096	0	1,246,684	826,727	1,943,544	2.35	66.3

a Otto-Hoffman by-product ovens.
b Includes 120 Otto-Hoffman ovens.
c Includes 120 Otto-Hoffman and 25 Semet-Solvay ovens.

Clearfield-Center district.—This district is named from the two counties, Clearfield and Center, which are included in it. There were 568 ovens reported in the district in 1900, compared with 450 in 1899. Of the 568 ovens, 138 were idle during the entire year. The production increased slightly over 1899, but was less than that of either 1897 or 1898.

The statistics of the manufacture of coke in the Clearfield-Center district for the years 1880 to 1900 are as follows:

Statistics of the manufacture of coke in the Clearfield-Center district, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	1	0	0	200	100	$200	$2.00	50
1881	2	50	0	20,025	13,350	22,695	1.70	67
1882	1	50	0	25,000	17,160	27,406	1.60	69
1883	1	60	0	26,500	18,696	28,844	1.50	71
1884	1	60	0	33,000	23,431	32,849	1.40	71
1885	2	245	0	69,720	48,103	70,331	1.46	69
1886	3	299	20	84,870	55,810	94,877	1.70	66
1887	6	523	10	154,566	97,852	198,095	2.02	63.3
1888	6	601	0	172,999	115,338	174,220	1.51	66.6
1889	6	671	0	195,473	120,734	215,112	1.78	61.7
1890	7	701	0	331,104	212,286	391,957	1.85	64
1891	7	666	0	293,542	183,911	339,082	1.84	63
1892	7	731	0	231,357	147,819	264,422	1.79	63.9
1893	8	695	0	155,119	98,650	171,482	1.74	63.6
1894	8	694	0	61,428	38,825	51,482	1.33	63
1895	8	695	0	155,088	99,469	131,188	1.32	64
1896	7	666	0	183,056	118,155	164,266	1.39	64.5
1897	7	668	0	230,395	153,517	197,139	1.28	66
1898	7	668	0	215,208	137,265	195,836	1.43	63.8
1899	6	450	50	198,110	130,965	234,527	1.79	66.1
1900	7	568	0	212,196	134,828	283,592	2.10	63.5

Broad Top district.—This name has been given to the ovens included in Bedford and Huntingdon counties, which comprise what is known as the Broad Top coal field. The production in 1900 amounted to 113,448 short tons, a slight increase over that of the preceding year. The production of this district in 1901 is apt to show a considerable increase, as at the close of 1900 there were 232 Otto-Hoffman ovens in process of construction, to be operated in connection with the Lackawanna Iron and Steel Company, at Lebanon, and which will be included in this district.

The statistics of the manufacture of coke in the Broad Top region from 1880 to 1900 are shown in the following table:

Statistics of the manufacture of coke in the Broad Top region, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	5	188	105	92,894	51,130	$123,748	$2.40	55
1881	5	188	105	111,593	66,560	167,074	2.51	59
1882	5	293	50	170,637	105,111	215,079	2.05	62
1883	5	343	110	220,932	147,154	271,692	1.84	66
1884	5	453	0	227,954	151,959	264,569	1.74	66
1885	5	537	0	190,836	112,073	185,656	1.65	58
1886	5	562	100	171,137	108,294	187,321	1.73	63.3
1887	5	581	0	262,730	164,535	347,061	2.11	62.6
1888	5	591	0	196,015	119,469	286,655	2.40	61
1889	5	589	0	152,090	91,256	186,718	2.05	60
1890	5	482	16	247,823	157,208	314,416	2.00	63
1891	5	448	0	146,008	90,728	197,048	2.17	62
1892	5	448	8	185,600	117,554	216,090	1.84	63.3
1893	5	456	14	136,069	86,752	150,196	1.73	63.8
1894	5	454	14	53,216	34,089	51,815	1.52	64
1895	5	460	0	133,276	85,842	150,224	1.75	64.4
1896	5	480	0	111,145	72,175	126,306	1.75	64.9
1897	5	491	15	106,706	66,949	107,430	1.60	62.7
1898	5	500	4	122,820	80,935	124,882	1.543	65.9
1899	5	519	3	161,196	107,258	197,895	1.84	66.5
1900	6	532	*a* 232	179,088	113,448	230,580	2.03	63.3

a Otto-Hoffman ovens.

Upper Connellsville district.—This district includes that portion of the Connellsville trough or basin lying north of a point a short distance south of Latrobe. The coal of this vicinity differs somewhat from that of the lower part of the basin, so that in addition to its geographical position there is another reason for separating this production from that of the Connellsville field proper.

There are 15 establishments in the district, operating 2,203 ovens, one establishment of 72 ovens having been idle throughout the entire year. The production increased from 609,893 short tons in 1899 to 753,967 short tons in 1900, and the value of the product increased from $986,298 to $1,514,507.

The following are the statistics of the manufacture of coke in the Upper Connellsville region for the years 1880 to 1900:

Statistics of the manufacture of coke in the Upper Connellsville district, Pennsylvania, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	8	757	0	319,927	229,433	$397,945	$1.73	72
1881	10	986	0	588,924	343,728	548,362	1.60	58
1882	11	1,118	0	650,174	375,918	536,503	1.43	58
1883	11	1,118	0	668,882	389,053	422,174	1.08	58
1884	11	1,118	0	496,894	294,477	311,665	1.06	59
1885	11	1,168	40	555,735	319,297	346,168	1.08	57
1886	12	1,337	29	691,331	442,968	572,073	1.29	64.1
1887	16	1,442	87	717,274	470,233	840,144	1.79	65.6
1888	16	1,977	0	657,966	441,966	617,189	1.40	67
1889	13	1,568	80	635,220	417,263	609,828	1.46	65.6
1890	14	1,569	28	889,277	577,246	1,008,102	1.75	64.9
1891	14	1,724	0	1,000,184	649,316	1,111,056	1.71	65
1892	14	1,843	0	706,171	451,975	691,323	1.53	64
1893	14	1,843	0	499,809	320,793	447,090	1.39	64
1894	14	1,843	0	279,971	176,799	212,595	1.20	63
1895	14	1,849	30	319,285	208,158	251,892	1.21	65
1896	14	1,863	0	617,601	406,112	570,687	1.405	65.7
1897	14	1,863	0	556,941	345,372	444,709	1.29	62
1898	13	1,832	0	638,277	403,045	538,609	1.34	63
1899	13	1,861	68	933,792	609,893	986,298	1.62	65.3
1900	15	2,203	0	1,143,650	753,967	1,514,507	2.008	65.9

Irwin district.—The production in this district in 1900 was less than half that of 1899, and little more than one-third of the output in 1898. The district includes the ovens situated near the town of Irwin, and also those located in what may be termed the Irwin Basin, on the Youghiogheny River. Most of the coke made in the district is produced by the Carnegie Steel Company, at Larimer and Douglas. These ovens were operated only five months during the year, so that 694 of the 697 ovens in the district were idle more than half the year.

The statistics of the manufacture of coke in the Irwin district from 1889 to 1900 are shown in the following table:

Statistics of the manufacture of coke in the Irwin district, Pennsylvania, from 1889 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1889	4	696	0	373,913	243,448	$351,304	$1.44	65
1890	4	661	0	270,476	172,329	256,458	1.49	63.7
1891	4	696	0	323,099	197,082	266,061	1.35	61
1892	4	669	0	328,193	202,809	284,029	1.40	61.8
1893	5	725	0	238,832	150,463	175,609	1.30	63
1894	5	725	0	176,318	110,995	119,764	1.08	63
1895	5	725	0	166,124	103,872	105,609	1.017	62.5
1896	5	696	0	279,104	175,916	275,518	1.566	63
1897	5	696	0	207,704	136,663	189,869	1.39	65.8
1898	5	696	0	332,368	183,176	239,583	1.308	55
1899	5	697	0	223,457	133,085	197,694	1.48	59.6
1900	5	697	0	93,647	61,630	153,743	2.49	65.8

Lower Connellsville district.—This district includes coke ovens located in the Masontown or so-called "Klondike" field and other coking plants near and south of the Connellsville district, whose coking coal is of the same character. All the ovens in this district were either building or completed in 1900, none being in operation more than seven months. The first coke was drawn on June 1, 1900.

The coal of this field is slightly harder than the main Connellsville article. In coke-oven operation here many new features have been introduced, and in this way the product is kept on a par with the original Connellsville coke. In mine operation electricity is employed in almost every process. The drift, slope, and shaft mines are lighted with electricity almost to the workings, electric mining machines have been installed, and electric haulage is used. The shaft machinery is manipulated by electricity, and the same may be said of tipple operation. Electricity has supplanted the old larry in conveying the raw coal to the ovens, and electric and automatic coke drawers and machinery for loading the finished coke on the cars for shipment is used. There have also been numerous improvements in the ovens. They are larger in size than those of the main Connellsville region, and they have decided improvements in the way of draft and other modern construction. Thus has this region, comparatively recently an ideal farming community, been turned into a great coking field, whose growth and development as such has been unparalleled in the history of industrial development. Like those of the main Connellsville region, the ovens of this new field are of the beehive pattern.

The development of this new coking field is one of the most remarkable features of the coke-making industry during 1900. The popular name of Klondike was given to it by the promoters of some of the enterprises in the field, but on account of its location relative to the

Connellsville basins the designation of Lower Connellsville has been considered more appropriate. The coal is said to be as well adapted for coke making as the Connellsville coal itself, and the coke is also claimed to be as good as standard Connellsville coke. No work in this district had been started at the beginning of 1900. At the close of the year there were 10 establishments in the field, 1,498 ovens had been built, 1,112 ovens were in course of construction, and a production of 111,379 short tons of coke had been obtained. The area of this new field is said to be about 100 square miles, or about one-half of the main Connellsville basin.

The following table shows the record of the Lower Connellsville or Klondike district for 1900:

Statistics of manufacture of coke in the Lower Connellsville district, Pennsylvania, in the year 1900.

Establishments	10
Ovens built	1,498
Ovens building	1,112
Coke produced ... tons	111,379
Value of coke produced	$220,137
Value per ton of coke produced	$1.976
Coal used ... tons	170,590
Yield of coal in coke ... per cent	65.3

TENNESSEE.

Tennessee is the sixth among the coke-producing States, with a production in 1900 of 475,432 short tons, an increase of 40,124 short tons, or a little more than 9 per cent over 1899. The value increased nearly 50 per cent, from $850,686 in 1899 to $1,269,555 in 1900. The average price advanced from $1.95 to $2.67 per ton, the latter figure being the highest ever recorded. Previous to 1900 the highest price ever obtained was in 1882, when it reached $2.50. There were 2,107 ovens in the State at the close of 1900. One hundred and forty-eight of these were idle during the entire year. Parts of other plants were also idle during a portion of the year, and the average number in operation throughout the entire year was 1,552. There were 340 ovens building at the close of the year.

The following are the statistics of the manufacture of coke in Tennessee for the years 1880 to 1900:

Statistics of manufacture of coke in Tennessee from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	6	656	68	217,656	130,609	$316,607	$2.42	60
1881	6	724	84	241,644	143,853	342,585	2.38	60
1882	8	861	14	313,537	187,695	472,505	2.52	60
1883	11	992	10	330,961	203,691	459,126	2.25	62
1884	*a* 13	1,105	175	348,295	219,723	428,870	1.95	63
1885	12	1,387	36	412,538	218,842	398,459	1.82	53
1886	12	1,485	126	621,669	368,139	687,865	1.87	59
1887	11	1,560	165	655,857	396,979	870,900	2.19	61
1888	11	1,634	84	630,099	385,693	490,491	1.27	61
1889	12	1,639	40	626,016	359,710	731,496	2.03	57
1890	11	1,664	292	600,387	348,728	684,116	1.96	58
1891	11	1,995	0	623,177	634,318	701,803	1.93	58
1892	11	1,941	0	600,126	354,096	724,106	2.05	59
1893	11	1,942	0	449,511	265,777	491,523	1.85	61
1894	11	1,860	0	516,802	292,646	480,124	1.64	56.6
1895	12	1,903	0	684,655	396,790	754,926	1.90	57.9
1896	15	1,861	100	600,379	339,202	624,011	1.84	56.5
1897	15	1,948	0	667,996	368,769	667,656	1.81	55
1898	15	1,949	40	722,356	394,545	642,920	1.63	54.6
1899	14	2,040	62	779,995	435,308	850,686	1.95	55.8
1900	14	2,107	340	854,789	475,432	1,269,555	2.67	55.6

a One establishment made coke in pits.

Nearly 80 per cent of the coal used in the manufacture of coke in Tennessee was washed before coking, and this 80 per cent was nearly equally divided between washed run of mine and washed slack. A small amount of unwashed slack was also used, and the amount of unwashed run-of-mine coal used was about half the amount of washed run of mine used.

The character of the coal used in the manufacture of coke in Tennessee since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Tennessee since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	255,359	0	273,028	72,000	600,387
1891	184,556	0	377,914	60,707	623,177
1892	176,453	15,000	367,827	40,846	600,126
1893	179,126	0	137,483	132,902	449,511
1894	166,990	61,841	149,958	138,013	516,802
1895	96,744	59,284	285,906	242,721	684,655
1896	0	206,319	219,231	174,829	600,379
1897	36,485	400,166	119,755	111,590	667,996
1898	37,217	306,969	122,756	255,414	722,356
1899	140,804	267,105	31,850	340,236	779,995
1900	150,697	349,448	24,122	330,522	854,789

UTAH.

As there is but one establishment making coke in Utah, detailed statistics of production have been included with that of Colorado in order to preserve the confidential nature of the producer's report. The coals in this State are practically identical in character with those of western Colorado.

The following is the amount of coke produced in Utah from 1889 to 1900:

Production of coke in Utah from 1889 to 1900.

Year.	Tons.	Year.	Tons.
1889	761	1895	22,519
1890	8,528	1896	20,447
1891	7,949	1897	23,617
1892	7,309	1898	28,826
1893	16,005	1899	26,881
1894	16,056	1900	35,154

VIRGINIA.

The production of coke in Virginia in 1900 amounted to 685,156 short tons, valued at $1,464,556, as against 618,707 short tons, valued at $1,071,284, in 1899. Thus it will be seen that while the production increased little more than 10 per cent, the value increased a little over 35 per cent. As was the case in 1899, the increases in 1900 were the result of the developments in Wise County, along the Clinch River Division of the Norfolk and Western Railroad. The number of ovens in the State increased from 1,588 in 1899 to 2,331 in 1900—nearly 50 per cent. All of these new ovens were constructed in Wise County. In addition to these there were 150 ovens which had been completed at the close of the year, but did not begin operations until the latter part of April, 1901. There were 300 ovens in course of construction on December 31, which will add to the production for the present year. The number of completed ovens included 60 Newton-Chambers ovens, of which 56 were operated during the year, 4 being idle. Prior to 1895 there were only two establishments in the State, and the largest number of ovens reported was 736. One of these establishments was at Pocahontas, in the Flat Top coal region, and the other at Lowmoor, just east of the West Virginia line. The coal for the Pocahontas ovens is drawn from mines which extend beyond the boundary line between Virginia and West Virginia, and the greater part of the product belongs of right to the latter State. It has been customary, however, to credit all of the product to Virginia, as the openings are in that State, and it is not possible to accurately separate what rightfully belongs to Virginia from that mined in West Virginia. The ovens at Lowmoor draw their entire supply of coal from the New River district, in West Virginia. The Clinch Valley or Wise County coke is made from coal drawn entirely from Virginia mines, and the manufacture of coke from coal mined in the State really began with the building of the ovens in Wise County in 1895. Wise County has produced more than 60 per cent of the total product of the State during the last four years.

The following are the statistics of the manufacture of coke in Virginia from 1883 to 1900:

Statistics of the manufacture of coke in Virginia from 1883 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1883	1	200	0	39,000	25,340	$44,345	$1.75	65
1884	1	200	0	99,000	63,600	111,300	1.75	64.3
1885	1	200	0	81,899	49,139	85,993	1.75	60
1886	2	350	100	200,018	122,352	305,880	2.50	61.2
1887	2	350	300	235,841	166,947	417,368	2.50	70.8
1888	2	550	0	230,529	140,199	260,000	1.74	64.7
1889	2	550	250	238,793	146,528	325,861	2.22	61
1890	2	550	250	251,683	165,847	278,724	1.68	66
1891	2	550	250	285,113	167,516	265,107	1.58	58.8
1892	2	594	206	226,517	147,912	322,486	2.18	65.3
1893	2	594	206	194,059	125,092	282,898	2.26	64.5
1894	2	736	100	280,524	180,091	295,747	1.64	64.2
1895	5	832	350	410,737	244,738	322,564	1.32	59.6
1896	7	1,138	101	454,964	268,081	404,573	1.509	58.9
1897	6	1,453	110	574,542	354,067	495,864	1.40	61.6
1898	6	*a* 1,564	0	852,972	531,161	699,781	1.317	62
1899	6	*a* 1,588	429	994,635	618,707	1,071,284	1.73	62.2
1900	7	*a* 2,331	300	1,083,827	685,156	1,464,556	2.137	63.2

a Includes 60 Newton-Chambers by-product ovens, of which 56 were operated in 1900.

Fifty-seven per cent of the total amount of coal used for coke making in Virginia was run of mine and 43 per cent slack. All of it was unwashed.

The character of the coal used in the manufacture of coke in Virginia since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Virginia since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	98,215	0	153,468	0	251,683
1891	107,498	0	177,615	0	285,113
1892	106,010	0	120,507	0	226,517
1893	107,498	0	86,561	0	194,059
1894	103,874	0	176,650	0	280,524
1895	114,802	0	295,935	0	410,737
1896	70,756	0	370,624	13,584	454,964
1897	286,158	0	227,363	61,021	574,542
1898	405,399	0	237,474	210,099	852,972
1899	612,267	0	225,118	157,250	994,635
1900	620,207	0	463,620	0	1,083,827

WASHINGTON.

Washington is the only one of the Pacific coast States producing coking coal. The operations are not particularly important when compared with the output of other States and are of interest principally as establishing the fact that it is possible to produce coke from Washington coals. The production in 1900 amounted to 33,387 short tons, an increase of 10 per cent over the preceding year.

The industry was started in 1884, since which time the production has been as follows:

Statistics of the production of coke in Washington from 1884 to 1900.

Year.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
				Short tons.	*Short tons.*			*Per cent.*
1884	1	0	0	700	400	$1,900	$4.75	57.5
1885	1	2	0	544	311	1,477	4.75	57
1886	1	11	21	1,400	825	4,125	5.00	58.9
1887	1	30	0	22,500	14,625	102,375	7.00	65
1888	1	30	100	0	0	0	0	0
1889	1	30	0	6,983	3,841	30,728	8.00	55
1890	2	30	80	9,120	5,837	46,696	8.00	64
1891	2	80	0	10,000	6,000	42,000	7.00	60
1892	3	84	30	12,372	7,177	50,446	7.03	58
1893	3	84	0	11,374	6,731	34,207	5.08	59
1894	3	84	0	8,563	5,245	18,249	3.48	61.2
1895	3	110	0	22,973	15,129	64,632	4.27	65.9
1896	3	120	0	38,685	25,949	104,894	4.04	67
1897	3	120	0	39,124	26,189	115,754	4.42	67
1898	2	90	0	48,559	30,197	128,933	4.27	62.2
1899	2	90	0	50,813	30,372	151,216	4.98	59.8
1900	2	90	0	54,310	33,387	160,165	4.797	61.5

The character of the coal used in the manufacture of coke in Washington since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Washington since 1890.

[Short tons.]

Year.	Run of mine. Unwashed.	Run of mine. Washed.	Slack. Unwashed.	Slack. Washed.	Total.
1890	0	9,120	0	0	9,120
1891	0	0	10,000	0	10,000
1892	0	0	0	12,372	12,372
1893	0	10,974	0	405	11,379
1894	0	0	0	8,563	8,563
1895	0	0	0	22,973	22,973
1896	0	20,967	0	17,718	38,685
1897	0	39,124	0	0	39,124
1898	0	48,559	0	0	48,559
1899	0	44,681	0	6,132	50,813
1900	0	48,162	0	6,148	54,310

WEST VIRGINIA.

West Virginia, while ranking third among the coal-producing States, is next to Pennsylvania in the quantity of coke manufactured, although in 1900 closely pressed by Alabama for this position. In 1899 West Virginia's coke product exceeded that of Alabama by nearly 500,000 tons, while in 1900 West Virginia's lead over Alabama was reduced to less than 250,000 tons. In 1900 West Virginia produced 2,358,499 short tons of coke, valued at $1,746,633, as compared with 2,278,577 short tons, valued at $3,480,408, in 1899. From this it will be seen that the production increased 79,922 short tons, or about 3½ per cent, while the value increased $1,266,225 or 36.4 per cent. The average price per ton realized in 1900 was $2.01, which was exceeded only five times in the previous history of the coke-making industry in the State. The increase in production in 1900 over 1899 was comparatively small, but it is interesting to note that in the last twenty years there have been only two instances in which the coke production in any one year was less than that of the preceding one. These two exceptions to a steadily increasing production were in 1884 and 1897.

The statistics for 1900 show that there were 106 coking establishments in the State, with a total of 10,249 ovens, an increase from 87 establishments and 8,846 ovens in 1899. There were 1,306 ovens in course of construction at the close of 1900. The number of ovens built includes 120 Semet-Solvay ovens operated in connection with the Riverside Iron Works at Wheeling. Of the 106 establishments, 8, with a total of 352 ovens, were not operated during the year. In addition to these there were some idle ovens in plants which were in operation during the year. The average number operated throughout the year was 6,729, or 66 per cent of the total number within the State.

The following table exhibits the statistics of coke production in West Virginia since 1880:

Statistics of the manufacture of coke in West Virginia from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	18	631	40	230,758	138,755	$318,797	$2.30	60
1881	19	689	0	304,823	187,126	429,571	2.30	61
1882	22	878	0	366,653	230,398	520,437	2.26	63
1883	24	962	9	411,159	257,519	563,490	2.19	63
1884	27	1,005	127	385,588	223,472	425,952	1.91	62
1885	27	978	63	415,533	260,571	485,588	1.86	63
1886	29	1,100	317	425,002	264,158	513,843	1.94	62
1887	39	2,080	742	698,327	442,031	976,732	2.21	63.3
1888	51	2,764	318	854,531	525,927	896,797	1.71	61.5
1889	53	3,438	631	1,001,372	607,880	1,074,177	1.76	60
1890	55	4,060	334	1,395,266	833,377	1,524,746	1.83	60

Statistics of the manufacture of coke in West Virginia from 1880 to 1900—Continued.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1891	55	4,621	555	1,716,976	1,009,051	1,845,043	1.83	58.8
1892	72	5,843	978	1,709,183	1,034,750	1,821,965	1.76	60.5
1893	75	7,354	132	1,745,757	1,062,076	1,716,907	1.62	60.8
1894	78	7,858	60	1,976,128	1,193,933	1,639,687	1.373	60.4
1895	78	7,834	55	2,087,816	1,285,206	1,724,239	1.34	61.6
1896	84	8,351	28	2,687,104	1,649,755	2,259,999	1.37	61.4
1897	84	8,404	38	2,413,283	1,472,666	1,933,808	1.31	61
1898	87	*a* 8,659	161	3,145,398	1,925,071	2,432,657	1.26	61.2
1899	87	*a* 8,846	*b* 619	3,802,825	2,278,577	3,480,408	1.53	60
1900	106	*c* 10,249	1,306	3,868,840	2,358,499	4,746,633	2.01	60.9

a Includes 60 Semet-Solvay ovens at Wheeling.
b Includes 60 Semet-Solvay ovens building at Wheeling.
c Includes 120 Semet-Solvay ovens at Wheeling.

As shown in the following table the larger part of the coal used in coke making in West Virginia is unwashed slack. It is to be noted that in 1899 there was an unusual amount of run-of-mine coal used. This was due to the enormous demand for coke during that year and to an insufficient supply of slack coal to meet the requirements. In 1900, on the other hand, the demand for coal was more pronounced than the demand for coke, and a larger amount of slack coal was available for coke manufacture.

The character of the coal used in the manufacture of coke in West Virginia since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in West Virginia since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	324,847	0	930,989	139,430	1,395,266
1891	276,259	0	1,116,060	324,657	1,716,976
1892	298,824	115,397	1,108,353	186,609	1,709,183
1893	324,932	15,240	1,176,656	228,929	1,745,757
1894	162,270	14,901	1,607,735	191,222	1,976,128
1895	405,725	24,054	1,476,003	182,034	2,087,816
1896	407,378	33,096	2,079,237	167,393	2,687,104
1897	373,205	28,145	1,800,528	211,405	2,413,283
1898	713,815	0	2,137,983	293,600	3,145,398
1899	1,336,239	0	2,215,255	251,331	3,802,825
1900	509,960	8,000	3,140,064	210,816	3,868,840

PRODUCTION BY DISTRICTS.

It has been customary in the preceding reports of this series to consider the coke production by districts, into which the State has been divided. These districts are known respectively as the Upper Monongahela, the Upper Potomac, the Kanawha, the New River, and the Flat Top. The first two are in the northern part of the State, and are named from the fact that they are drained by the headwaters of the Monongahela and Potomac rivers. The other three districts are in the southern portion of the State. The New River and Kanawha districts are practically one, separation being made at a point where the New and Gauley rivers combine to form the Kanawha. The Flat Top region is also drained by the upper portion of the New River, and includes the ovens in West Virginia which belong to the Pocahontas coal field. The Flat Top district is by far the most important, and bears the same relation to the production in West Virginia that the Connellsville district does to that of Pennsylvania. The output from this district averages something over 50 per cent of the total coke product of the State. The next in importance is the Upper Monongahela, while the third position in the State alternates between the New River and the Upper Potomac districts.

In the following tables are exhibited the statistics of coke production in West Virginia, by districts, during the last two years:

Production of coke in West Virginia in 1900, by districts.

District.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke produced.	Average price of coke, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per ct.*
Flat Top	*a* 38	5,290	666	1,952,274	1,208,838	$2,290,947	$1.895	61.9
Kanawha	11	847	80	291,277	165,339	412,636	2.495	56.7
New River	27	1,722	560	568,856	341,527	750,637	2.198	60
Upper Monongahela	24	*b* 1,563	0	584,265	355,861	817,340	2.297	60.9
Upper Potomac	6	827	0	472,168	286,934	475,073	1.655	60.8
Total	106	10,249	1,306	3,868,840	2,358,499	4,746,633	2.01	60.9

a Includes 1 establishment in Tug River district. *b* Includes 120 Semet-Solvay ovens.

Production of coke in West Virginia in 1899, by districts.

District.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke produced.	Average price of coke, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per ct.*
Flat Top	35	4,623	214	1,861,570	1,138,389	$1,453,601	$1.28	61.1
Kanawha	8	653	88	323,506	190,337	364,148	1.91	58.8
New River	22	1,444	167	503,160	281,134	533,996	1.90	56
Upper Monongahela	19	*a* 1,453	*b* 60	607,796	362,872	596,305	1.64	59.7
Upper Potomac	3	673	90	506,793	305,845	532,358	1.74	60.3
Total	87	8,846	619	3,802,825	2,278,577	3,480,408	1.53	60

a Includes 60 Semet-Solvay ovens. *b* All Semet-Solvay ovens.

The Pocahontas Flat Top district.—Next to the Connellsville district of Pennsylvania this is the most important coke-producing region in the United States. Outside of Pennsylvania and Alabama it produces more coke than any other single State and nearly as much as any two. Like the Connellsville region, it produces a typical blast-furnace coke, but its product is chemically superior to the Connellsville, being lower in ash, and is regarded by some ironmasters as equal in physical properties to Connellsville coke. The production in this district in 1900 amounted to 1,208,838 tons, an increase of 70,449 short tons over the product of 1899. Owing to the marked advance in price in 1900 the value of the output of this district last year was $847,346 in excess of that of the preceding year. Every establishment in the district was operated during 1899. The statistics of production of this district from its beginning in 1886 are shown in the following table:

Statistics of the manufacture of coke in the Flat Top district of West Virginia from 1886 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1886	2	10	38	1,075	658	$1,316	$2.00	61.2
1887	5	348	642	76,274	51,071	100,738	1.97	67
1888	13	882	200	164,818	103,947	183,938	1.77	63
1889	16	1,433	431	387,533	240,386	405,635	1.69	64
1890	17	1,584	252	566,118	325,576	571,239	1.75	57.5
1891	19	1,889	358	537,847	312,421	545,367	1.70	58
1892	30	2,848	933	595,734	353,696	596,911	1.69	59.3
1893	34	4,349	80	746,051	451,503	713,261	1.58	60.5
1894	36	4,648	18	1,229,136	746,762	989,876	1.325	60.7
1895	36	4,648	18	858,913	524,252	656,494	1.25	61
1896	36	4,648	18	1,400,369	852,120	1,100,312	1.291	60.8
1897	36	4,648	18	1,172,206	720,988	868,484	1.20	61.5
1898	36	4,667	27	1,701,404	1,057,626	1,216,059	1.15	62.2
1899	35	4,623	214	1,861,570	1,138,389	1,453,601	1.28	61.1
1900	*a* 38	5,290	666	1,952,274	1,208,838	2,290,947	1.895	61.9

a Includes 1 establishment in the Tug River district.

New River district.—This district includes the ovens along the Chesapeake and Ohio Railroad from Quinnimont to Nuttallburg. It was until 1899 the second district in the State as a coke producer, but production in the New River district decreased in 1899, while that of both the Upper Potomac and Upper Monongahela districts increased, and each had a larger production that year than the New River district. The production of the latter district in 1900 increased more than 60,000 tons over 1899 and reached the highest figure in its history. It also exceeded the production in the Upper Potomac district in that year, but was slightly less than that of the Upper Monongahela.

The coal of this district makes an excellent coke, which is in great demand, its market being chiefly east of the mountains. The coke made at Lowmoor, Va., also belongs of right to this district, as the coal is drawn from it.

The statistics of the manufacture of coke in the New River district from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in the New River district, West Virginia, from 1880 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1880	6	468	40	159,032	98,427	$239,977	$2.14	62
1881	6	499	0	219,446	136,423	334,652	2.45	62
1882	6	518	0	233,361	148,373	352,415	2.38	64
1883	6	546	0	264,171	167,795	384,552	2.29	64
1884	8	547	12	219,839	135,335	274,988	2.03	62
1885	8	519	0	244,769	156,007	325,001	2.08	63.8
1886	8	513	5	203,621	127,006	281,778	2.22	62
1887	11	518	50	253,373	159,836	401,164	2.51	63
1888	12	743	0	334,695	199,831	390,182	1.95	60
1889	12	773	0	268,185	157,186	351,132	2.23	58.6
1890	12	773	4	275,458	174,295	377,847	2.17	63
1891	13	787	102	309,073	193,711	426,630	2.20	63
1892	14	965	0	315,511	196,359	429,376	2.19	62
1893	13	947	10	281,600	178,049	355,965	2.00	63
1894	14	1,089	0	222,900	140,842	245,154	1.74	63.2
1895	14	978	0	385,899	244,815	404,978	1.65	63.4
1896	17	1,259	0	425,219	269,372	443,072	1.64	63.3
1897	17	1,225	0	439,103	268,263	419,151	1.56	61.1
1898	18	1,299	4	519,937	317,998	484,001	1.52	61
1899	22	1,444	167	503,160	281,134	533,996	1.90	56
1900	27	1,722	560	568,856	341,527	750,637	2.198	60

Kanawha district.—This district includes all the ovens along the Kanawha River, from its formation by the junction of the New and Gauley rivers, at Gauley, to the western limits of the coal fields. The production in 1900 amounted to 165,339 tons, about 25,000 tons less than the production in 1899. It was, however, with the exception of 1899, the largest production in the history of the field.

The statistics of the manufacture of coke in the Kanawha district from 1880 to 1900 are as follows:

Statistics of the manufacture of coke in the Kanawha district, West Virginia, from 1880 to 1900.

Year.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
				Short tons.	*Short tons.*			*Per cent.*
1880	4	18	0	6,789	4,300	$9,890	$2.30	63.3
1881	4	18	0	11,516	6,900	16,905	2.45	60
1882	5	*a* 138	0	40,782	26,170	62,808	2.40	64
1883	5	*a* 147	0	58,735	37,970	88,090	2.32	64.6
1884	6	*a* 177	15	60,281	39,000	76,070	1.95	64.6
1885	7	*b* 181	63	65,348	37,551	63,082	1.68	57
1886	7	302	170	89,410	54,329	117,649	2.17	60.7
1887	7	548	0	153,784	96,721	201,418	2.08	63
1888	9	572	8	141,641	84,052	146,837	1.75	59
1889	6	474	0	109,466	63,678	117,340	1.84	58
1890	6	474	0	182,340	104,076	196,583	1.89	57
1891	6	474	0	241,427	134,715	276,420	2.05	56
1892	6	506	0	242,627	140,641	284,174	2.02	58
1893	6	506	0	215,108	122,241	237,308	1.94	56.8
1894	6	506	0	176,746	104,160	181,586	1.74	58.9
1895	6	506	0	267,520	164,729	270,879	1.64	61.6
1896	7	576	10	259,715	157,741	263,210	1.67	60.7
1897	7	576	20	199,312	117,849	187,359	1.59	59.1
1898	8	622	100	225,240	135,867	208,949	1.538	60
1899	8	653	88	323,506	190,337	364,148	1.91	58.8
1900	11	847	80	291,277	165,339	412,636	2.495	56.7

a Eighty of these ovens are Coppée, the balance beehive.
b Sixty of these ovens are Coppée, the balance beehive.

Upper Potomac district.—In the Upper Potomac district are included the ovens along the line of the West Virginia Central and Pittsburg Railway, which runs south from near Cumberland, Md. The number of establishments in the district was doubled in 1900 as compared with 1899, and the number of ovens increased from 673 to 827, but the production fell off from 305,845 tons to 286,934 tons, and the value decreased somewhat more in proportion. This district showed an exception to the general conditions which prevailed in 1900, as the average price obtained for the product was less than was obtained in 1899.

Statistics of the production of coke in the Upper Potomac district of West Virginia are as follows:

Statistics of the manufacture of coke in the Upper Potomac district of West Virginia from 1887 to 1900.

Year.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
				Short tons.	*Short tons.*			*Per cent.*
1887	1	20	50	3,565	2,211	$4,422	$2.00	62
1888	1	28	0	9,176	5,835	8,752	1.50	64
1889	2	84	0	26,105	17,945	28,559	1.58	69
1890	2	178	28	94,983	61,971	118,503	1.91	65
1891	2	390	39	111,014	76,599	133,549	1.75	69
1892	3	395	0	114,045	78,691	121,208	1.54	69
1893	3	394	0	123,492	84,607	115,250	1.36	68.5
1894	2	394	0	66,598	43,546	43,546	1.00	65.4
1895	2	442	0	183,187	110,753	126,595	1.14	60.5
1896	2	482	0	270,275	164,093	242,133	1.476	60.7
1897	2	592	0	312,984	190,401	278,012	1.46	60.8
1898	2	622	0	379,227	230,150	329,371	1.43	60.7
1899	3	673	90	506,793	305,845	532,358	1.74	60.3
1900	6	827	0	472,168	286,934	475,073	1.655	60.8

Upper Monongahela district.—This district includes the ovens in the group of counties lying along the Baltimore and Ohio Railroad near the headwaters of the Monongahela River—Preston, Taylor, Harrison, and Marion counties—and embraces the Clarksburg and Fairmont mining regions, in which some of the most important developments in the State have been made in the last few years. The production in 1900 was slightly less than in 1899. The 120 Semet-Solvay ovens located at Wheeling and operated in connection with the Riverside Iron Works are included with this district.

The statistics of coke production in the Upper Monongahela district since 1880 are shown in the following table:

Statistics of the manufacture of coke in the Upper Monongahela district, West Virginia, from 1880 to 1900.

Year.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
				Short tons.	*Short tons.*			*Per cent.*
1880	8	145	0	64,937	36,028	$68,930	$1.91	55
1881	9	172	0	73,863	43,803	78,014	1.78	59
1882	11	222	0	92,510	55,855	105,214	1.88	60
1883	13	269	0	88,253	51,754	90,848	1.76	59
1884	13	281	100	78,468	49,139	74,894	1.52	63
1885	12	278	0	105,416	67,013	97,505	1.45	63.5
1886	12	275	104	131,896	82,165	113,100	1.38	62.3
1887	15	646	0	211,330	132,192	268,990	2.03	62.5
1888	17	567	110	213,377	138,097	175,840	1.27	64.7
1889	17	674	200	210,083	128,685	171,511	1.33	62.5
1890	18	1,051	50	276,367	167,459	260,574	1.56	60
1891	15	1,081	56	517,615	291,605	462,677	1.58	56

Statistics of the manufacture of coke in the Upper Monongahela district, West Virginia, from 1880 to 1900—Continued.

Year.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
				Short tons.	*Short tons.*			*Per cent.*
1892	19	1,129	45	441,266	265,363	390,296	1.47	60.1
1893	19	1,158	42	379,506	225,676	295,123	1.31	59
1894	20	1,221	42	280,748	158,623	179,525	1.13	56.5
1895	20	1,260	37	392,297	240,657	265,293	1.10	61.3
1896	22	1,386	0	331,526	206,429	211,272	1.023	62.3
1897	22	1,363	0	289,678	175,165	180,802	1.03	60.5
1898	23	*a* 1,449	30	319,590	183,430	194,277	1.06	57
1899	19	*a* 1,453	*b* 60	607,796	362,872	596,305	1.64	59.7
1900	24	*c* 1,563	0	584,265	355,861	817,340	2.297	60.9

a Includes 60 Semet-Solvay ovens at Wheeling.
b All Semet-Solvay ovens at Wheeling.
c Includes 120 Semet-Solvay ovens at Wheeling.

WISCONSIN.

All of the coke made in this State is from Connellsville coal, and the coke may be considered as standard Connellsville. Most of the coke made during the last few years has been from slack coal.

The statistics of the manufacture of coke in Wisconsin from 1888 to 1900, inclusive, are as follows:

Statistics of the manufacture of coke in Wisconsin.

Year.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
				Short tons.	*Short tons.*			*Per cent.*
1888	1	50	....	1,000	500	$1,500	$3.00	50
1889	1	50	....	25,616	16,016	92,092	5.75	62.5
1890	1	70	....	38,425	24,976	143,612	5.75	65
1891	1	120	0	52,904	34,387	192,804	5.61	65
1892	1	120	0	54,300	33,800	185,900	5.50	62.2
1893	1	120	0	24,085	14,958	95,851	6.41	62
1894	1	120	0	6,343	4,250	19,465	4.58	67
1895	1	120	0	8,287	4,972	26,103	5.25	60
1896	1	120	0	8,648	5,332	21,000	3.94	62
1897	1	120	0	29,207	17,216	75,000	4.36	59
1898	1	120	0	59,900	35,280	123,480	3.50	59
1899	1	120	0	54,950	33,437	125,389	3.75	60.8
1900	1	120	0	80,000	48,000	240,000	5.00	60

The character of the coal used in the manufacture of coke in Wisconsin since 1890 is shown in the following table:

Character of coal used in the manufacture of coke in Wisconsin since 1890.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890	38,425	0	0	0	38,425
1891	52,904	0	0	0	52,904
1892	54,300	0	0	0	54,300
1893	20,474	0	3,611	0	24,085
1894	6,343	0	0	0	6,343
1895	8,287	0	0	0	8,287
1896	0	0	5,183	3,465	8,648
1897	0	0	0	29,207	29,207
1898	0	0	0	59,900	59,900
1899	34,680	0	20,270	0	54,950
1900	0	0	80,000	0	80,000

WYOMING.

There is but one establishment making coke in the State of Wyoming, that of the Cambria Mining Company, located at Cambria, in Weston County. The ovens are operated chiefly to utilize the slack coal produced in the mining operations. None of the coal is washed before coking.

The statistics of the production of coke in Wyoming from 1891 to 1900, inclusive, are as follows:

Statistics of the production of coke in Wyoming from 1891 to 1900.

Year.	Establishments.	Ovens.		Coal used.	Coke produced.	Total value of coke at ovens.	Value of coke at ovens, per ton.	Yield of coal in coke.
		Built.	Building.					
				Short tons.	*Short tons.*			*Per cent.*
1891	1	24	0	4,470	2,682	$8,046	$3.00	60
1892	1	24	0	0	0	0	0	0
1893	1	24	0	5,400	2,916	10,206	3.50	54
1894	1	24	0	8,685	4,352	15,232	3.50	50
1895	1	74	0	10,240	4,895	17,133	3.50	47.8
1896	1	74	0	41,038	19,542	58,626	3.00	47.6
1897	1	74	0	54,976	24,007	72,021	3.00	43.7
1898	1	74	0	35,384	18,350	64,225	3.50	51.9
1899	1	74	0	32,100	15,630	38,510	2.46	48.7
1900	1	74	0	32,460	14,501	43,503	3.00	44.7

The character of the coal used in the manufacture of coke in Wyoming is shown in the following table:

Character of coal used in the manufacture of coke in Wyoming since 1891.

[Short tons.]

Year.	Run of mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1891	0	0	4,470	0	4,470
1892	0	0	0	0	0
1893	0	0	5,400	0	5,400
1894	0	0	8,685	0	8,685
1895	0	0	10,240	0	10,240
1896	0	0	41,038	0	41,038
1897	0	0	54,976	0	54,976
1898	0	0	35,384	0	35,384
1899	0	0	32,100	0	32,100
1900	0	0	32,460	0	32,460

PETROLEUM.[1]

By F. H. Oliphant.

IMPORTANT FEATURES OF THE YEAR.

The following are the most conspicuous features in the production of petroleum in the United States during the year 1900:

(1) The total production of crude petroleum in 1900 was greater than that of any previous year. (2) There was a large increase in the production of petroleum in West Virginia, California, Ohio, Indiana, and Texas. (3) Of the total production, 91½ per cent came from the Appalachian and Lima-Indiana fields, leaving 8½ per cent as the production in all of the other fields in the United States. (4) There was an increase in the average price and value of petroleum at the wells. (5) There was an increase in the number of wells drilled in most of the fields. (6) There was an increase in the stocks in the Lima-Indiana and Appalachian fields. (7) The exports of petroleum and its products increased in quantity and value.

INCREASE IN TOTAL PRODUCTION OF THE UNITED STATES.

The total production of crude petroleum in 1900 was 63,362,704 barrels, being the largest for any year in our history. It was 6,291,854 barrels larger than that of 1899, the increase amounting to a little over 11 per cent, as compared with 3 per cent gain in 1899 over that of 1898. It was greater by 2,402,343 barrels than the heretofore largest production, that of 1896.

The five States of West Virginia, California, Ohio, Indiana, and Texas increased the production 6,156,292 barrels in 1900. West Virginia increased 2,285,045 barrels; California increased 1,457,389 barrels; Ohio increased 1,220,622 barrels; Indiana increased 1,026,210 barrels; Texas increased 167,026 barrels. These totals make up almost the entire gain in production in 1900.

[1] For much of the statistical information in this report credits should be given to the Oil City Derrick, and to Miss Belle Hill for the careful compilation of most of the tables. Other special acknowledgments are made in the body of the report.

PERCENTAGES OF PRODUCTION BY FIELDS.

The following table shows the percentages of production in the Appalachian, Lima-Indiana, and all of the other fields combined for the years 1896 to 1900, inclusive:

Percentages of total crude petroleum produced in the several fields for 1896, 1897, 1898, 1899, and 1900.

Field.	1896.	1897.	1898.	1899.	1900.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Appalachian	55.72	58.25	57.28	57.97	57.18
Lima-Indiana	41.43	37.71	36.70	35.48	34.34
All other	2.85	4.04	6.02	6.55	8.48
Total	100.00	100.00	100.00	100.00	100.00

The gain in the percentage of production in the West and South, outside of the Appalachian and Lima-Indiana fields, has increased during 1900 about 2 per cent. The older fields produce with great regularity. The other fields are newer and have greater possibilities in territory that has not yet been developed.

INCREASE IN PRICES AND VALUE.

The average price of all the petroleum sold in the United States in 1900 was \$1.19½ per barrel, as compared with \$1.13⅛ in 1899, a gain of 6.3 cents per barrel. This, with the increased production, makes the value of the petroleum produced in 1900 greater than that of 1899 by \$11,148,787.

The value of Pennsylvania petroleum was \$1.35¼ in 1900, as compared with \$1.31 in 1899. The general average price of Lima-Indiana petroleum was 98 cents in 1900, as compared with 89 cents in 1899. The average price of Texas petroleum in 1900 was \$1.04⅓, as compared with 71 cents in 1899. The value of the crude petroleum produced in 1900 was over \$11,000,000 greater than that of 1899, as compared with an increase of more than \$20,000,000 in 1899 over 1898, amounting to over \$31,000,000 increase in the years 1899 and 1900.

INCREASE IN WELLS COMPLETED.

More wells were drilled during the year 1900 in the Appalachian and Lima-Indiana fields than during any previous year in the history of the petroleum industry. The total number recorded is 14,583, which shows a gain of 1,215 wells, or more than 9 per cent, over 1899. Of the whole number completed in both these fields 11,764 wells were productive, and 2,822 proved to be dry holes, or did not produce a paying quantity. There were 10,950 wells completed in 1899, and of this number 2,418 were dry holes. The percentage of unproductive wells to the productive wells in 1900 was 24 per cent, as compared with $22\frac{1}{8}$ per cent in 1899. In 1898 there were 7,186 wells completed, of which 1,539 were dry or unproductive, the dry wells amounting to $21\frac{1}{2}$ per cent of the total wells drilled.

INCREASE IN STOCKS.

The following table shows the amount of oil on hand in the Appalachian and Lima-Indiana fields at the close of the year in 1898, 1899, and 1900:

Amount of oil on hand in the Appalachian and Lima-Indiana fields at the close of the years 1898, 1899, and 1900.

Fields.	1898.	1899.	1900.
Appalachian	11,786,603	13,451,191	13,475,548
Lima-Indiana	15,180,892	10,545,927	14,988,928
Total	26,967,495	23,997,118	28,464,476

The total stock held in both the Appalachian and the Lima-Indiana fields at the close of 1900, as shown above, was 28,464,476 barrels, as compared with 23,997,118 barrels at the close of 1899, showing a gain of 4,467,358 barrels, amounting to over $18\frac{1}{2}$ per cent increase, as compared with a decline of 11 per cent at the close of 1899.

The stock in the Lima-Indiana field at the close of 1900 was 14,988,928 barrels, as compared with 10,545,927 barrels at the close of 1899, a gain of 4,453,001 barrels. The stock in the Appalachian field at the close of 1900 was 13,475,548 barrels, as compared with 13,451,191 at the close of 1898, a gain of 24,357 barrels.

At the close of 1900 the Lima-Indiana oil fields contained nearly 53 per cent of the total stocks and the Appalachian fields about 47 per cent. This is a reversal of conditions prevailing at the close of 1899, when the Appalachian fields contained 56 per cent of the net stocks and the Lima-Indiana 44 per cent. The Lima-Indiana stocks touched the lowest point during the last dozen years in 1899, but made heavy gains in 1900.

INCREASE IN EXPORTS.

The total number of gallons of petroleum and its products exported in 1900 was 975,123,476, valued at $73,276,282, as compared with 951,024,441 gallons, valued at $64,982,249, in 1899, an increase of 24,099,035 gallons, and an increase in value amounting to $8,294,033 as compared with 1899. The average price received for all grades of petroleum and its products exported in 1900 was $7\frac{52}{100}$ cents per gallon, as compared with $6\frac{83}{100}$ cents per gallon in 1899. The value of the exported petroleum and its products in 1900 was the greatest in the history of the export trade. The quantity was slightly exceeded in the years 1898 and 1897.

PRODUCTION AND VALUE.

PRODUCTION BY FIELDS.

In the following table is given a statement of the total amount and the total value of all crude petroleum produced in the United States in 1899 and 1900, by States and important districts:

Total amount and value of crude petroleum produced in the United States and average price per barrel in 1899 and 1900.

State and district.	1899.			1900.		
	Barrels.	Value.	Average value per barrel.	Barrels.	Value.	Average value per barrel.
California	2,642,095	$2,508,751	$0.95	4,099,484	$3,863,225	$0.942
Colorado	390,278	404,110	1.035	317,385	323,434	1.019
Illinois	360	1,800	5.00	250	1,500	6.00
Indiana	3.848,182	3,363,738	.874	4,874,392	4,693,983	.963
Kansas	69,700	52,275	.75	74,714	69,142	.925
Kentucky	18,280	17,256	.944	29,384	23,410	.79⅗
Indian Territory, Michigan, Missouri	132	205	1.55⅓	8,074	6,031	.747
New York	1,320,909	1,708,926	1.29⅜	1,300,925	1,759,501	1.35¼
Ohio:						
Eastern and southern	4,764,135	6,243,075	1.31	5,476,089	7,406,734	1.35¼
Lima	16,377,174	14,718,985	.89⅞	16,884,358	16,673,304	.98¾
Mecca-Belden	799	4,244	5.31	2,283	11,563	5.06½
Total	21,142,108	20,966,304	.9917	22,362,730	24,091,601	1.077
Pennsylvania:						
Franklin	61,085	244,340	4.00	59,036	236,144	4.00
Pennsylvania	12,991,368	16,807,582	1.29⅜	13,197,866	17,850,114	1.35¼
Smiths Ferry	1,150	1,488	1.29⅜	1,300	1,758	1.35¼
Total	13,053,603	17,053,410	1.306	13,258,202	18,088,016	1.364
Texas	669,013	473,443	.708	836,039	871,996	1.043
West Virginia:						
Burning Springs, West Virginia	13,892,906	17,973,947	1.29⅜	16,176,757	21,879,064	1.35¼
Petroleum (*a*), Volcano (*b*)	17,724	40,819	2.303	18,918	43,638	2.307
Total	13,910,630	18,014,766	1.29½	16,195,675	21,922,702	1.353
Wyoming	5,560	38,920	7.00	5,450	38,150	7.00
Grand total	*c*57,070,850	64,603,904	1.13⅕	*c*63,362,704	75,752,691	1.195

a Production of light oil in Petroleum included with West Virginia's product.
b Production of light oil in Volcano included with West Virginia's product.
c In addition to this product, 13,578 barrels of crude were produced in Kentucky and Tennessee in 1899 and 19,712 barrels in 1900, for which no value could be given, none being sold or used.

The increase or decrease in the production by States, as well as the percentages of increase or decrease in 1900 compared with 1899, is shown in the following table:

Total production of crude petroleum and percentage of increase or decrease, by States, in 1900 as compared with 1899.

State.	Production.		Increase.	Decrease.	Percentage.	
	1899.	1900.			Increase.	Decrease.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	*Per cent.*	*Per cent.*
California	2,642,095	4,099,484	1,457,389	....	55.16	....
Colorado	390,278	317,385	....	72,893	....	18.67
Illinois	360	250	....	110	....	30.55
Indiana	3,848,182	4,874,392	1,026,210	....	26.66	....
Kansas	69,700	74,714	5,014	....	7.19	....
Kentucky	18,280	29,384	11,104	....	60.74	....
Indian Territory, Michigan, Missouri	132	8,074	7,942	....	6,016.66	....
New York	1,320,909	1,300,925	....	19,984	....	1.51
Ohio	21,142,108	22,362,730	1,220,622	....	5.77	....
Pennsylvania	13,053,603	13,258,202	204,599	....	1.56	....
Texas	669,013	836,039	167,026	....	24.96	....
West Virginia	13,910,630	16,195,675	2,285,045	....	16.43	....
Wyoming	5,560	5,450	....	110	....	1.98
Total	57,070,850	63,362,704	6,291,854	....	11.02+	....

It will be noticed in the above table that New York is the only large producing State that showed a decrease in 1900. The other States in which a decrease is shown have unimportant productions. The large increase in Kentucky was due to the accumulation of former years finding a market, owing to pipe-line connections having been made with the railroads. The largest decrease for the year was in Colorado.

The production of petroleum in the principal fields of the United States in 1896, 1897, 1898, 1899, and 1900 was as follows:

Production of petroleum in the United States from 1896 to 1900, by fields.

[Barrels of 42 gallons.]

Field.	1896.	1897.	1898.	1899.	1900.
Appalachian	33,970,222	35,229,949	31,711,857	33,050,076	36,233,174
Lima-Indiana	25,255,870	22,805,033	20,321,323	20,225,356	21,758,750
Southern California	1,252,777	1,903,411	2,257,207	2,642,095	4,099,484
Florence, Colorado	361,450	384,934	444,383	390,278	317,385
Kansas	113,571	81,098	71,980	69,700	74,714
Texas	1,450	65,975	546,070	669,013	836,039
Wyoming	2,878	3,650	5,475	5,560	5,450
Other	2,143	1,466	5,938	18,772	37,708
Total	*a*60,960,361	*a*60,475,516	*a*55,364,233	*a*57,070,850	*a*63,362,704

a In addition to this amount, 4,325 barrels of crude oil were produced in Kentucky and Tennessee in 1896, 4,377 barrels in 1897, 19,152 barrels in 1898, 13,578 barrels in 1899, and 19,712 barrels in 1900, for which, as none was sold or used, no value could be given.

PRODUCTION OF CRUDE PETROLEUM IN THE UNITED STATES, 1859 TO 1900.

In the following table will be found a statement of the production of crude petroleum in the United States from the beginning of production, marked by the drilling of the Colonel Drake Well in 1859, up to and including the production of 1900, the table being by years and States:

Production of crude petroleum in the United States from 1859 to 1900.

[Barrels of 42 gallons.]

Year.	Pennsylvania and New York.	Ohio.	West Virginia.	California.	Kentucky and Tennessee.	Colorado.	Indiana.
1859	2,000						
1860	500,000						
1861	2,113,609						
1862	3,056,690						
1863	2,611,309						
1864	2,116,109						
1865	2,497,700						
1866	3,597,700						
1867	3,347,300						
1868	3,646,117						
1869	4,215,000						
1870	5,260,745						
1871	5,205,234						
1872	6,293,194						
1873	9,893,786						
1874	10,926,945						
1875	8,787,514	a 200,000	a 3,000,000	a 175,000			
1876	8,968,906	31,763	120,000	12,000			
1877	13,135,475	29,888	172,000	13,000			
1878	15,163,462	38,179	180,000	15,227			
1879	19,685,176	29,112	180,000	19,858			
1880	26,027,631	38,940	179,000	40,552			
1881	27,376,509	33,867	151,000	99,862			
1882	30,053,500	39,761	128,000	128,636	b 160,933		
1883	23,128,389	47,632	126,000	142,857	4,755		
1884	23,772,209	90,081	90,000	262,000	4,148		
1885	20,776,041	661,580	91,000	325,000	5,164		
1886	25,798,000	1,782,970	102,000	377,145	4,726		
1887	22,356,193	5,022,632	145,000	678,572	4,791	76,295	
1888	16,488,668	10,010,868	119,448	690,333	5,096	297,612	
1889	21,487,435	12,471,466	544,113	303,220	5,400	316,476	33,375
1890	28,458,208	16,124,656	492,578	307,360	6,000	368,842	63,496
1891	33,009,236	17,740,301	2,406,218	323,600	9,000	665,482	136,634
1892	28,422,377	16,362,921	3,810,086	385,049	6,500	824,000	698,068
1893	20,314,513	16,249,769	8,445,412	470,179	3,000	594,390	2,335,293
1894	19,019,990	16,792,154	8,577,624	705,969	1,500	515,746	3,688,666
1895	19,144,390	19,545,233	8,120,125	1,208,482	1,500	438,232	4,386,132
1896	20,584,421	23,941,169	10,019,770	1,252,777	1,680	361,450	4,680,732
1897	19,262,066	21,560,515	13,090,045	1,903,411	322	384,934	4,122,356
1898	15,948,464	18,738,708	13,615,101	2,257,207	5,568	444,383	3,730,907
1899	14,374,512	21,142,108	13,910,630	2,642,095	18,280	390,278	3,848,182
1900	14,559,127	22,362,730	16,195,675	4,099,484	29,384	317,385	4,874,392
Total	601,385,850	241,089,003	104,010,825	18,838,875	277,747	5,995,505	32,598,233

a Includes all production prior to 1876.

b Includes all petroleum produced in Kentucky and Tennessee prior to 1883.

Production of crude petroleum in the United States from 1859 to 1900—Continued.

[Barrels of 42 gallons.]

Year.	Illinois.	Kansas.	Texas.	Missouri.	Indian Territory.	Wyoming.	United States.
1859							2,000
1860							500,000
1861							2,113,609
1862							*a* 3,056,690
1863							2,611,309
1864							2,116,109
1865							2,497,700
1866							3,597,700
1867							3,347,300
1868							3,646,117
1869							4,215,000
1870							5,260,745
1871							5,205,234
1872							6,293,194
1873							9,893,786
1874							10,926,945
1875							*b* 12,162,514
1876							9,132,669
1877							13,350,363
1878							15,396,868
1879							19,914,146
1880							26,286,123
1881							27,661,238
1882							30,510,830
1883							23,449,633
1884							24,218,438
1885							21,858,785
1886							28,064,841
1887							28,283,483
1888							27,612,025
1889	1,460	500	48	20			35,163,513
1890	900	1,200	54	278			45,823,572
1891	675	1,400	54	25	30		54,292,655
1892	521		45	10	80		50,509,657
1893	400	18,000	50	50	10		48,431,066
1894	300	40,000	60	8	130	2,369	49,344,516
1895	200	44,430	50	10	37	3,455	52,892,276
1896	250	113,571	1,450	43	170	2,878	*c* 60,960,361
1897	500	81,098	65,975	19	625	3,650	*c* 60,475,516
1898	360	71,980	546,070	10		5,475	*c* 55,364,233
1899	360	69,700	669,013	*d* 132		5,560	*c* 57,070,850
1900	250	74,714	836,039	*e* 8,074		5,450	*c* 63,362,704
Total	6,176	516,593	2,118,908	8,679	1,082	28,837	1,006,876,313

a In addition to this amount, it is estimated that for want of a market some 10,000,000 barrels ran to waste in and prior to 1862 from the Pennsylvania fields; also a large amount from West Virginia and Tennessee.

b Including all production prior to 1876 in Ohio, West Virginia, and California.

c In addition to this amount, 4,325 barrels of crude oil were produced in Kentucky and Tennessee in 1896, 4,377 barrels in 1897, 19,152 barrels in 1898, 13,578 barrels in 1899, and 19,712 barrels in 1900, for which, as none was sold or used, no value could be given.

d Includes the production of Michigan.

e Includes production of Michigan and Indian Territory.

PETROLEUM.

The total production of petroleum in the United States since the discovery by Colonel Drake, in Oil Creek, in August, 1859, down to the close of the year 1900 foots up 1,006,876,313 barrels. Allowing 5.6 cubic feet to one barrel of oil, this amount would fill a space equivalent to 5,638,507,352.8 cubic feet. The sides of a cube to contain this volume of oil would have to be 1,779.9 feet in length. This amount of oil would fill a tank with a base of 1 square mile to a height of 202.25 feet. It would fill 33,560 tanks of 30,000 barrels capacity, and these tanks, touching side to side and placed in a straight line, would extend a distance of 572 miles.

Of this great total Pennsylvania produced 60 per cent, Ohio produced 24 per cent, West Virginia produced 10.3 per cent, Indiana 3.2 per cent, California 1.8 per cent, leaving less than 1 per cent for the production of Kentucky, Tennessee, Colorado, Kansas, Texas, and all other producing States.

INCREASE IN THE APPALACHIAN FIELD.

This field embraces all the districts producing what is popularly known as "Pennsylvania oil." It extends from Wellsville, in New York State, on the northeast, down through western Pennsylvania into West Virginia, and includes a large portion of southeastern Ohio. Its extension through Kentucky and Tennessee into northern Alabama has not been attended with any noteworthy developments. The production of Kentucky and Tennessee has been very small, while Alabama has produced no oil in marketable quantities.

The total production of the Appalachian field, as seen in the following table, increased 9.63 per cent in 1900, as compared with an increase of 4.22 per cent in 1899. New York decreased 1.51 per cent in 1900, all the other States showing an increase in production. West Virginia gave the largest per cent of gains, closely followed by southeastern Ohio. In 1899 Pennsylvania showed a loss of 11.46 per cent and in 1900 a gain of 1.56 per cent. The Appalachian production, which includes all the petroleum produced in what is known as the Pennsylvania oil region, amounted to 36,233,174 barrels in 1900, as against 33,050,076 barrels in 1899. Of the total gain of over 3,000,000 barrels the West Virginia districts supplied a little more than 70 per cent.

The following table gives the production of the Appalachian States in 1899 and 1900, with the percentage of their increase or decrease. A part of the production in Ohio comes from another field, known as the Lima-Indiana field, but is not included in this table.

Production of petroleum in the Appalachian field in 1899 and 1900, by States, showing increase or decrease.

State.	Production.		Increase.	Decrease.	Percentage.	
	1899	1900.			Increase.	Decrease.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	*Per cent.*	*Per cent.*
New York	1,320,909	1,300,925		19,984		1.51
Pennsylvania	13,053,603	13,258,202	204,599		1.56	
West Virginia	13,910,630	16,195,675	2,285,045		16.43	
Southeastern Ohio	4,764,934	5,478,372	713,438		14.97	
Total	33,050,076	36,233,174	3,183,098		9.63	

INCREASE IN THE LIMA-INDIANA FIELD.

This field embraces a portion of northwestern Ohio and central Indiana. The petroleum in this field comes from the Trenton limestone and carries a small percentage of sulphur. The petroleum from the Appalachian fields is found almost entirely in sandstone, and is generally known as "white-sand oil." It is free from sulphur, produces a larger percentage of illuminating oil, and is more easily refined. There was produced in the Lima-Indiana field 21,758,750 barrels in 1900, as compared with 20,225,356 barrels in 1899, an increase of 1,533,394 barrels, equivalent to 7½ per cent.

Production of petroleum in the Lima-Indiana field in 1899 and 1900.

State.	Production, in barrels.		Increase, in barrels.	Percentage increase.
	1899.	1900.		
Ohio	16,377,174	16,884,358	507,184	3.1
Indiana	3,848,182	4,874,392	1,026,210	27.0
Total	20,225,356	21,758,750	1,533,394	7.5

The total production of the field in 1898 was 20,321,323 barrels; that of 1897 was 22,805,033 barrels. The decline was less than one-half of 1 per cent in 1899 and about 12 per cent in 1898. More complete details are given under the same headings in another part of this report.

In the following tables are shown the number of wells completed and dry holes in the Appalachian and Lima-Indiana fields for the years 1899 and 1900:

Number of wells completed and dry holes in the Appalachian and Lima-Indiana fields in 1899 and 1900.

1899.

Month.	Appalachian.		Lima-Indiana.		Total both fields.	
	Completed.	Dry.	Completed.	Dry.	Completed.	Dry.
January	583	147	342	35	925	182
February	454	93	240	26	694	119
March	626	150	322	53	948	203
April	616	137	240	33	856	170
May	751	160	345	35	1,096	195
June	809	172	449	43	1,258	215
July	751	152	373	42	1,124	194
August	765	160	434	42	1,199	202
September	803	165	481	44	1,284	209
October	886	190	460	49	1,346	239
November	895	200	485	48	1,380	248
December	813	194	445	48	1,258	242
Total	8,752	1,920	4,616	498	13,368	2,418

1900.

Month.	Appalachian.		Lima-Indiana.		Total both fields.	
	Completed.	Dry.	Completed.	Dry.	Completed.	Dry.
January	633	140	412	42	1,045	182
February	591	123	327	22	918	145
March	599	153	389	46	988	199
April	797	183	553	62	1,350	245
May	859	220	630	85	1,489	305
June	877	233	599	71	1,476	304
July	814	209	565	77	1,379	286
August	807	191	495	60	1,302	251
September	796	185	491	37	1,287	222
October	766	182	495	60	1,261	242
November	672	166	414	59	1,086	225
December	634	175	368	41	1,002	216
Total	8,845	2,160	5,738	662	14,583	2,822

The number of productive wells completed is the difference between the completed wells and the dry holes in the above.

Stocks of petroleum held by pipe lines at close of 1899 and 1900 in the Appalachian and Lima-Indiana fields.

[Barrels of 42 gallons.]

	1899.	1900.
National Transit Co	7,615,626	8,174,506
Southwest Pennsylvania Pipe Line Co	1,560,443	1,368,892
Eureka Pipe Line Co	1,593,080	1,401,201
Buckeye Pipe Line Co. (Macksburg oil)	674,583	591,899
Southern Pipe Line Co	396,256	471,599
Crescent Pipe Line Co	73,633	103,808
New York Transit Co	756,120	533,030
Tidewater Pipe Co	294,265	334,308
Producers and Refiners' Oil Co	140,966	148,769
Elk Oil Co	597	595
Emery Pipe Line Co	25,102	20,252
United States Pipe Line Co	33,148	25,857
Other lines	287,372	300,832
Total stocks Appalachian field	13,451,191	13,475,548
Total Lima-Indiana stocks	10,545,927	14,988,928
Total both fields	23,997,118	28,464,476

OTHER STATES AND FIELDS.

Since 1894 Ohio has produced more petroleum than any other State. In 1900 the southeastern field produced 5,476,089 barrels, the Mecca-Belden field 2,283 barrels, and the Lima-Indiana field 16,884,358 barrels, making a total of 22,362,730 barrels, equivalent to more than 38 per cent of the combined Appalachian and Lima-Indiana production, of which it is a part. West Virginia still stands second in the order of production by States; Pennsylvania is third. Indiana increased her production over 1,000,000 barrels, and still retains fourth place. California is fifth, having increased in production in 1900 over 55 per cent. If this increase is maintained during the present year, California will change places with Indiana.

California produced over 76 per cent of the production in 1900 outside of the Appalachian and the Lima-Indiana fields. California's gain in 1899 over 1898 was 17.05 per cent, while the gain of 1898 over 1897 was 18.5 per cent. The total production of California for 1900 was 4,099,484 barrels as compared with 2,642,095 barrels in 1899 and 2,257,207 barrels in 1898.

Texas is steadily increasing its output of crude petroleum and produced more oil in 1900 than during any preceding year. The gain the past year, however, was small in comparison with the figures of previous years. The Texas production for 1900 was 836,039 barrels as compared with 669,013 barrels in 1899, which is an increase of 167,026 barrels, or nearly 25 per cent. In 1899 this increase amounted to 22.5 per cent, while the gain of 1898 over 1897 was 727.5 per cent.

Colorado declined again. In 1899 the production decreased 54,105 barrels and in 1900, 72,893 barrels. The production the past year was only 317,385 barrels, so that the decrease was nearly 23 per cent.

The production of the State of Kansas is given as 74,714 barrels in 1900 and 69,700 barrels in 1899. This is an increase of 5,014 barrels, or a little over 7 per cent. In 1899 a decrease of 2,280 barrels was recorded. The production for 1898 was 71,980 barrels.

Kentucky is credited with a production of 29,384 barrels in 1900 as against 18,280 barrels in 1899. This is an increase of 11,104 barrels, or over 60 per cent.

EXPORTS.

The following tables are the official statement of the amount and value of petroleum and its products (mineral oils) exported from the United States for the year ending December 31, 1900, as compared with the preceding year:

Exports of mineral oils from the United States in 1899 and 1900.

Port and kind.	1899.		1900.	
CRUDE.	*Gallons.*		*Gallons.*	
Delaware	71,206,551	$3,432,458	101,047,806	$5,283,622
New York	3,622,195	262,385	3,423,169	250,950
Philadelphia	42,855,221	2,262,986	33,030,185	1,775,698
Total	117,683,967	5,957,829	137,501,160	7,310,270
NAPHTHA.				
Baltimore	....	....	4,323	404
Boston and Charlestown	1,538	404	3,910	765
Delaware	1,752,824	110,049	1,054,452	68,539
New York	9,563,127	968,591	11,223,617	1,177,555
Philadelphia	6,586,526	478,563	5,976,442	400,806
Total	17,904,015	1,557,607	18,262,744	1,648,069
ILLUMINATING.				
Baltimore	38,354,499	2,383,517	42,645,471	2,997,744
Boston and Charlestown	848,076	71,038	729,546	75,584
Delaware	20,905,323	1,201,042	2,316,085	174,143
New York	470,569,568	32,635,754	509,291,233	38,835,002
Philadelphia	193,885,527	12,174,849	175,603,152	11,851,083
Total	724,562,993	48,466,200	730,585,487	53,933,556
LUBRICATING AND PARAFFIN.				
Baltimore	858,336	108,253	1,366,583	175,031
Boston and Charlestown	455,804	83,988	184,161	33,934
New York	55,872,621	7,078,330	54,760,098	7,926,783
Philadelphia	12,142,427	1,074,164	12,686,873	1,406,870
Total	69,329,188	8,344,735	68,997,715	9,542,618
RESIDUUM.				
Boston and Charlestown	22,680	1,614	43,890	2,900
New York	7,258,692	227,924	10,228,008	423,722
Philadelphia	14,262,906	426,340	9,504,472	415,147
Total	21,544,278	655,878	19,776,370	841,769
Grand total	951,024,441	64,982,249	975,123,476	73,276,282

Exports of mineral oils from the United States in 1899 and 1900—Continued.

RECAPITULATION BY KINDS.

Kind.	1899.		1900.	
	Gallons.		*Gallons.*	
Crude petroleum	117,683,967	$5,957,829	137,501,160	$7,310,270
Naphtha	17,904,015	1,557,607	18,262,744	1,648,069
Illuminating oil	724,562,993	48,466,200	730,585,487	53,933,556
Lubricating oil and paraffin	69,329,188	8,344,735	68,997,715	9,542,618
Residuum	21,544,278	655,878	19,776,370	841,769
Total	951,024,441	64,982,249	975,123,476	73,276,282

RECAPITULATION BY PORTS.

Port.	1899.		1900.	
	Gallons.		*Gallons.*	
Baltimore	39,212,835	$2,491,770	44,016,377	$3,173,179
Boston and Charlestown	1,328,098	157,044	961,507	113,183
Delaware	93,864,698	4,743,549	104,418,343	5,526,304
New York	546,886,203	41,172,984	588,926,125	48,614,012
Philadelphia	269,732,607	16,416,902	236,801,124	15,849,604
Grand total	951,024,441	64,982,249	975,123,476	73,276,282

New York continues to be the leading port for the export of petroleum products, with Philadelphia second. During 1900 over 60 per cent of the exports of mineral oils of all kinds were from New York, while Philadelphia and Delaware ports exported about 22 per cent.

Exports of mineral oils from the United States from 1887 to 1900, inclusive.

[Gallons.]

Year.	Crude.	Naphtha.	Illuminating.	Lubricating and paraffin.	Residuum.	Total.	
						Quantity.	Value.
1887	80,643,839	12,344,669	464,702,903	20,340,820	2,989,098	581,021,329	$45,231,988
1888	77,387,799	13,466,234	450,801,683	24,280,826	1,861,104	567,797,646	47,563,749
1889	84,144,196	13,958,985	548,496,241	27,754,239	1,837,794	676,191,455	52,792,473
1890	95,368,525	12,406,586	547,542,569	31,896,146	1,828,900	689,042,726	51,657,302
1891	94,926,424	11,398,085	526,972,018	33,068,716	932,692	667,297,935	45,351,957
1892	104,012,829	16,351,340	586,406,366	33,805,128	329,574	740,905,237	42,283,163
1893	114,609,343	16,249,389	705,674,917	34,762,754	460,614	871,757,017	41,117,814
1894	114,268,611	14,831,967	726,726,687	38,975,128	59,766	894,862,159	40,463,088
1895	115,954,128	12,757,940	677,500,647	46,769,565	143,850	853,126,130	56,223,425
1896	117,921,276	13,420,769	749,305,844	50,629,143	507,990	931,785,022	62,764,278
1897	121,488,726	13,430,320	795,919,525	51,228,284	12,230,902	994,297,757	59,057,547
1898	114,915,082	17,026,626	761,152,107	63,968,341	29,418,454	986,480,610	52,551,048
1899	117,683,967	17,904,015	724,562,993	69,329,188	21,544,278	951,024,441	64,982,249
1900	137,501,160	18,262,744	730,585,487	68,997,715	19,776,370	975,123,476	73,276,282

This table is of interest as showing the remarkably steady amount of illuminating oil that has been marketed during the last few years.

It also shows the increasing demand for the other products of crude petroleum as well as for the crude itself. Comparing the year 1894 with 1900, the amount of illuminating oil is very nearly the same, yet the sales of other products and of crude have largely increased. While the year 1897 holds the record for the greatest amount of petroleum exported from the United States, the value of the petroleum products sent abroad in 1900 exceeds that of any previous year by several million dollars.

Exports of mineral oil from the United States in years 1897 to 1900, by months.

Month.	1897.		1898.	
	Gallons.		*Gallons.*	
January	61,006,066	$4,081,845	85,412,917	$3,989,811
February	72,378,443	4,561,148	62,091,132	2,998,714
March	78,622,541	4,884,479	85,944,541	4,243,945
April	68,434,629	4,046,766	76,649,229	3,929,149
May	84,714,994	5,362,282	86,431,145	4,571,862
June	96,569,600	5,655,793	93,109,931	4,972,286
July	89,083,369	5,132,815	89,982,205	4,722,093
August	94,763,463	5,691,276	97,457,340	5,010,507
September	87,413,316	4,850,891	87,999,604	4,779,026
October	87,843,419	4,960,228	79,524,827	4,643,148
November	82,676,014	4,964,730	76,007,690	4,496,250
December	90,791,903	4,865,294	65,870,049	4,194,257
Total 12 months	994,297,757	59,057,547	986,480,610	52,551,048

Month.	1899.		1900.	
	Gallons.		*Gallons.*	
January	62,385,776	$3,817,129	75,338,676	$6,339,185
February	51,759,280	3,403,331	64,291,406	5,507,351
March	85,273,703	5,291,534	75,095,173	6,494,982
April	66,873,657	4,267,075	68,346,204	6,035,136
May	87,216,379	5,210,928	83,872,727	6,744,936
June	87,214,749	5,481,991	79,031,621	5,772,984
July	81,171,542	5,245,519	89,688,610	6,266,480
August	100,220,318	6,565,691	102,998,938	7,303,116
September	92,676,402	7,007,626	90,605,804	6,440,542
October	86,562,810	6,583,145	92,141,804	6,109,079
November	83,678,752	6,632,253	75,243,820	5,134,598
December	65,991,073	5,476,027	78,468,693	5,127,893
Total 12 months	951,024,441	64,982,249	975,123,476	73,276,282

The average distillation of 100 gallons of crude petroleum of the Pennsylvania oil fields is estimated to yield 76 gallons of illuminating oil, 11 gallons of gasoline, benzine, and naphtha, and 3 gallons of lubricating oils, while the remaining 10 gallons represent residuum and loss.

In the following table are shown the exports of crude petroleum and its products from the United States from 1871 to 1900, together with a statement of the production of the entire country for the same period reduced to gallons. From these figures it appears that over 40 per cent of the total marketable products derived from the petroleum produced in the United States finds a market abroad. If the illuminating oil is reduced to its crude equivalent, the percentage will be much larger, and it will be found that nearly, if not quite, one-half of our total annual production is shipped to Europe and other countries.

Quantity of crude petroleum produced in, and the qualities and values of petroleum products exported from, the United States during each of the calendar years from 1871 to 1900.

Year ending December 31—	Production.		Exports.			
			Mineral, crude (including all natural oils, without regard to gravity).		Mineral, refined or manufactured.	
	Barrels (of 42 gallons).	Gallons.			Naphtha, benzine, gasoline, etc.	
			Gallons.		*Gallons.*	
1871	5,205,234	218,619,828	11,278,589	$2,171,706	8,396,905	$895,910
1872	6,293,194	264,314,148	16,363,975	2,761,094	8,688,257	1,307,058
1873	9,893,786	415,539,012	19,643,740	2,665,171	10,250,497	1,266,962
1874	10,926,945	458,931,690	14,430,851	1,428,494	10,616,644	997,355
1875	12,162,514	510,825,588	16,536,800	1,738,589	14,048,726	1,392,192
1876	9,132,669	383,572,098	25,343,271	3,343,763	13,252,751	1,502,498
1877	13,350,363	560,715,246	28,773,233	3,267,309	19,565,909	1,938,672
1878	15,396,868	646,668,456	24,049,604	2,169,790	13,431,782	1,077,402
1879	19,914,146	836,394,132	28,601,650	2,069,458	19,524,582	1,367,996
1880	26,286,123	1,104,017,166	36,748,116	2,772,400	15,115,131	1,344,529
1881	27,661,238	1,161,771,996	40,430,108	3,089,297	20,655,116	1,981,197
1882	30,510,830	1,281,454,860	45,011,154	3,373,302	16,969,839	1,304,041
1883	23,449,633	984,884,586	59,018,537	4,439,097	17,365,314	1,195,035
1884	24,218,438	1,017,174,396	79,679,395	6,102,810	13,676,421	1,132,528
1885	21,858,785	918,068,970	81,435,609	6,040,685	14,739,469	1,160,999
1886	28,064,841	1,178,723,322	76,346,480	5,068,409	14,474,951	1,264,736
1887	28,283,483	1,187,906,286	80,650,286	5,141,833	12,382,213	1,049,043
1888	27,612,025	1,159,705,050	77,549,452	5,454,705	13,481,706	1,083,429
1889	35,163,513	1,476,867,546	85,189,658	6,134,002	13,984,407	1,208,116
1890	45,822,672	1,924,552,224	96,572,625	6,535,499	12,462,636	1,050,613
1891	54,291,980	2,280,263,160	96,722,807	5,365,579	11,424,993	868,137
1892	50,509,136	2,121,383,712	104,397,107	4,696,191	16,393,284	1,037,558
1893 *a*	48,412,666	2,033,331,972	111,703,508	4,567,391	17,304,005	1,074,710
1894	49,344,516	2,072,469,672	121,926,349	4,415,915	15,555,754	943,970
1895	52,892,276	2,221,475,592	111,285,264	5,161,710	14,801,224	910,988
1896	*b* 60,960,361	2,560,335,162	110,923,620	6,121,836	12,349,319	1,059,542
1897	*b* 60,475,516	2,539,971,672	121,488,726	5,020,968	13,430,320	994,781
1898	*b* 55,364,233	2,325,297,786	114,915,082	4,764,111	17,026,626	1,053,231
1899	*b* 57,070,850	2,396,975,700	117,683,967	5,957,829	17,904,015	1,557,607
1900	*b* 63,362,704	2,661,233,568	137,501,160	7,310,270	18,262,744	1,648,069

a Exports are for fiscal years from 1893 to 1896, inclusive.

b In addition to this amount, 4,325 barrels of crude oil were produced in Kentucky and Tennessee in 1896, 4,377 barrels in 1897, 19,152 barrels in 1898, 13,578 barrels in 1899, and 19,712 barrels in 1900, for which, as none was sold or used, no value could be given.

Quantity of crude petroleum produced in, and the qualities and values of petroleum products exported from, the United States, etc.—Continued.

Year ending December 31—	Exports.			
	Mineral, refined or manufactured.			
	Illuminating.		Lubricating (heavy paraffin, etc.).	
	Gallons.		*Gallons.*	
1871	132,178,843	$33,493,351	240,228	$92,408
1872	118,259,832	29,456,453	438,425	180,462
1873	207,595,988	41,357,686	1,502,503	517,466
1874	206,562,977	30,168,747	993,068	269,886
1875	203,678,748	28,168,572	938,052	265,837
1876	220,831,608	44,089,066	1,157,929	370,431
1877	307,373,842	51,366,205	1,914,129	577,610
1878	306,212,506	36,855,798	2,525,545	698,182
1879	365,597,467	32,811,755	3,168,561	713,208
1880	286,131,557	29,047,908	5,607,009	1,141,825
1881	444,666,615	42,122,683	5,053,862	1,165,605
1882	428,424,581	37,635,981	8,821,536	2,034,487
1883	440,150,660	39,470,352	10,108,394	2,193,245
1884	433,851,275	39,450,794	11,985,219	2,443,385
1885	445,880,518	39,476,082	12,978,955	2,659,210
1886	485,120,680	39,012,922	13,948,367	2,689,464
1887	485,242,107	37,007,336	20,582,613	3,559,280
1888	455,045,784	37,236,111	24,510,437	4,215,449
1889	551,769,666	41,215,192	27,903,267	4,638,724
1890	550,873,438	39,826,086	32,090,537	4,766,850
1891	531,445,099	34,879,759	33,310,264	4,999,978
1892	589,418,185	31,826,545	34,026,855	5,130,643
1893 (*a*)	642,239,816	31,719,404	32,432,857	4,738,892
1894	730,368,626	30,676,217	40,190,577	5,449,000
1895	714,859,144	34,706,844	43,418,942	5,867,477
1896	716,455,565	48,630,920	50,525,530	6,556,775
1897	795,919,525	46,229,579	51,228,284	6,478,479
1898	761,152,107	38,542,082	63,968,341	7,385,054
1899	724,562,993	48,466,200	69,329,188	8,344,735
1900	730,585,487	53,933,556	68,997,715	9,542,618

a Exports are for fiscal years from 1893 to 1896, inclusive.

Quantity of crude petroleum produced in, and the qualities and values of petroleum products exported from, the United States, etc.—Continued.

Year ending December 31—	Exports.			
	Residuum (tar, pitch, and all other, from which the light bodies have been distilled).		Total.	
	Gallons.		*Gallons.*	
1871	101,052	$10,450	152,195,617	$36,663,825
1872	568,218	56,618	144,318,707	33,761,685
1873	1,377,180	117,595	240,369,908	45,924,880
1874	2,504,628	177,794	235,108,168	33,042,276
1875	2,323,986	169,671	237,526,312	31,734,861
1876	2,863,896	239,461	263,449,455	49,545,219
1877	4,256,112	390,077	361,883,225	57,539,873
1878	3,126,816	220,835	349,346,253	41,022,007
1879	4,827,522	273,050	421,719,782	37,235,467
1880	3,177,630	198,983	346,779,443	34,505,645
1881	3,756,018	197,321	514,561,719	48,556,103
1882	4,265,352	275,263	503,492,462	44,623,074
1883	6,502,524	465,350	533,145,429	47,763,079
1884	5,303,298	327,599	544,495,608	49,457,116
1885	5,713,908	334,767	560,784,459	49,671,743
1886	1,993,824	109,673	591,884,302	48,145,204
1887	2,989,098	141,350	601,846,317	46,898,842
1888	1,870,596	116,009	572,457,975	48,105,703
1889	1,858,458	97,265	680,705,456	53,293,299
1890	1,830,612	91,905	693,829,848	52,270,953
1891	1,002,414	61,382	673,905,577	46,174,835
1892	403,032	38,220	744,638,463	42,729,157
1893 *a*	541,044	41,661	804,221,230	42,142,058
1894	211,008	14,704	908,252,314	41,499,806
1895	137,508	13,063	884,502,082	46,660,082
1896	204,960	14,330	890,458,994	62,383,403
1897	12,230,902	333,740	994,297,757	59,057,547
1898	29,418,454	806,570	986,480,610	52,551,048
1899	21,544,278	655,878	951,024,441	64,982,249
1900	19,776,370	841,769	975,123,476	73,276,282

a Exports are for fiscal years from 1893 to 1896, inclusive.

FOREIGN MARKETS.

In the following table is given a statement showing the foreign markets for our oil in the past eight years. As will be seen from this table, the total exports of illuminating oils were decreased slightly in 1900.

Exports of petroleum in its various forms from the United States from 1893 to 1900, by countries.

[Gallons.]

Country and kind.	Year ending June 30— 1893.	1894.	1895.	1896.
CRUDE.				
Europe:				
France	69,424,609	84,434,953	72,802,459	79,242,152
Germany	4,182,963	4,877,593	3,966,870	817,212
Netherlands				4,455,469
Spain	21,112,042	15,176,034	15,188,547	12,869,235
United Kingdom			3,997,013	
Other Europe	3,948,842	2,009,727	2,590,441	1,212,528
Total	98,668,456	106,498,307	98,545,330	98,596,596
North America:				
Mexico	5,508,769	8,026,189	5,229,983	6,779,059
Cuba	6,955,315	6,865,549	6,980,372	4,838,657
Other North America	548,068	534,304	523,579	708,008
Total	13,012,152	15,426,042	12,733,934	12,325,724
All other countries	22,900	2,000	6,000	1,300
Total crude	111,703,508	121,926,349	111,285,264	110,923,620
REFINED.				
Naphtha.				
Europe:				
France	4,080,839	3,764,569	1,564,360	1,672,056
Germany	4,127,354	4,278,757	4,900,028	2,814,217
United Kingdom	8,209,526	6,834,760	7,343,355	7,236,285
Other Europe	658,270	364,135	577,378	160,658
Total	17,076,989	15,242,221	14,385,121	11,883,216
North America	122,237	106,454	145,970	208,249
West Indies		67,195	84,299	104,062
South America	55,940	79,777	135,752	96,020
Asia and Oceania	39,625	57,057	45,217	49,927
Africa	9,214	3,050	4,865	7,845
Total	227,016	313,533	416,103	466,103
Total naphtha	17,304,005	15,555,754	14,801,224	12,349,319
Illuminating.				
Europe:				
Belgium	33,541,439	36,312,974	35,385,765	35,413,132
Denmark	12,262,308	9,290,251	14,626,436	12,693,927
France	8,161,023	11,812,001	6,204,663	5,338,501
Germany	119,277,484	86,388,785	100,829,413	121,841,266
Italy	22,815,279	22,945,037	28,017,572	22,648,184
Netherlands	51,298,480	31,868,189	45,900,640	122,510,644
Sweden and Norway	16,312,922	9,848,074	24,623,246	10,582,677

Exports of petroleum in its various forms from the United States from 1893 to 1900, by countries—Continued.

[Gallons.]

Country and kind.	Year ending June 30— 1893.	1894.	1895.	1896.
REFINED—continued.				
Illuminating—Continued.				
Europe—Continued.				
United Kngdom	180,996,321	274,555,010	279,064,424	181,883,052
Portugal				4,286,732
Other Europe	8,654,660	7,232,024	6,586,826	3,862,377
Total	453,319,916	490,252,345	541,238,985	521,060,492
North America:				
British North America	6,341,042	8,218,417	7,621,352	9,141,934
Central America				1,371,502
Mexico				241,061
West Indies British	4,439,118	4,174,856	4,109,358	2,712,126
West Indies Other				2,189,271
Other North American	2,204,602	1,759,565	1,501,157	60,864
Total	12,984,762	14,182,838	13,231,867	15,716,758
South America:				
Argentina	4,070,719	3,162,846	5,876,742	7,803,218
Brazil	15,556,685	12,154,709	15,315,196	18,490,043
Chile				4,325,915
Uruguay	2,882,105	2,520,571	3,898,514	3,622,810
Venezuela				1,483,127
Other South America	6,041,571	5,503,680	7,245,123	2,784,155
Total	28,551,080	23,341,806	32,335,575	38,509,268
Asia:				
China	27,874,230	40,377,296	18,022,800	25,694,890
Hong Kong	12,758,820	16,888,820	10,595,610	10,499,000
East Indies British	57,404,175	85,907,557	46,680,054	24,762,150
East Indies Dutch				16,947,830
Japan	26,869,510	37,272,450	24,298,170	33,701,038
Total	124,906,735	180,446,123	99,596,634	111,604,908
Oceania:				
British Australasia	11,053,991	11,821,881	14,686,752	13,721,827
Hawaiian Islands				629,740
Other Asia and Oceania	2,637,250	2,944,958	3,636,230	4,931,965
Total	138,597,976	195,212,962	117,919,616	130,888,440
Africa	8,206,932	7,049,455	9,676,741	10,280,607
All other countries	579,150	329,220	456,360	
Total illuminating	642,239,816	730,368,626	714,859,144	716,455,565
Lubricating.				
Europe:				
Belgium	2,426,926	2,931,204	2,679,832	4,078,951
France	2,426,659	3,050,544	3,271,804	5,165,586
Germany	3,798,953	5,637,471	5,378,398	5,990,561
Italy	788,805	1,356,340	1,381,587	1,324,994

Exports of petroleum in its various forms from the United States from 1893 to 1900, by countries—Continued.

[Gallons.]

Country and kind.	Year ending June 30— 1893.	1894.	1895.	1896.
REFINED—continued.				
Lubricating—Continued.				
Europe—Continued.				
Netherlands	1,842,608	2,346,896	2,641,209	2,724,546
United Kingdom	17,683,132	19,668,767	21,209,497	23,436,081
Other Europe	249,474	415,385	520,025	815,017
Total	29,216,557	35,406,610	37,082,352	43,535,736
North America	1,043,770	1,308,586	1,248,751	1,244,538
West Indies	....	417,123	316,274	213,304
South America	1,207,232	1,509,708	2,159,844	2,221,780
Asia and Oceania	888,032	1,433,191	2,438,975	3,000,471
Africa	77,266	115,359	172,746	309,701
Total	3,216,300	4,783,967	6,336,590	6,989,794
Total lubricating	32,432,857	40,190,577	43,418,942	50,525,530
Residuum (barrels).				
Europe	10,404	2,056	2,099	4,248
North America	2,202	2,460	1,045	438
All other countries	276	513	130	194
Total residuum	12,882	5,029	3,274	4,880

Country and kind.	Year ending June 30— 1897.	1898.	1899.	1900.
CRUDE.				
Europe:				
France	100,153,929	85,125,657	83,630,510	95,603,800
Germany	2,430,249	3,585,777	3,485,360	3,536,491
Netherlands	2,400,000	2,400,000	2,409,040	3,328,764
Spain	12,049,778	9,914,851	9,723,420	16,127,318
United Kingdom	....	5,060	310	....
Other Europe	1,345,360	136,314	2,391,864	138,628
Total	118,379,316	101,167,659	101,640,504	118,735,001
North America:				
Mexico	7,090,850	7,713,859	7,969,871	8,002,845
Cuba	4,772,589	3,829,463	3,297,175	5,935,494
Porto Rico	....	....	160,000	211,503
Other North America	623,958	585,390	20,510	136,033
Total	12,487,397	12,128,712	11,447,556	14,285,875
South America:				
Brazil	841,140	....	....	....
Other South America	....	1,026	....	....
Total	841,140	1,026	....	....
All other countries	18,390	....	....	2,780
Total crude	131,726,243	113,297,397	113,088,060	133,023,656

Exports of petroleum in its various forms from the United States from 1893 to 1900, by countries—Continued.

[Gallons.]

Country and kind.	Year ending June 30— 1897.	1898.	1899.	1900.
REFINED.				
Naphtha.				
Europe:				
France	2,103,725	1,713,646	1,517,758	4,776,290
Germany	2,800,883	6,135,309	4,716,306	6,803,632
Netherlands	1,400,000	1,500	1,477,034	2,030,232
United Kingdom	7,125,371	7,380,140	7,584,526	7,356,743
Other Europe	281,541	382,201	414,597	420,706
Total	13,711,520	15,612,796	15,710,221	21,387,603
North America	256,869	290,372	251,879	241,340
West Indies	83,529	18,261	15,864	20,479
South America	67,178	85,492	137,743	95,314
Asia and Oceania	120,479	231,487	120,123	228,228
Africa	9,453	14,521	16,955	15,129
Total	537,508	640,133	542,564	600,490
Total naphtha	14,249,028	16,252,929	16,252,785	21,988,093
Illuminating.				
Europe:				
Belgium	42,437,133	44,317,797	40,715,711	43,675,550
Denmark	14,001,755	18,969,052	17,548,051	18,236,065
France	2,736,190	5,875,777	3,994,908	3,962,328
Germany	114,533,356	137,981,137	115,124,570	124,542,723
Italy	24,525,066	18,705,089	19,750,201	17,534,626
Netherlands	126,341,441	134,204,836	138,188,341	121,135,337
Sweden and Norway	18,961,261	23,567,695	17,345,423	24,693,536
United Kingdom	185,200,507	179,160,587	178,796,530	146,477,760
Portugal	4,712,019	5,500,240	2,692,476	1,826,056
Other Europe	2,488,975	3,821,197	2,787,050	4,567,988
Total	535,987,703	572,103,407	536,943,261	506,651,963
North America:				
British North America	9,071,814	9,952,286	9,861,600	10,845,114
Central America	1,201,053	1,034,878	1,075,322	1,102,066
Mexico	335,692	550,544	581,222	282,160
West Indies—				
British	2,661,734	2,675,186	2,609,283	2,729,301
Other	2,218,373	2,234,338	2,899,504	2,592,440
Other North America	63,548	42,020	40,045	35,727
Total	15,552,214	16,489,252	17,066,976	17,586,808
South America:				
Argentina	9,703,792	10,648,733	6,483,293	10,182,529
Brazil	19,819,941	19,569,447	16,289,130	18,409,626
Chile	3,622,300	3,923,448	3,685,800	4,166,481
Uruguay	2,821,420	3,576,570	1,760,465	3,120,200
Venezuela	1,456,472	1,417,804	1,327,681	1,021,839
Other South America	3,049,493	2,820,834	2,760,223	3,029,520
Total	40,473,418	41,956,836	32,306,592	39,930,195

Exports of petroleum in its various forms from the United States from 1893 to 1900, by countries—Continued.

[Gallons.]

Country and kind.	Year ending June 30— 1897.	1898.	1899.	1900.
REFINED—continued.				
Illuminating—Continued.				
Asia:				
China	42,516,120	44,324,344	22,683,425	32,775,880
Hongkong	14,977,050	15,637,420	18,095,260	19,181,230
East Indies—				
British	19,276,390	33,341,284	20,109,900	9,906,240
Dutch	24,898,000	12,534,930	15,371,400	11,207,740
Japan	46,252,501	51,621,050	32,705,180	51,297,805
Other Asia	5,085,030	4,119,840	155,700	2,412,770
Total	153,005,091	161,578,868	109,120,865	126,781,665
Oceania:				
British Australasia	15,329,222	18,859,348	14,396,782	19,542,573
Hawaiian Islands	391,150	785,740	1,049,210	1,217,780
Other Oceania	623,490	1,089,215	23,575	27,780
Total	16,343,862	20,734,303	15,469,567	20,788,133
British Africa	4,851,040	5,963,379	7,540,818	5,981,035
Other Africa	5,137,298	5,600,536	3,831,401	3,307,838
Total illuminating	771,350,626	824,426,581	722,279,480	721,027,637
Lubricating.				
Europe:				
Belgium	3,784,941	3,872,617	4,625,800	4,798,917
France	4,225,199	5,246,208	6,500,107	7,170,304
Germany	6,877,196	8,086,776	8,233,910	10,279,660
Italy	1,550,688	1,970,890	1,921,123	2,084,206
Netherlands	2,840,832	4,196,352	4,332,727	5,223,275
United Kingdom	21,301,290	25,724,836	26,353,051	28,669,308
Other Europe	1,011,201	920,919	1,755,551	1,882,200
Total	41,591,347	50,018,598	53,722,269	60,107,870
North America	1,259,249	1,429,468	1,549,299	1,932,313
West Indies	114,942	186,285	416,688	308,429
South America	1,876,794	1,971,050	2,899,295	2,488,018
Asia and Oceania	4,879,886	5,978,725	7,737,421	9,244,955
Africa	477,127	715,239	1,099,421	502,184
Total	8,607,998	10,280,767	13,702,124	14,475,899
Total lubricating	50,199,345	60,299,365	67,424,393	74,583,769
Residuum (barrels).				
Europe	140,777	471,604	724,241	389,919
North America	566	1,680	5,299	2,894
All other countries	1,269	2,278	674	3,120
Total residuum	142,612	475,562	730,214	395,933

PRODUCTION BY FIELDS, STATES, AND DISTRICTS.

APPALACHIAN OIL FIELD.

The year 1900 proved one of great activity in the Appalachian petroleum field. The market in 1900 was a satisfactory one for the average producers, and everywhere earnest efforts were made to enlarge the limits of the known producing regions and open up new areas of oil territory. These efforts were only partially successful, as no considerable areas of new territory were found approaching in importance the Scio field in Ohio of the previous year. Sand Fork, in Lewis County, W. Va., and the Gaines pool, in Tioga County, Pa., were the most conspicuous developments of the past year, but neither proved at all remarkable nor added a very considerable amount to the world's supply of crude petroleum.

The market, which ranged above $1.60 per barrel for the first three months of the year, began to decline early in April, and prices continued downward until $1.05 per barrel was touched in November. The bottom mark was the direct result of an expected overproduction of petroleum from the Sand Fork region. Prices rallied during December, and the year closed with a $1.20 market. The average price for the entire year showed a gain over the year preceding.

Since January, 1877, the records show that 104,793 wells have been completed in the Appalachian oil field, of which number 18,894 failed to find oil in paying quantities. At an average cost of $2,000 each, these wells represent an aggregate capital of $209,586,000. The total number of wells completed in the Eastern petroleum fields since the first discovery by Colonel Drake, below Titusville, in 1859, must approximate close to 118,000.

Under the heads of the several States more complete details are given in regard to the different divisions that are included under the general title of the Appalachian field.

PRODUCTION OF THE APPALACHIAN OIL FIELD FROM 1889 TO 1900, BY STATES.

The tables that follow relate to the oil statistics of the Appalachian field by States, exclusive of Kentucky and Tennessee, whose petroleum production as yet is insignificant in comparison with the four great oil-producing States, from which the main source of the supply of Pennsylvania oil has been obtained for many years past.

For reasons stated in previous reports, the statistics of the New York and Pennsylvania oil fields are presented together.

Production of petroleum in the Appalachian oil field from 1889 to 1900.

[Barrels of 42 gallons.]

Year.	Pennsylvania and New York.	West Virginia.	Southeastern Ohio.	Total.
1889	21,487,435	544,113	318,277	22,349,825
1890	28,458,208	492,578	1,116,521	30,067,307
1891	33,009,236	2,406,218	424,323	35,839,777
1892	28,422,377	3,810,086	1,193,414	33,425,877
1893	20,314,513	8,445,412	2,602,965	31,362,890
1894	19,019,990	8,577,624	3,184,310	30,781,924
1895	19,144,390	8,120,125	3,694,624	30,959,139
1896	20,584,421	10,019,770	3,366,031	33,970,222
1897	19,262,066	13,090,045	2,877,838	35,229,949
1898	15,948,464	13,615,101	2,148,292	31,711,857
1899	14,374,512	13,910,630	4,764,934	33,050,076
1900	14,559,127	16,195,675	5,478,372	36,233,174

It will be seen by the above table that for the year 1900 the Appalachian field increased its production 3,183,098 barrels, a gain of 9.6 per cent. In 1899 there was an increase of 4.2 per cent over 1898, while 1898 showed a decline of 10 per cent as compared with 1897. Of the total production in 1900, New York and Pennsylvania supplied about 40 per cent, West Virginia 45 per cent, and southeastern Ohio 15 per cent. Of the total production in 1899 New York and Pennsylvania furnished 43.5 per cent, West Virginia 42.1 per cent, and southeastern Ohio 14.4 per cent. In 1898, 50.3 per cent of the total came from New York and Pennsylvania, 42.9 per cent from West Virginia, and 6.8 per cent from southeastern Ohio. The southwestern sections of the Appalachian fields are constantly supplying a great proportion of the total product, while the districts of the northeast are steadily declining.

PRODUCTION IN THE APPALACHIAN OIL FIELD, BY MONTHS.

In the following table is given the production of crude petroleum in the Appalachian oil field from 1895 to 1900, by months:

Production of crude petroleum in the Appalachian oil field from 1895 to 1900, by months.

[Barrels of 42 gallons.] .

Month.	1895.	1896.	1897.	1898.	1899.	1900.
January	2,469,941	2,727,891	2,754,761	2,816,280	2,491,156	2,912,987
February	2,083,087	2,528,867	2,663,406	2,465,715	2,283,943	2,590,712
March	2,504,645	2,711,088	2,935,568	2,864,176	2,735,261	2,999,625
April	2,588,727	2,933,487	2,809,148	2,688,999	2,641,307	2,945,281
May	2,586,710	2,888,502	2,902,571	2,714,058	2,823,731	3,143,756
June	2,488,551	2,916,018	2,990,489	2,595,135	2,794,575	3,063,505
July	2,673,621	2,972,001	3,035,334	2,572,648	2,843,626	3,095,131
August	2,753,417	2,871,118	3,115,375	2,667,974	2,999,744	3,193,527
September	2,685,766	2,831,507	3,035,321	2,578,710	2,838,459	2,997,810
October	2,717,958	2,901,781	3,078,061	2,581,226	2,919,006	3,240,317
November	2,661,700	2,745,756	2,983,616	2,527,486	2,861,905	3,004,314
December	2,745,016	2,942,206	2,926,299	2,639,450	2,817,363	3,046,209
Total	30,959,139	33,970,222	35,229,949	31,711,857	33,050,076	36,233,174

PIPE-LINE RUNS OF THE APPALACHIAN FIELD.

In the following table will be found the pipe-line runs in the Appalachian oil field in 1900, by lines and months:

Pipe-line runs in the Appalachian oil field in 1900, by lines and months.

[Barrels of 42 gallons.]

Month.	National Transit.	Southwest.	Eureka.	Tide Water.	Producers and Refiners' Pipe Line Company, Limited.
January	580,353	298,446	1,258,545	140,415	112,488
February	501,812	261,437	1,138,858	122,896	94,670
March	603,075	315,007	1,317,928	147,283	111,936
April	615,162	301,433	1,282,309	138,617	107,393
May	620,174	310,139	1,396,438	134,471	114,373
June	588,088	301,000	1,382,955	127,536	114;840
July	572,156	293,689	1,427,539	130,435	109,632
August	588,917	310,861	1,430,378	133,152	117,272
September	542,907	302,740	1,333,450	136,100	108,959
October	590,174	335,467	1,463,699	155,628	115,902
November	544,907	319,781	1,353,975	137,702	105,378
December	552,076	366,139	1,328,514	140,990	108,170
Total	6,899,801	3,716,139	16,114,588	1,645,225	1,321,013

Month.	Elk.	Emery.	United States.	Franklin.	Buckeye-Macksburg.	Total.
January	16,846	26,513	....	4,393	403,239	2,841,238
February	14,346	21,057	....	2,734	358,960	2,516,770
March	17,145	24,521	....	5,364	408,778	2,951,037
April	16,233	25,380	3,618	5,616	390,849	2,886,610
May	16,768	25,250	3,564	4,300	453,400	3,078,877
June	16,891	27,778	5,912	4,231	435,272	3,004,503
July	15,614	28,638	4,498	4,581	450,783	3,037,565
August	16,163	28,519	6,457	3,920	493,395	3,129,034
September	15,395	24,783	2,656	4,458	453,467	2,924,915
October	16,297	27,779	2,836	3,687	489,203	3,200,672
November	15,525	25,873	1,480	4,212	442,533	2,951,366
December	15,328	27,363	1,552	3,909	474,336	3,018,377
Total	192,551	313,454	32,573	51,405	5,254,215	35,540,964

AVERAGE DAILY PRODUCTION OF THE APPALACHIAN OIL FIELD FROM 1894 TO 1900, INCLUSIVE, BY MONTHS AND YEARS.

Average daily production of crude petroleum in the Appalachian oil field each month, for the years 1894 to 1900, by months and years.

[Barrels.]

Month.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
January	84,746	79,676	87,996	88,863	90,848	80,373	93,967
February	83,235	74,396	87,202	95,122	88,061	81,569	92,525
March	86,163	80,795	87,454	94,695	92,392	88,234	96,762
April	83,159	86,291	97,783	93,638	89,633	88,043	98,176
May	85,622	83,443	93,177	93,631	87,550	91,088	101,411
June	87,914	82,952	97,201	99,683	86,504	93,153	102,117
July	85,797	86,246	95,871	97,914	82,988	91,730	99,843
August	84,048	88,820	92,617	100,496	86,064	96,766	103,017
September	82,190	89,526	94,384	101,177	85,957	94,615	99,927
October	85.119	87,676	93,606	99,292	83,265	94,161	104,526
November	82,030	88,723	91,525	99,454	84,249	95,397	100,144
December	81,813	88,549	94,910	94,397	85,143	90,883	98,265
Average	84,334	84,820	92,815	96,520	86,882	90,548	99,269

The average daily production in 1900 increased 9.6 per cent as compared with 1899. The largest production was in October, when the large wells on Sand Fork, in West Virginia, were giving up their largest production.

SHIPMENTS OF PETROLEUM FROM THE APPALACHIAN FIELD.

The following table gives the total deliveries of petroleum by pipe lines from 1893 to 1900, inclusive, by years and months. These figures represent the quantity of petroleum delivered out of their receiving tanks to customers during 1900, amounting 35,401,113 barrels, which was 5,083,686 barrels more than the quantity delivered in 1899.

The pipe-line companies always receive more oil than is shown by deducting shipments from runs. The pipe-line runs for 1899 were 32,260,689 barrels, shipments for the same year were 30,317,426 barrels, which would leave 1,943,263 to go to the credit of stocks, and if added to the stocks on hand at the end of 1898 would amount to 13,729,569 barrels, instead of 13,451,191 barrels. This excess is absorbed by sand, paraffin, scale, and water, forming what is known as "B. S.," and which is unsalable.

The total runs for 1900 were 35,489,559 barrels, or 88,446 barrels in excess of the shipments. The stocks during the year, however, show a gain of only 24,357 barrels. The stocks for the past year reached their highest point in July, and were lowest at the close of February. The production of Appalachian oil has been slightly in excess of the demand for several years past.

Total shipments of petroleum in the Appalachian oil fields from 1893 to 1900, by months.

[Barrels of 42 gallons.]

Month.	1893.	1894.	1895.	1896.
January	2,957,358	3,141,722	3,140,864	2,543,518
February	2,584,742	2,656,026	2,808,801	2,252,417
March	2,843,938	2,912,594	2,608,232	2,438,900
April	2,666,199	2,846,805	2,781,379	2,227,514
May	3,033,700	2,819,413	2,845,334	2,418,590
June	3,074,443	2,914,400	2,816,698	2,249,062
July	3,319,658	2,927,036	2,634,880	2,540,332
August	3,248,873	3,256,397	2,424,843	2,404,298
September	3,000,740	2,966,864	2,332,271	2,542,963
October	3,316,914	3,271,371	2,573,915	2,606,494
November	3,096,578	3,208,560	2,655,325	2,502,035
December	3,152,238	3,286,087	2,410,084	2,614,072
Average	3,024,615	3,017,273	2,669,386	2,445,016
Total	36,295,381	36,207,275	32,032,626	29,340,195

Month.	1897.	1898.	1899.	1900.
January	2,538,501	2,909,176	2,484,546	2,898,725
February	2,311,488	2,133,424	1,905,583	2,752,484
March	2,773,710	2,627,845	2,635,454	2,799,258
April	2,454,018	2,422,105	2,379,122	2,845,047
May	2,546,696	2,393,831	2,579,304	2,794,178
June	2,556,161	2,435,248	2,538,921	2,881,534
July	2,707,317	2,563,825	2,357,716	2,756,900
August	3,100,209	2,696,018	2,779,825	3,386,097
September	2,956,036	2,585,253	2,704,392	3,034,646
October	3,638,301	2,847,108	2,743,677	3,005,063
November	3,320,084	2,408,127	2,607,901	3,152,667
December	2,761,803	2,383,976	2,600,985	3,094,514
Average	2,805,360	2,533,828	2,526,452	2,950,093
Total	33,664,324	30,405,936	30,317,426	35,401,113

STOCKS OF PETROLEUM IN THE APPALACHIAN OIL FIELD.

In the following table are given the stocks of petroleum in the tanks of the pipe-line companies in the Appalachian oil field at the close of each month for the past eight years:

Total stocks of petroleum in the Appalachian oil field at the close of each month from 1893 to 1900.

[Barrels of 42 gallons.]

Month.	1893.	1894.	1895.	1896.
January	17,305,206	11,755,219	5,859,348	5,499,477
February	17,042,245	11,384,776	5,087,498	5,741,797
March	16,834,533	11,295,959	4,942,643	6,005,732
April	16,641,773	10,751,983	4,730,819	6,697,481
May	16,285,855	10,639,454	4,506,874	7,153,922
June	15,845,548	10,381,209	4,275,506	7,791,359
July	15,182,551	9,869,915	4,306,287	8,182,582
August	14,730,600	9,210,959	4,592,906	8,672,385
September	14,261,432	8,730,456	4,908,593	8,924,639
October	13,559,543	8,038,376	5,013,941	9,178,509
November	12,904,344	7,283,988	4,988,092	9,409,098
December	12,316,611	6,499,880	5,344,784	9,745,722
Average	15,242,520	9,653,515	4,879,775	7,750,225

Month.	1897.	1898.	1899.	1900.
January	9,904,200	10,851,673	11,722,555	13,383,404
February	10,308,262	11,170,947	12,034,804	13,147,351
March	10,426,110	11,370,864	12,054,356	13,305,549
April	10,772,213	11,611,688	12,301,840	13,351,327
May	11,088,493	11,909,904	12,497,709	13,632,248
June	11,485,001	12,052,282	12,702,241	13,752,630
July	11,830,322	11,976,516	13,067,316	14,041,007
August	11,794,707	11,908,617	13,155,777	13,851,685
September	11,872,575	11,852,553	13,150,046	13,519,681
October	11,246,836	11,490,444	13,199,969	13,668,955
November	10,870,883	11,572,734	13,365,565	13,413,177
December	11,010,044	11,786,603	13,451,191	13,475,548
Average	11,050,804	11,629,569	12,725,281	13,545,214

The net stocks in the custody of the various pipe lines increased from 13,451,191 barrels on December 31, 1899, to 13,475,548 barrels at the close of December, 1900, a gain of 24,357 barrels. During 1899 there was an increase in the stocks of Appalachian oil of 1,664,588 barrels. During the height of the Bradford field excitement the stocks in custody of the pipe lines amounted at one time to nearly 40,000,000 barrels. The lowest point reached since then was 4,275,506 barrels, on June 30, 1895.

PRICES OF CRUDE PETROLEUM IN THE APPALACHIAN OIL FIELD.

Monthly and yearly average prices of pipe-line certificates of Pennsylvania crude petroleum at wells from 1860 to 1900.

[Per barrel of 42 gallons.]

Year.	January.	February.	March.	April.	May.	June.
1860	$19.25	$18.00	$12.62½	$11.00	$10.00	$9.50
1861	1.00	1.00	1.00	.62½	.50	.50
1862	.10	.15	.22½	.50	.85	1.00
1863	2.25	2.50	2.62½	2.87½	2.87½	3.00
1864	4.00	4.37½	5.50	6.56	6.87½	9.50
1865	8.25	7.50	6.00	6.00	7.37½	5.62½
1866	4.50	4.40	3.75	3.95	4.50	3.87½
1867	1.87½	1.85	1.75	2.07½	2.35	1.90
1868	1.95	2.00	2.55	2.82⅛	3.75	4.50
1869	5.75	6.95	6.00	5.70	5.35	4.95
1870	4.52½	4.52½	4.45	4.22½	4.40	4.17½
1871	3.82½	4.38	4.25	4.01	4.60	3.85½
1872	4.02½	3.80	3.72½	3.52½	3.80	3.85
1873	2.60	2.20	2.12½	2.30	2.47½	2.22½
1874	1.20	1.40	1.60	1.90	1.62½	1.32½
1875	1.03	1.52½	1.75	1.36½	1.40	1.26½
1876	1.80	2.60	2.01	2.02½	1.90½	2.01¾
1877	3.53¼	2.70	2.67½	2.58	2.24	1.94⅝
1878	1.43	1.65¼	1.59	1.37½	1.35¼	1.14
1879	1.03	.98	.86¼	.78½	.76	.68⅜
1880	1.10¼	1.03⅛	.88¾	.78	.80	1.00
1881	.95½	.90⅜	.83⅜	.86¼	.81⅞	.81¼
1882	.83⅛	.84½	.81⅜	.78⅜	.71½	.54⅜
1883	.93¾	1.01	.97⅝	.94⅜	1.00⅛	1.16⅜
1884	1.11	1.04⅜	.98⅛	.94	.85⅝	.68⅝
1885	.70⅞	.72⅜	.80⅜	.78½	.79	.82
1886	.88⅜	.79⅞	.77¼	.74⅛	.70	.66½
1887	.70	.64⅝	.63⅜	.64⅞	.64⅓	.62⅝
1888	.91¼	.91⅝	.98⅝	.82⅝	.86¾	.75⅞
1889	.86⅝	.89¼	.90⅞	.88	.83⅛	.83⅞
1890	1.05¾	1.05⅛	.90	.82⅝	.88⅞	.89¼
1891	.74¼	.78⅜	.74¼	.71½	.69¾	.68⅛
1892	.62⅜	.60¼	.57⅛	.57⅞	.57⅜	.54⅛
1893	.53½	.57⅜	.65¼	.68¾	.58¾	.60¼
1894	.79¾	.80⅝	.82	.84¼	.86	.89⅜
1895	.99	1.04⅜	1.09¾	1.79	1.74¼	1.53⅝
1896	1.42⅝	1.36⅝	1.28½	1.22½	1.15⅜	1.14¾
1897	.88	.90⅓	.92⅙	.85⅞	.86¾	.86¼
1898	.65	.67¾	.78⅝	.73¾	.82¼	.87⅛
1899	1.17	1.15	1.13	1.13	1.13	1.13¼
1900	1.66⅝	1.68	1.68	1.55	1.39⅜	1.25½

Monthly and yearly average prices of pipe-line certificates of Pennsylvania crude petroleum at wells from 1860 to 1900—Continued.

[Per barrel of 42 gallons.]

Year.	July.	August.	September.	October.	November.	December.	Yearly average.
1860	$8.62½	$7.50	$6.62½	$5.50	$3.75	$2.75	$9.59
1861	.50	.25	.20	.10	.10	.10	.49
1862	1.25	1.25	1.25	1.75	2.00	2.25	1.05
1863	3.25	3.37½	3.50	3.75	3.85	3.95	3.15
1864	12.12½	10.12½	8.87½	7.75	10.00	11.00	8.06
1865	5.12½	4.62½	6.75	8.12½	7.25	6.50	6.59
1866	3.00	3.75	4.50	3.39	3.10	2.12½	3.74
1867	2.62½	3.15	3.40	3.55	2.50	1.87½	2.41
1868	5.12½	4.57½	4.00	4.12½	3.75	4.35	3.62½
1869	5.37½	5.57½	5.50	5.50	5.80	5.12½	5.63¾
1870	3.77½	3.15	3.25	3.27½	3.22½	3.40	3.86
1871	4.79	4.66	4.65	4.82½	4.25	4.00	4.34
1872	3.80	3.58½	3.25	3.15	3.83½	3.32½	3.64
1873	2.00	1.42½	1.15	1.20	1.25	1.00	1.83
1874	1.02½	.95	.95	.85	.55	.61½	1.17
1875	1.09	1.13	1.33	1.32½	1.44	1.55	1.35
1876	2.24½	2.71⅜	3.81	3.37½	3.11	3.73	2.56¼
1877	2.07½	2.51	2.38	2.56¾	1.91	1.80	2.42
1878	.98¾	1.01	.86⅝	.82½	.89⅜	1.16	1.19
1879	.69⅞	.67⅛	.69⅜	.88⅛	1.05⅝	1.18⅓	.85⅞
1880	1.06¼	.91	.96	.96⅞	.91⅞	.91⅝	.94½
1881	.76⅞	.78⅛	.97⅛	.91¼	.85¼	.84⅜	.85⅞
1882	.57⅜	.58⅝	.72⅛	.93¾	1.14	.96	.78⅛
1883	1.05⅞	1.08	1.12½	1.11⅛	1.14½	1.14¾	1.05¾
1884	.63½	.81⅞	.78	.71⅛	.72½	.74⅜	.83½
1885	.92½	1.00¼	1.00¾	1.05½	1.04⅜	.89⅝	.87⅞
1886	.66	.62⅛	.63⅜	.65⅛	.71⅝	.70⅝	.71¼
1887	.59¼	.60⅛	.67	.70⅞	.73⅞	.80¾	.66¾
1888	.80⅝	.90⅛	.93⅝	.90⅝	.85⅜	.89¼	.87⅝
1889	.95⅛	.99½	.99⅛	1.01⅜	1.08½	1.04⅓	.94⅛
1890	.89⅛	.89¼	.81⅞	.80⅛	.72⅜	.67¼	.86¾
1891	.66½	.64	.58½	.60½	.58¾	.59⅝	.67
1892	.52½	.55	.54⅜	.51⅜	.52	.53¼	.55⅝
1893	.57⅝	.58⅞	.64⅝	.70¾	.73⅞	.78¼	.64
1894	.83⅛	.81	.83	.83	.83	.91½	.83⅞
1895	1.46⅝	1.26⅙	1.22⅜	1.24¼	1.48⅜	1.42	1.35⅞
1896	1.08¼	1.05	1.12	1.15	1.16	.98	1.17⅞
1897	.76¾	.71	.69¾	.67⅜	.65	.65	.78⅝
1898	.93¼	.97⅝	1.01¾	1.13⅛	1.16⅜	1.17½	.91⅛
1899	1.22⅜	1.27½	1.44½	1.50⅞	1.57⅜	1.65⅛	1.29⅜
1900	1.25⅝	1.25½	1.23	1.10⅜	1.06¾	1.08¾	1.35¼

In the preceding table is shown the average price for what is known as Pennsylvania petroleum at the wells for each month and year from 1860 to 1900. The average price for 1900 was $1.35¼, which is a gain of 5⅞ cents a barrel over the price for the preceding year, and only ⅝ cent on a barrel less than the average for 1895, which was the highest average price recorded for any year since 1877. In 1899 there was a gain in the average price of 38¼ cents a barrel over the price for 1898.

The price of oil is no longer influenced by the buying and selling of oil certificates on the oil exchange. In fact the oil exchange is very nearly a thing of the past, and the speculation in oil certificates has dropped to almost nothing. There is only a single oil exchange in existence, and transactions in oil certificates are seldom recorded on its boards.

Almost the entire product of the Appalachian field is sold under the head of Pennsylvania oil. The output of the Tiona and Middle district, which is not much above 1,000 barrels a day, because of its superior quality commands a premium of 15 cents a barrel above the Pennsylvania quotations. The other oils in some of the smaller pools of southeastern Ohio, which are of inferior grade, are from 7 to 15 cents below the price paid for the Pennsylvania product.

In the following tables are given the average monthly prices, during 1899 and 1900, of crude petroleum produced in the various districts of the Appalachian oil regions in which special prices are paid:

Average monthly prices of Appalachian crude petroleum, per barrel of 42 gallons, in 1899.

Month.	Tiona.	Pennsylvania.	Barnesville.	Corning.	Newcastle.
January	$1.27	$1.17	$1.07	$1.00	$0.92
February	1.25	1.15	1.05	.98	.90
March	1.25⅝	1.13	1.03	.96	.88
April	1.28	1.13	1.03	.96	.88
May	1.28	1.13	1.03	.96	.88
June	1.28¼	1.13¼	1.03¼	.96¼	.88¼
July	1.37⅜	1.22⅜	1.12⅜	1.05⅜	.97⅜
August	1.42½	1.27½	1.17½	1.10½	1.02½
September	1.59½	1.44½	1.34½	1.27½	1.19½
October	1.65⅞	1.50⅞	1.40⅞	1.33⅞	1.25⅞
November	1.72⅜	1.57⅜	1.47⅜	1.40⅜	1.32⅜
December	1.80⅛	1.65⅛	1.55⅛	1.48⅛	1.40⅛
Average	1.43¼	1.29⅜	1.19⅜	1.12⅜	1.04⅜

Average monthly prices of Appalachian crude petroleum, per barrel of 42 gallons, in 1900.

Month.	Tiona.	Pennsylvania.	Barnesville.	Corning.	Newcastle.
January	$1.81⅝	$1.66⅝	$1.56⅝	$1.49⅝	$1.41⅝
February	1.83	1.68	1.58	1.51	1.43
March	1.83	1.68	1.65	1.51	1.43
April	1.70	1.55	1.55	1.38	1.30
May	1.54⅜	1.39⅜	1.39⅜	1.22⅜	1.14⅜
June	1.40½	1.25½	1.25½	1.08½	1.00½
July	1.40⅝	1.25⅝	1.25⅝	1.08⅝	1.00⅝
August	1.40½	1.25½	1.25½	1.08½	1.00½
September	1.37¾	1.23	1.23	1.05¾	.97¾
October	1.25⅜	1.10⅜	1.10⅜	.93⅜	.85⅜
November	1.21¾	1.06¾	1.06¾	.89¾	.81¾
December	1.23¾	1.08¾	1.08¾	.91¾	.83¾
Average	1.50⅕	1.35¼	1.33¼	1.18⅕	1.10⅕

WELL RECORDS IN THE APPALACHIAN OIL FIELD.

The following table shows the total number of wells completed each month in the several districts for 1900:

Total number of wells completed in the Appalachian oil field in 1900, by months and districts.

Month.	Bradford.	Allegany.	Middle.	Venango and Clarion.	Butler and Armstrong.	Southwest district.	Southeastern Ohio.	Total.
January	43	39	37	123	60	244	87	633
February	27	33	32	111	47	252	89	591
March	21	28	30	114	62	240	104	599
April	43	42	42	162	64	319	125	797
May	44	66	57	152	66	339	135	859
June	29	72	64	162	61	357	132	877
July	40	58	48	130	70	346	122	814
August	38	68	57	122	87	312	123	807
September	41	44	69	120	67	326	129	796
October	28	53	64	111	62	295	153	766
November	27	37	47	98	66	277	120	672
December	23	35	36	89	52	291	108	634
Total	404	575	583	1,494	764	3,598	1,427	8,845

The year 1900 was another record breaker in respect to number of wells completed in the Appalachian oil field. More wells were completed than during any previous year in the history of the oil industry. The increase over 1899, however, was very small, amounting to 93, while the gain during 1899 over the previous year was 3,960. Of the 8,845 wells completed in 1900, 2,160 were dry holes. The productive wells drilled in 1900 were, therefore, 6,685, or nearly 76 per cent of the total. Of the 8,752 wells drilled in 1899, 1,920 were dry. The producing wells drilled in 1899 were, therefore, 6,832, or 78 per cent of the total, against 73½ per cent in 1898. The wells drilled in the Franklin lubricating petroleum district in Pennsylvania and the Volcano and Burning Springs lubricating petroleum districts are not included in the above table.

Total number of wells completed in the Appalachian oil field from 1892 to 1900.

District.	Wells completed.								
	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Bradford	37	52	284	578	769	696	488	642	404
Allegany	21	41	82	258	331	350	264	597	575
Middle	131	91	215	401	594	481	388	558	583
Venango and Clarion	131	243	731	1,783	1,614	990	772	1,535	1,494
Butler and Armstrong	342	298	755	1,292	1,153	802	497	699	764
Southwest	1,230	1,065	1,481	2,364	2,744	2,255	2,017	2,925	3,598
Southeastern Ohio	76	190	215	460	619	498	366	1,796	1,427
Total	1,968	1,980	3,763	7,136	7,824	6,072	4,792	8,752	8,845

The increase in the number of wells completed, as shown in the above table, came from the Middle, the Butler and Armstrong, and the Southwest districts. All the other sections showed a decline. The greatest gain was recorded in the Southwest, which supplied the most active developments of the year.

The number of dry holes in the Appalachian field from 1891 to 1900 in the different districts are noted in the following table:

Number of dry holes drilled in the Appalachian oil field from 1891 to 1900.

District.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Bradford	18	10	8	46	76	78	114	63	100	52
Allegany	8	6	22	28	39	46	51	52	134	126
Middle	34	35	17	31	58	104	122	94	103	153
Venango and Clarion	110	40	56	124	283	261	162	136	216	197
Butler and Armstrong	117	94	88	204	354	347	295	205	221	218
Southwest	363	243	206	357	653	865	640	559	755	976
Southeastern Ohio	14	34	46	85	125	200	196	160	391	438
Total	664	462	443	875	1,588	1,901	1,580	1,269	1,920	2,160

It will be noted that 240 more dry holes were drilled in 1900 than in 1899, a gain of 12½ per cent. There were 51 per cent more dry holes drilled in 1899 than in 1898, while 1898 showed a decrease of 20 per cent in comparison with 1897.

The following table shows the wells completed, the initial production, dry holes, wells drilling, and the rigs building in the Appalachian field, by months, during 1900:

Well record in the Appalachian oil field in 1900.

Month.	Wells completed.	Initial production.	Dry holes.	Wells drilling.	Rigs building.
		Barrels.			
January	633	8,187	140	652	459
February	591	7,691	123	665	402
March	599	7,058	153	672	427
April	797	12,362	183	701	483
May	859	11,857	220	724	454
June	877	12,809	233	752	409
July	813	13,117	210	707	388
August	812	11,419	191	733	396
September	795	17,241	184	760	405
October	769	11,611	187	703	467
November	672	11,805	166	707	494
December	634	9,635	174	651	382
Total	8,851	*a* 11,233	2,164	*a* 702	*a* 431

a Average.

Tables under the head of Ohio give detailed information as to wells drilled and initial daily production in that portion of the Appalachian oil fields known as the Corning, Macksburg, Steubenville, Marietta, and Scio districts, and miscellaneous wells in southeastern or southern Ohio, grouped in the previous tables under the head of Macksburg. That portion of the Sistersville pool in southern Ohio is included under the head of the Southwest district.

The remaining portion of the Sistersville pool is in West Virginia and is also a part of the great Southwest district. Detailed information as to the number of wells drilled and initial daily production is given in the following table:

Well record in West Virginia in 1900.

Month.	Wells completed.	Initial production.	Dry holes.	Wells drilling.	Rigs building.
		Barrels.			
January	193	5,397	44	270	155
February	215	5,239	46	275	141
March	202	4,962	60	277	146
April	263	7,449	60	293	163
May	289	7,247	81	299	164
June	301	8,622	86	303	151
July	297	9,703	75	285	160
August	255	6,715	59	334	148
September	274	12,197	68	344	163
October	242	5,690	57	289	229
November	216	7,354	57	305	254
December	220	6,013	55	330	192
Total	2,967	*a* 7,216	748	*a* 300	*a* 172

a Average.

OHIO.

The total amount and value of crude petroleum produced in Ohio from 1895 to 1900, inclusive, by districts, are shown in the following table:

Total amount and value of crude petroleum produced in Ohio from 1895 to 1900.

Year.	Lima district.		Southeastern Ohio district.		Mecca-Belden district.		Total.	
	Production.	Value.	Production.	Value.	Production.	Value.	Production.	Value.
	Barrels.		*Barrels.*		*Barrels.*		*Barrels.*	
1895	15,850,609	$11,372,812	3,693,248	$5,018,201	1,376	$8,229	19,545,233	$16,399,242
1896	20,575,138	13,723,617	3,365,365	3,966,924	666	2,897	23,941,169	17,693,438
1897	18,682,677	8,967,685	2,877,193	2,262,193	645	3,120	21,560,515	11,232,998
1898	16,590,416	10,244,582	2,147,610	1,957,010	682	3,618	18,738,708	12,205,210
1899	16,377,174	14,718,985	4,764,135	6,243,075	799	4,244	21,142,108	20,966,304
1900	16,884,358	16,673,304	5,476,089	7,406,734	2,283	11,563	22,362,730	24,091,601

COLORADO.

This was one of the States which showed a decrease in 1900. There was a falling off in the production in 1900 of 72,893 barrels, notwithstanding there was considerable activity in the field operations. The number of dry holes has been large in comparison with the producing wells, but not so large as in the year 1899. Some new territory has been opened up near the southern limit of the field. The number of wells completed in 1900 was 31. Of this number 18 were dry and 13 were producers. The number of wells abandoned was 4. Of this number 2 were drilled in 1900. The average depth of the wells drilled in 1900 was 2,230 feet. In some wells three pay streaks are found at from 200 to 400 feet apart. A well may miss them all or may possibly pass through all three.

In the following table will be found a statement of the production of crude oil in Colorado from 1887 to 1900:

Production of crude oil in Colorado from 1887 to 1900.

Year.	Barrels.	Year.	Barrels.
1887	76,295	1895	438,232
1888	297,612	1896	361,450
1889	316,476	1897	384,934
1890	368,842	1898	444,383
1891	665,482	1899	390,278
1892	824,000	1900	317,385
1893	594,390		
1894	515,746	Total	5,995,505

WYOMING.

This State has some fifteen distinct pools of petroleum scattered over its large area. Most of these have only natural springs to mark their existence, although considerable drilling has been done in various parts of the State. The locations for these wells have often been made without due regard to the known dips of the rocks, and have either reached the oil sand too soon or the depth of the oil sand was beyond the capacity of the machinery. Very few wells were drilled in 1899, and operations were confined to the working of the wells at Salt Creek, close to the north line of Natrona County, where a good natural lubricating petroleum is produced. There is a similar grade of lubricating petroleum near New Castle, Weston County, where three wells have been drilled.

Most of the oil outside of these localities is of a dark color, ranging from 16° to 25° Baumé, produces only a limited amount of illuminating oil, and is not a first-class lubricator in its natural state.

The great inland valleys and plains, with their ridges and mountain chains extending for many miles, with numerous synclinal and anticlinal folds, have, at frequent intervals, been cut through by streams and exposed the rocks down to the sub-Carboniferous, the Triassic, and the Jurassic, and the individual members of the great Cretaceous formation. There are numerous places at which the exposed rocks of this Cretaceous formation are still discharging dark, heavy petroleum until miniature lakes are formed. At other points the rocks where they come to the surface are saturated with it. At others natural gas is seen bubbling up in pools of water. All of these facts seem to indicate that Wyoming will one day produce a large amount of petroleum, although many natural difficulties will have to be overcome. The elevation of the State averages about 6,000 feet above tide. The extremes are from 3,000 to 14,000 feet.

The large areas in this State that are cut off from communication and transportation, the long distance to any large center of population, the abundance of good coal, and the scarcity of good water and timber, together with its comparatively small population, have all been factors that have retarded the development of its petroleum. The day will come, however, when this State will probably furnish a large amount of petroleum. At Salt Creek six wells owned by the Pennsylvania Oil and Gas Company are producing a dark-green oil of natural lubricating qualities, of 24° Baumé gravity. The production is between 18 and 20 barrels per day for the whole group. The petroleum is hauled 50 miles south to Casper, on the Fremont, Elkhorn and Missouri Valley Railroad, by teams, the oil being loaded into tank wagons, a team of 16 to 18 horses hauling 30 to 35 barrels. The first well was drilled in the Salt Creek pool in 1889. The depths of the six wells now producing run from 800 to 1,125 feet. Three strings of casing are required to reach the sand. At Casper a small percentage of the light products are distilled out of the main body, leaving a very good quality of lubricating petroleum. It is thoroughly filtered to remove a fine, sharp sand. There was considerable prospecting in the neighborhood of Douglas during the summer of 1900. Several wells were put down and a heavy petroleum found resembling that found at Salt Creek and New Castle, but no shipments have been made.

The production has remained steady for the past three years.

Production of petroleum in Wyoming from 1894 to 1900.

Year.	Barrels.	Year.	Barrels.
1894	2,369	1898	5,475
1895	3,455	1899	5,560
1896	2,878	1900	5,450
1897	3,650	Total	28,837

INDIAN TERRITORY, MICHIGAN, AND MISSOURI.

The combined production of oil in Michigan, Missouri, and the Indian Territory is very small. The total number of barrels produced in 1900 was 8,074, the largest proportion being from Indian Territory.

The number of oil wells producing at the close of 1900 in Indian Territory was 4; in Michigan, 10. A small quantity of crude petroleum was produced in Missouri from one well, located in Bates County. The only locality in which oil was produced in Indian Territory in 1900 was near Bartlesville, on lease of the Osage Nation. There are a number of wells located in the Cherokee Nation and Creek Nation, but produced no oil in 1900. The production in Michigan is at Port Huron, where there are 10 producing wells. This field is an extension of the Canadian field on the opposite side of Lake Huron.

Production of petroleum in Indian Territory from 1891 to 1900.

Year.	Barrels.	Year.	Barrels.
1891	30	1896	170
1892	80	1897	625
1893	10	1898	None.
1894	130	1899	None.
1895	37	1900	(*a*)

a Included with Michigan and Missouri.

Production of petroleum in Missouri from 1889 to 1900.

Year.	Barrels.	Year.	Barrels.
1889	20	1895	10
1890	278	1896	43
1891	25	1897	19
1892	10	1898	10
1893	50	1899	*a* 132
1894	8	1900	*b* 8,074

a Includes the production of Michigan.
b Includes the production of Michigan and Indian Territory.

TEXAS.

This is only the fourth year in which the State of Texas has occupied a place of prominence as a producer of petroleum. Its production in 1896 was only 1,450 barrels; in 1900 it was 836,039 barrels, 580 times the production in 1896. Almost the entire production comes from the Corsicana field in Navarro County, 265 miles north of Sabine Pass on the Gulf of Mexico.

The greater portion of the petroleum comes from a depth of 1,010 to 1,040 feet in a loose-grained quartz sand, in which foraminifera or microscopic fossils are found. This bed of sand ranges from 15 to 30 feet in thickness, and is capped by an almost continuous deposit of Ponderosa clay and marl. There are a few limestone concretions found near the surface. The original wells produced from 10 to 30 barrels per day when first opened up, and they are now producing about one-half of that amount.

The area of the original field, as now developed, begins just southeast of Corsicana near the old reservoir, and extends in a general northern direction, taking in a large portion of the town and extending almost north for 4 miles with an average width of over 1 mile, the western boundary being very close to the line of the Southern Pacific Railroad. This field is fully equipped with all the modern appliances, including gas engines, in some instances, for producing petroleum in an economical manner.

During the early part of the year a field of heavy petroleum was developed 5 miles due east of Corsicana, and also at Powell, 3 miles farther east on the St. Louis, Arkansas and Texas Railroad. Some of these wells that produced over 100 barrels per day when first opened up are now producing only from 8 to 10 barrels per day.

Most of the wells find this heavy petroleum at a depth of 700 feet. A few to the east have found heavy petroleum at a depth of 400 feet. This petroleum can be converted into good lubricating oils and marketed as such. It is entirely different from the regular Corsicana petroleum. The geological equivalent of the strata in which all of the Corsicana petroleum is found is Upper Cretaceous. All of the strata in southeastern Texas in which numerous shows of petroleum and natural gas are found, as far as located, belong to the newer geological horizons. The recent alluvia are found bordering the Gulf, reaching back in a general parallel course to the Gulf shore line for many miles. The rise to the northwest brings the strata to the surface in that direction. Below the alluvium is the upper division of the Tertiary known as Pleistocene, followed in turn by the Miocene and Eocene. The exact dividing line between the alluvium and the newer Tertiary or Pleistocene is difficult to determine owing to the great mass of the former covering up the outcrop of the latter. In a general way it follows parallel to the coast line of the Gulf, ranging from 40 to 60 miles inland. The outcrop of the Eocene division of Tertiary also follows the shore line in a generally parallel manner, distant from it about 90 miles. The northwestern outcrop of this formation ranges from 200 miles north of the southern outcrop in eastern Texas to an average of 60 miles between Columbus and Austin, widening again to about 200 miles where it joins the Mexican border. In this broad belt of the Eocene division of the Tertiary group the greatest number of indications of petroleum are found. There are also numerous deposits of lignite coal in this geological division. The petroleum found at Corsicana is in the next division below the Tertiary, known as the Cretaceous period. Following parallel to this line of division between the Tertiary and Cretaceous there are also numerous indications of petroleum, generally of a lighter gravity than that found in the Tertiary.

PRODUCTION IN TEXAS.

The total production of crude petroleum in the State of Texas in 1900 was 836,039 barrels, valued at $871,996, or $1.043 per barrel. Of this amount, 829,560 barrels, valued at $867,719, was produced in the Corsicana light-oil field, the remainder, 6,479 barrels, valued at $4,277, being the product of other fields.

There are three wells located in Bastrop County. They are 340 feet deep and the output has never been tested, but the quality of oil produced has been pronounced as very fine illuminating oil.

Three wells have also been drilled in Caldwell County, about 3 miles from Lockhart, in which oil has been found at a depth of from 300 to 400 feet. An analysis of this oil was made and the same said to be a fine quality of oil. The wells in Nacogdoches County, formerly reported upon, were not operated in 1900 to any extent. There are quite a number of wells drilled in this locality. A number of them flow naturally a dark, tarry petroleum. At Sour Lake, in Hardin County, 9 miles north of Sour Lake station, on the Southern Pacific Railroad, five wells have been drilled and a small production of heavy petroleum, about 16° Baumé, secured. These wells are from 250 to 350 feet deep. The supply seems to be limited, as very little or no petroleum was produced in this region in 1900. There are some natural flows of petroleum in springs, as well as springs that flow considerable quantities of natural gas and sulphuretted hydrogen. The lake is a body of water perhaps 200 feet square, in which there is a constant ebullition caused by the escaping gases. The water is so charged with sulphuric acid as to be quite sour to the taste. The clay in the lake has sufficient sulphur in it to burn when dry. There are several natural flows of bitumen, that has gradually hardened, found on the surface. The gravity of this petroleum is 16° Baumé. A new refinery of small capacity has been erected here during the year, but up to the close of 1900 no refining had been done.

There are a great many localities in this State where surface indications of petroleum, natural gas, and bitumen have been reported, and probably many more exist that have never been reported. The following is a list of the counties in southeast Texas in which indications of petroleum are said to exist, either as oil or gas flows or solid bitumen: Martin, Washington, Harrison, Trinity, Smith, Anderson, Houston, Nacogdoches, Shelby, San Augustine, Tyler, Jasper, Hardin, Jefferson, Chambers, Brazos, Harris, Grimes, Limestone, Bastrop, Colorado, Caldwell, Atascosa, Duval, Uvalde, Webb, Starr, and Hidalgo; also Pecos, Reeves, and El Paso in the extreme western portion of the State. Over this great area there are chances for developing many profitable pools of petroleum as the State increases in wealth and population.

The production of petroleum in Texas since 1889 has been as follows:

Production of petroleum in Texas from 1889 to 1900.

Year.	Barrels.	Year.	Barrels.
1889	48	1896	1,450
1890	54	1897	65,975
1891	54	1898	546,070
1892	45	1899	669,013
1893	50	1900	836,039
1894	60	Total	2,118,908
1895	50		

The production in this section is generally refined at Corsicana, where one of the most complete modern refineries has been recently erected. The distribution of the refined product is made by railroad. The cost of distributing these products, owing to the long hauls to reach any large consumption, has in a measure restricted the refining of the crude petroleum. Other markets for it have been found on the Gulf of Mexico. During the year a large receiving tank was erected at Sabine Pass, with the necessary appliances for loading vessels. The petroleum is transported by railroad from Corsicana to Sabine Pass and loaded into tank vessels. Several shipments in bulk have been made from this point to Mexico and elsewhere.

The following analysis of Corsicana petroleum was made Mr. by F. C. Thiele:

Distilled under ordinary pressure, without particular precautions to prevent cracking, Mr. Thiele found—

	Specific gravity.
Naphtha, 10.8 per cent	0.710
Kerosene, 54.5 per cent	0.796
Residue, 34.7 per cent	0.905

WELL RECORDS IN TEXAS.

Well record and production of crude petroleum in the Corsicana oil field in 1898, by months.

Month.	Wells.						Rigs.	Production. *b*
	Completed.	Producing.	Dry. *a*	Drilling.	Gas.	Abandoned.		*Barrels.*
January (*c*)	76	66	10	6			8	13,797
February	11	9	2	19		1	18	20,110
March	25	23	2	17	1		13	21,421
April	32	29	3	6			13	30,276
May	32	31	1	13		1	7	31,007
June	26	24	2	8	1		20	55,677
July	26	26		18			9	56,649
August	39	38	1	11	1		11	58,458
September	29	28	1	14			18	63,138
October	27	23	4	16		3	7	63,227
November	24	23	1	12	1		8	63,777
December	27	22	5	14		2	4	67,083
Total	374	342	32	*d* 13	4	7	*d* 11	544,620

a Includes 2 artesian wells.
b Includes local consumption approximated.
c One-half month estimated and covers all previous operations.
d Average.

Well record and production of crude petroleum in the Corsicana oil field in 1899, by months.

Month.	Wells.						Rigs.	Production. *b*
	Completed.	Producing.	Dry. *a*	Drilling.	Gas.	Abandoned.		
								Barrels.
January	19	14	5	12	....	2	6	63,975
February	15	13	2	9	....	4	8	50,755
March	21	16	4	9	1	4	5	64,047
April	13	8	5	16	....	2	9	52,938
May	29	11	16	17	2	1	10	57,437
June	29	18	10	14	1	1	9	55,292
July	22	12	10	9	....	3	11	53,836
August	23	9	11	15	3	14	11	53,544
September	23	16	6	15	1	17	10	53,695
October	27	22	5	11	....	11	7	52,961
November	24	16	7	12	1	8	6	52,844
December	23	14	9	15	....	12	3	57,159
Total	268	169	90	*c*13	9	79	*c*8	668,483

a Includes 2 artesian wells. *b* Local consumption estimated. *c* Average.

Well record and production of crude petroleum in the Corsicana oil field in 1900, by months.

Month.	Wells.						Rigs.	Production. *c*
	Completed.	Producing. *a*	Dry. *b*	Drilling.	Gas.	Abandoned.		
								Barrels.
January	28	23	4	12	1	7	2	59,736.87
February	31	24	5	8	2	16	6	54,520.53
March	26	20	6	12	....	16	4	68,808.44
April	28	18	10	15	....	9	4	58,700.12
May	36	21	11	9	4	12	5	65,920.47
June	26	19	4	16	3	9	6	70,652.68
July	38	29	9	14	....	5	14	77,481.00
August	37	23	14	20	....	11	4	79,027.57
September	41	25	16	8	....	8	5	74,386.08
October	27	18	7	15	2	....	10	77,867.84
November	32	22	9	16	1	10	12	70,467.57
December	23	19	3	12	1	9	8	71,990.53
Total	373	261	98	*d*13	14	112	*d*7	829,559.70

a Includes 56 wells in what is known as "Heavy Oil District;" production of this territory not included.
b Includes 2 artesian wells.
c Includes local consumption, estimated.
d Averages.

These wells are usually drilled by the rotary hydraulic system, at the cost of 50 to 60 cents per foot. They are in many instances completed in ten days. In the case of a failure to find the petroleum in paying quantities, the casing is pulled out, so that the labor is all that is lost; therefore a dry hole in this region is very different from a dry hole in the 3,000-foot wells of West Virginia, which cost not less than $8,000 to $10,000.

PRICES OF CORSICANA OIL.

Fluctuations in prices of Texas Corsicana light oil in 1900.

Date.	Per barrel.	Date.	Per barrel.
January 1	$1.03	August 16	$0.97
20	1.06	September 25	.92
22	1.08	26	.89
February 23	1.11	October 2	.87
May 1	1.10	4	.81
7	1.07	December 14	.88
10	1.05	26	.90
12	1.03	27	.91
21	1.01	28	.93
23	.99	29	.95

Average price per month and average for the year 1900 of Texas Corsicana light oil.

Month.	Per barrel.	Month.	Per barrel.
January	$1.048	August	$0.98
February	1.087	September	.955
March	1.11	October	.817
April	1.11	November	.81
May	1.037	December	.859
June	.99	Average	1.046
July	.99		

ANALYSIS AND COMPARISON OF CORSICANA OIL.

The following analysis of Corsicana petroleum was made by Professor Harrington, of the State Agricultural and Medical College:

One-half liter, or about one-half pint, was subjected to distillation, and the following fractions obtained at the respective temperatures, expressed in degrees of the centigrade scale: Began to boil at 80°; between 80° and 90° gave off 16.4 per cent of its volume; between 90° and 110° gave off 7.8 per cent of its volume; between 110° and 140° gave off 10.4 per cent of its volume; between 140° and 170° gave off 9.2 per cent of its volume; between 170° and 200° gave off 3.6 per cent of its volume; between 200° and 280° gave off 16 per cent of its volume; between 280° and 305° gave off 11.2 per cent of its volume; above 305° gave off 15.8 per cent of its volume, making the total volatile matter about 90 per cent, leaving a coke residuum of about 10 per cent.

Reported in a different way, for the purpose of comparison, results were obtained as follows:

Comparison of Corsicana oil with others.

Crude oil from—	Specific gravity 17° C.	Began to boil.	Came over—		
			Under 150° C.	Between 150° and 300° C.	Over 305° C.
		° C.	*Per cent.*	*Per cent.*	*Per cent.*
Corsicana	0.821	80	34.6	40	15.8
Pennsylvania	0.818	82	21	38	40.7
Galacia	0.824	90	26.5	47	26.5
Baku	0.859	91	23	38	39
Alsace	0.907	135	3	50	47
Hannover	0.899	170	....	32	68

It will be seen from the above that the Corsicana oil compares favorably with the Pennsylvania product, which generally yields in product 60 to 75 per cent.

The discovery of petroleum near Beaumont, in this State, shortly after the close of the year 1900 has caused universal interest. It has been thought best to give a brief account of this most wonderful discovery, which has infused new life into the search for oil, both in Texas and Louisiana.

On January 10, 1901, a monster well was unexpectedly developed 4½ miles south of Beaumont, Jefferson County, by Capt. A. F. Lucas and his associates, Mr. J. M. Guffey and Mr. John Galey. The contractors were Messrs. Hammil Brothers. This well produced more petroleum in a given time than any other thus far developed in the United States. Only a few of the Russian wells at Baku, flowing from larger diameters, have produced more petroleum in the same length of time.

This well flowed continuously a column of petroleum 6 inches in diameter to an average height of 160 feet until it was capped and fully secured January 19, nearly nine days after the well began to flow, without having shown any signs of weakening. A gage showed 104 pounds to the square inch at the top of the well, which was supporting 1,050 feet of petroleum. The output of this well for the nine days was not less than 75,000 barrels per day, this amount being forced through 6-inch pipe or tubing. In the immediate neighborhood high-pressure gas was struck by two of the wells, and for a time blew out quantities of sand, mud, and water, with great volumes of gas.

This large amount of petroleum was secured by damming up the outlet of a basin near by, and a miniature lake of petroleum was formed. The grass for many yards surrounding the well and lake of oil was more or less saturated with petroleum carried off by the wind from the flowing well.

A passing locomotive set the grass on fire on March 3. This soon communicated with the grass that was saturated with petroleum, which in turn set fire to the lake. One of the greatest conflagrations ensued, lasting several hours. The wind was favorable and carried the great mass of flame and smoke away from the derricks and tanks, by this time erected. The original well was located on the south flank of an elliptical mound, about 3,500 feet across its longer axis and 1,500 feet across the shorter, the direction of the longer axis being S. 45° W. The elevation of the highest portion was about 16 feet above the surrounding prairie. For many years the existence of mineral springs or shallow wells, all more or less charged with sulphur and iron, was known. There were several springs and openings in the ground where gas escaped, and which would burn when lighted until blown out by a hard wind.

Two attempts were made in this locality during the past ten years to drill wells, which failed owing to want of proper machinery and experience.

The specific gravity of the Beaumont oil is 22° Baumé, equal to 7.66 pounds to 1 gallon. A barrel of 42 gallons weighs 322 pounds, equivalent to 6.2 barrels to 1 ton. It has a remarkably high viscosity for its gravity, and is fluid at quite a low temperature. It flashes at 180° and fires at 200° F., and contains from 2 to 3 per cent of sulphur.

Its calorific value must approximate closely to that of the other crudes, 1 pound of which, when properly consumed in stationary boilers, will evaporate 15½ pounds of water. The ordinary Western coal will evaporate 8½ pounds of water to 1 pound of coal; from which it appears that 48½ pounds of petroleum will evaporate as much as 100 pounds of coal. Taking 48½ per cent of 2,000 pounds, or 970 pounds of oil, and dividing this amount by 322 pounds (the weight of a barrel of oil), we get 3.01, by which it appears that 3 barrels of oil will equal 1 ton of coal.

The presence of so large an amount of sulphur in this petroleum may seriously affect the lighter distillation products that may be derived from the crude, but it will probably not act corrosively on the sheets or flues of a boiler, especially where steam is used to spray it.

Where air is used and the sulphur combines with the oxygen to form sulphurous acid, it is neutralized by the far greater volume of carbonic acid, nitrogen, and steam, amounting to 500 times the weight of the sulphur.

This petroleum is well fitted for fuel purposes. It is situated far from any large deposit of coal and is within 20 miles of a deep-water harbor, on a coast that is destitute of fuel. These give additional value to this most remarkable deposit. To fully introduce it as a fuel on the high seas, it will be necessary to increase the fire test to 250° F. To bring it up to this high test, a portion of the more volatile parts will have to be distilled off and marketed as gas oil.

The opening up of the Lucas gusher brought oil experts and operators from all of the oil fields of the United States and Canada to Beaumont, resulting in the leasing and optioning of all the lands for many miles surrounding the original well. There were a number of legitimate companies formed to operate for petroleum, but a greater number were organized on purely speculative priciples and a vast amount of stock in them was disposed of at fictitious prices. The impression seemed to be with those organizing many of the companies, and those to whom the stock was sold, that beneath the entire gently sloping plain reaching back from the Gulf a stratum saturated with petroleum was covered up and it was only necessary to drill down and tap this great reservoir to secure gushers similar to the Lucas well. It took many dry holes to show that in this locality at least the paying wells were confined to the slightly elevated locality known as Spindle Top, fully described in the previous portion of this article.

By the 1st of July, inside of an area of 80 acres, embracing all of this elevation, there were 14 producing wells, 3 abandoned holes, 15 drilling wells, and 18 rigs, making a total of 50 operations.

Inside of a circle of 3 miles diameter, with the original Lucas well as a center, there were 96 rigs, 40 drilling wells, 13 dry holes, 10 abandoned holes, and 14 producing wells. Outside of this area there are 25 rigs scattered over the country, 8 drilling wells, and 5 dry holes, making 38 operations—all told, 211 operations in Jefferson County from January 1 to July 1, 1901.

Of the 14 producing wells mentioned, 9 or 10 are large producers that originally ranged from 60,000 to 15,000 barrels per day. The remainder are small and range from 4,000 to 600 barrels per day. All of them get the petroleum at the same horizon, at about 1,000 feet or slightly more, although a number were drilled deeper. One well, however, is an exception, as it is producing from a pay streak found at 750 feet in depth. In several of these wells two pay streaks showing petroleum were found above the main deposits that were disregarded.

Several of the dry holes to the west, north, and east of this producing area were drilled to about 3,000 feet without finding a trace of petroleum or natural gas, the strata being from top to bottom a succession of sand and clay, with more of a pinkish tint toward the bottom, the limestones, dolomites, and sulphur beds being absent.

The main storehouse of the petroleum is a dolomite limestone full of cavities, with patches of dog-tooth spar and crystals of pure sulphur.

This stratum was reported at 960 to 1,050 feet in depth, called "limy concretions and hard sandstone." The nature of the drill would prevent its penetrating very hard material, so that this may be more properly called soft limestone.

The rotary drill is in general use in the field, having been used in this region many years previous in searching for artesian water. The bit in this method is fastened to the end of pipe or tubing; the tubing rotates and at the same time carries water forced in at the top under pressure, which impinges between the blades of the cutter, washing up the detached material between the outside of the casing and the wall of the well. This method is very successful in strata that cave or run, as does quicksand, as the pressure of the water and the mud or clay it carries holds back and plasters up beds of quicksand or caving material. It is a rapid method, and where no solid stratum is encountered the drill descends almost continuously, new joints being screwed on at the top from time to time. However, when any bowlder or compact sandstone or limestone is encountered it is necessary to withdraw the bit and put a steel collar with saw teeth to cut. This process is slow, and there is always risk of caving upon withdrawing the pipe.

One of the serious objections is that the weight of the water often prevents the petroleum from flowing into the well. The petroleum strata may be passed in this way, and there is risk in casing past it in new localities. Another objection is that the mud and sand do not have time to settle in the tanks on top, so that it is very difficult to determine where there is a change in the material that is being cut by the drill.

The following is a section of the Lucas well, near Beaumont, Tex., begun October 27, 1900, completed January 10, 1901:

Log of Lucas well, near Beaumont, Tex.

From—	To—	Thickness.	Kind of material.
Feet.	*Feet.*	*Feet.*	
0	36	36	Yellow clay.
36	56	20	Coarse gray sand.
56	170	114	Blue clay, pretty hard.
170	245	75	Fine gray sand.
245	265	20	Variegated colored gravel, from bean to goose egg in size.
265	317	52	Coarse gray sand.
317	352	45	Blue clay.
352	376	19	Coarse gray sand with pyrite concretions.
376	395	19	Blue clay.
395	440	45	Fine gray sand with lignite.
440	448	8	Marl shells.
448	508	60	Gray sand with concretions and considerable lignite.
508	$508\frac{3}{4}$	$\frac{3}{4}$	Soft limestone.
$508\frac{3}{4}$	$528\frac{1}{4}$	$19\frac{1}{2}$	Gray clay and sulphuretted hydrogen gas.
$528\frac{1}{4}$	529	$\frac{3}{4}$	Hard clay stone with calcite depositions.
529	563	34	Gray sand.
563	588	25	Compact hard sand with pyrite.
588	$588\frac{1}{2}$	$\frac{1}{2}$	Hard sandstone and limy concretions.
$588\frac{1}{2}$	$601\frac{3}{4}$	$13\frac{1}{4}$	Gray clay.
$601\frac{3}{4}$	602	$\frac{1}{4}$	Hard sand.
602	660	58	Gray clay with limy concretions.
660	666	6	White limy shells.
666	680	14	Gray clay.
680	686	6	Gray sandstones with small amount of oil.
686	693	7	Gray clay with limy concretions.
693	716	23	Gray clay, becoming hard.

Log of Lucas well, near Beaumont, Tex.—Continued.

From—	To—	Thick-ness.	Kind of material.
Feet.	*Feet.*	*Feet.*	
716	718	2	Limy concretions with calcite.
718	785	67	Hard gray clay with limy concretions, with fine pyrite.
785	634	49	Hard clay (gray) with limy concretions, with fine pyrite.
834	854	20	Sandstone and pyrite, quite hard.
854	856	2	Hard rock, apparently limestone.
856	880	36	Fine oil sand with hard layers toward bottom and heavy pressure under it, filling casing 100 feet above point of drilling.
880	960	80	Hard clay.
960	1,010	50	Limy concretions with layers of hard sandstone.
1,010	1,050	40	Struck heavy gas pressure and oil, which lasted about one hour, then subsided.
1,050	1,160	110	Sand, mixed with limestone concretions and fossils.

Oil began to flow, probably from the stratum passed at 1,050 feet, and the 4-inch pipe which was used in drilling was shot out of the well, carrying block and tackle with it, followed by the column of water used in drilling, and this was followed by the oil.

The well flowed unrestrained for nine days, shooting a column of oil 6 inches in diameter from 150 to 200 feet high, and giving no signs of exhaustion at the time the well was brought under control.

The great number of wells drilled surrounding the 80 acres on Spindle Top that were dry—finding strata entirely different from that on the mound—indicates that the condition found there is unusual. The presence of sulphur and beds of dolomite, with lime and sulphur crystals and flows of sulphuretted hydrogen gas, are all confined to this locality, so far as developed. There are a number of similar mounds, but more extensive, as well as ridges or elevations, found scattered over the vast coastal plain of Texas. The prominent ones are Big Hill, High Island, Damon's Mound, Bryan Mound, and Sour Lake, which have somewhat similar appearances, but whether they will duplicate the structure found at Spindle Top can only be determined by the drill.

There are a series of small mounds, from 10 to 25 feet in diameter and from 2 to 5 feet in height, scattered all over the coastal plain of Texas, that are of different origin, and are due to the gradual accumulation of the strata below the surface, carried up by slow currents of water more or less impregnated with natural gas through a central vent. Originally they were soft and mucky; drying out in the course of time, they became solid, as the force that elevated them shifted to form another.

CALIFORNIA.

In no other State did there exist, in 1900, the activity in testing and developing petroleum territory that was shown in the State of California. There were over 2,000 oil companies organized and operating in the State at the close of 1900, and the number is growing fast.

While the existence of petroleum in this State has been known from the time of the early settlers, owing to the numerous surface indications of bitumen and heavy oil flows, the first petroleum obtained was from a well drilled near the town of Ventura in 1867. At the present day petroleum is known to exist from Humboldt County, on the north, to San Diego County, on the south, in a general way parallel to the Pacific coast, for a distance of 650 miles—not that there is a continuous development for this great distance at present, but the scattered indications and the geological conditions seem to warrant the assumption that petroleum can be found almost continually over this territory in areas from 15 to 50 miles in width. The principal development is in the southern quarter of the State, on the western side of the San Joaquin Valley, along the east flank of the Coast Range, ending with the great inland basin of the San Joaquin River, the Kern River or Bakersfield district being on the eastern side of the valley.

The Fullerton, Los Angeles, and Santa Paula fields are on irregular ranges of hills and mountains that generally range west to northwest. The principal producing counties are Los Angeles, Kern, Fresno, Orange, and Santa Barbara. The petroleum is usually found in the sharp folds and anticlinals of the strata, although that of the Kern River district is comparatively level. In the producing regions the strata are generally much distorted, although there are many instances where several miles of a continuous anticlinal or a synclinal can be followed, all having been acted upon by volcanic forces, without sufficient heat to have altered the character of the strata.

The geological formations holding the petroleum extend from the newest Cretaceous to the Neocene, and are very recent when compared to the formations containing the petroleum in Pennsylvania and Ohio. The petroleum is generally found in very soft sandstone from 10 to 100 feet or more in thickness, above which there is usually a series of thin-bedded clay and sand. In some of the fields the large mass of soft sandstone would fill up the well with loose sand and petroleum if it were not penetrated by perforated casing. There are large unproductive areas along this belt, although only a small proportion can be said to have been thoroughly tested.

PRODUCTION IN CALIFORNIA.

The total production of crude petroleum in California during the year 1900 was approximately 4,099,484 barrels, which is a gain of 1,457,389 barrels over the preceding year, or a little over 55 per cent. The production for 1899 was 2,642,095 barrels, which was an increase of 384,888 barrels over 1898, or a gain of 17 per cent. It will be seen from the annexed table that California's oil production has been making wonderful strides since 1895, when the State first began to assume some importance as a petroleum producer. The district of Los Angeles produced over 40 per cent of the total crude output of the State during the past year, while Kern County made the largest increase in new production.

The following table gives the yearly production of petroleum in California from 1876 to 1900, that previous to 1876 being estimated:

Production of petroleum in California.

Year.	Barrels.	Year.	Barrels.
Previous to 1876	175,000	1889	303 220
1876	12,000	1890	307,360
1877	13,000	1891	323,600
1878	15,227	1892	385,049
1879	19,858	1893	470,179
1880	40,552	1894	705,969
1881	99,862	1895	1,208,482
1882	128,636	1896	1,252,777
1883	142,857	1897	1,903,411
1884	262,000	1898	2,257,207
1885	325,000	1899	2,642,095
1886	377,145	1900	4,099,484
1887	678,572	Total	18,838,875
1888	690,333		

The following figures show the production of crude petroleum for 1897, 1898, 1899, and 1900, by counties:

Production of crude petroleum in California from 1897 to 1900, by counties.

[Barrels of 42 gallons.]

County.	1897.	1898.	1899.	1900.
Fresno	70,140	154,000	439,372	532,000
Kern		10,000	15,000	892,500
Los Angeles	1,327,011	1,462,871	1,409,356	1,730,263
Orange	12,000	60,000	108,077	372,200
Santa Barbara	130,136	132,217	208,370	153,750
Santa Clara	4,000	3,000	1,500	771
Ventura	368,282	427,000	496,200	418,000
Total production	1,911,569	2,249,088	2,677,875	4,099,484
Total value	$1,918,569	$2,376,420	$2,660,793	$3,863,225
Average price per barrel	$1.00	$1.05	$0.99	$0.94

The average price per barrel received for crude petroleum at the wells in the city of Los Angeles in 1900 was 98.79 cents, while the average price received for crude in Newhall, Puente, and Whittier districts was $1.03, making the average price for the county of Los Angeles $1. There was no change in the average price of crude since 1899 at wells in Fresno, Santa Barbara, and Ventura counties, but the average price of crude in Orange County in 1900 was $1.05, or 13½ cents per barrel higher than in 1899. The price of crude petroleum in Kern

County ranged from 50 cents to $1 per barrel in 1900, the average for the year being 78⅓ cents. Owing to the lower price of crude in Kern County and the increased production of this field in 1900 as compared with 1899, the average price for the State is 94.2 cents, against the average price of 99 cents in 1899.

The increase in the production in Kern County in 1900 is due to the recent development in that county in the Sunset, McKittrick, and Kern River or Bakersfield districts. The first named is situated in the southwestern corner of the county, and its present dimensions are about 10 miles in length by 7 miles in width. The wells are from 150 to 450 feet in depth and will produce about 20 barrels per day. The Kern River or Bakersfield field covers about 15 square miles. The oil sand is horizontal and is of great thickness, being from 200 to 400 feet. There were over 300 producing wells in this district at the close of the year. The McKittrick field has produced several large flowing wells, one of which is said to have produced 2,000 barrels the first day it was opened up.

All of the petroleum produced in these fields is heavy, being about 14° B. on an average. It finds a ready market for fuel.

WASHINGTON.

Petroleum and natural gas are reported to have been found in Whitman County 40 miles south of Spokane. Some petroleum has also been found in the neighborhood of Tacoma.

NEW MEXICO.

Petroleum indications have been reported in the northwestern corner of Socorro County, near the head of the Little Colorado River. Also in the southwestern portion of Chaves and the western portion of Eddy counties.

MONTANA.

A dark, heavy petroleum resembling asphalt is found in Park County, Mont.

UTAH.

For several years ozocerite or natural paraffin was mined in this State, but of late the accessible deposits have been exhausted. In eastern central Utah there are numerous hydrocarbons present in highly charged slates and shales. There are quite a number of these solid hyrocarbons found scattered over an area of 10,000 square miles in Carbon and Wasatch and Utah counties, Utah, and a part of Routt and and Garfield counties, in Colorado. The several varieties are known as black wax or ozocerite, elaterite, sandstone asphaltum, limestone asphaltum, albertite, oil shales, and several varieties of gilsonite. This latter is mined extensively and manufactured into varnishes and waterproof mineral paints.

ARIZONA.

Petroleum is reported to have been found in northwestern Arizona, in Mohave County. A strip of country 3 or 4 miles wide, commencing near the summit of the Chemelmeyis Range and extending to the Colorado River, a distance of about 10 miles, has numerous showings of a dark sand saturated with petroleum, which can be squeezed out by a little pressure of the hand.

ALASKA.

Nothing so far has been done toward the development of the surface indications near Cape Yakutat, Cape Martin, and Kachewak Bay, and the conditions remain the same as reported in 1898. An English company is making arrangements to put down several wells during the summer of 1901. Progress is slow in these far-off northern regions.

FOREIGN COUNTRIES OF THE WESTERN CONTINENT IN WHICH PETROLEUM IS FOUND.

CANADA.

The production in Ontario shows considerable falling off, that of 1900 being about 50,000 barrels less than that of 1899.

PRODUCTION IN CANADA.

The Imperial Oil Company, Limited, of Canada, has made the following statement of the production of crude petroleum in Canada in the years 1898, 1899, and 1900, by districts:

Production of crude petroleum in Canada in 1898, 1899, and 1900, by districts.

[Barrels of 35 imperial gallons, or about 42 standard gallons.]

District.	1898.	1899.	1900.
Petrolia	513,179	a 528,641	501,435
Oil Springs	133,366	b 107,487	99,019
Bothwell	66,404	65,044	47,405
Plympton	25,000	....	....
Dawn	5,923	....	....
Euphemia	5,227	....	....
Zone	901	....	....
Dutton	....	3,622	4,791
Total	750,000	704,794	652,650

a Includes production from Plympton.
b Includes the production from Dawn, Euphemia, and Zone.

The past three years show a decline in the production of about 50,000 barrels per year. This is due chiefly to the decline in the production at Oil Springs.

Canadian oils and naphtha inspected and corresponding quantities of crude oil.

Year.	Refined oils inspected.	Crude equivalent calculated.	Ratio of crude to refined.	Equivalent in barrels of 35 gallons.	Average price per barrel of crude.	Value of crude oil.
	Imperial gallons.	*Imperial gallons.*				
1881	6,457,270	12,914,540	100 : 50	368,987	....	....
1882	6,135,782	13,635,071	100 : 45	389,573	....	....
1883	7,447,648	16,550,328	100 : 45	472,866	....	....
1884	7,993,995	19,984,987	100 : 40	571,000	....	....
1885	8,225,882	20,564,705	100 : 40	587,563	$0.82¼	$483,271
1886	7,768,006	20,442,121	100 : 38	584,061	.90	525,655
1887	9,492,588	24,980,494	100 : 38	713,728	.78	556,708
1888	9,246,176	24,332,042	100 : 38	695,203	1.02⅗	713,695
1889	9,472,476	24,664,144	100 : 38	704,690	.92¾	653,600
1890	10,174,894	26,776,037	100 : 38	795,030	1.18	902,734
1891	10,065,463	26,435,430	100 : 38	755,298	1.33¾	1,010,211
1892	10,370,707	27,291,334	100 : 38	779,753	1.26¼	984,438
1893	10,618,804	27,944,221	100 : 38	798,406	1.09½	874,255
1894	11,027,082	29,018,637	100 : 38	829,104	1.00¾	835,322
1895	10,674,232	25,414,838	100 : 42	726,138	1.49⅗	1,086,738
1896	10,684,284	25,438,771	100 : 42	726,822	1.59	1,155,647
1897	10,434,878	24,844,995	100 : 42	709,857	1.42½	1,011,546
1898	11,148,348	26,543,685	100 : 42	758,391	1.40	1,061,747
1899	11,927,981	28,399,955	100 : 42	808,570	1.48⅗	1,202,020
1900	13,428,422	31,972,433	100 : 45	710,498	1.62	1,151,007

PRICES IN CANADA.

The average price for each year from 1885 to 1900 is given in the following table. The production prior to 1895 was sold at prices established by the Petrolia Oil Exchange. Now the producers make sales direct to the refineries:

Average price and sales of crude petroleum in Canada from 1885 to 1900.

Year.	Price.	Sales.	Year.	Price.	Sales.
		Barrels.			*Barrels.*
1885	$0.82¼	871,500	1893	$1.09½	20,941
1886	.90	782,570	1894	1.00¾	32,348
1887	.78	406,203	1895	1.49⅗	9,755
1888	1.02⅗	516,007	1896	1.59	0
1889	.92¾	400,932	1897	1.42½	0
1890	1.18	394,924	1898	1.40	0
1891	1.33¾	377,453	1899	1.48⅗	0
1892	1.26¼	165,315	1900	1.62	0

Average closing prices for crude oil on Petrolia Oil Exchange.

Month.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
January	$1.30	$1.29¼	$1.18¼	$1.01¼	$1.16	$1.72	$1.50	$1.40	$1.40	$1.71
February	1.28½	1.29	1.18¾	1.01	1.19⅞	1.72	1.50	1.40	1.40	1.74
March	1.31¾	1.27¾	1.19	1.01	1.27	1.72	1.50	1.40	1.40	1.75
April	1.37	1.26	1.19	.99½	1.55¾	1.72	1.40	1.40	1.43	1.75
May	1.37½	1.25¾	1.07	.92	1.67¼	1.70	1.40	1.40	1.45	1.65
June	1.37	1.27½	1.07	.92¾	1.52	1.50	1.40	1.40	1.45	1.53
July	1.33½	1.26½	1.06	.94	1.54¼	1.50	1.40	1.40	1.45	1.56
August	1.34¾	1.26	1.05	.96	1.54	1.50	1.40	1.40	1.46½	1.57
September	1.35	1.26¼	1.04½	.98	1.55½	1.50	1.40	1.40	1.52½	1.57
October	1.35	1.26¾	1.04	1.06	1.59⅞	1.50	1.40	1.40	1.57	1.55
November	1.33¼	1.25	1.04	1.12¼	1.64½	1.50	1.40	1.40	1.63½	1.51
December	1.31½	1.18½	1.02	1.13½	1.72⅜	1.50	1.40	1.40	1.66½	1.55
The year	1.33¾	1.26¼	1.09½	1.00¾	1.49⅔	1.59	1.42½	1.40	1.48⅔	1.62

QUEBEC: GASPE BAY PETROLEUM.

The Canadian Petroleum Company is still engaged in drilling wells and preparing to erect a refinery. The amount of petroleum in sight is insignificant, although it is claimed a number of the wells are good producers. Some of them are 3,800 feet in depth.

It is difficult to get at the facts, but the general impression is that the petroleum thus far found is insignificant, and that these expenditures are unwarranted.

NEWFOUNDLAND.

Preparations are in progress for the development of the petroleum found on the northwestern shore of this island.

A number of test wells have been put down at Parsons Pond and Port au Port Bay. One well was put down 600 feet at the latter point in 1900, but owing to an insufficient supply of casing it will not be completed until the year following.

It is remarkable that the measures holding petroleum in this locality are the lowest known oil-producing strata, and belong to the Quebec group, which underlies the Chazy and Trenton limestones.

The color of the petroleum is a dark amber. The gravity ranges from 33° to 36° B. It possesses good natural lubricating qualities.

MEXICO.

There are many known deposits of petroleum and asphalt in Mexico. In the state of Vera Cruz some petroleum has been produced from wells of moderate depth. Indications have been traced along the Gulf coast for many miles and some deposits of asphalt discovered in the region round and about Tampico. In the absence of coal a deposit of fuel oil would find a ready market for railroads, manufactures, and reduction works.

All the petroleum so far discovered seems to have an asphalt base, which unfits it for making an illuminating oil.

The high tax on manufactured oils derived from petroleum levied by Mexico, as compared to the comparatively low tax levied on crude petroleum, causes the latter to be shipped in bulk in vessels to Tampico and Vera Cruz and by railroad to the City of Mexico, and at all three of these points extensive refineries exist.

The tax on refined petroleum for illuminating purposes is about 30 cents per gallon as compared with 7½ cents per gallon on crude petroleum.

Exports of petroleum and its products from the United States to Mexico, years ending June 30, 1899 and 1900.

Kind of oil.	1899.		1900.	
	Gallons.	Value.	Gallons.	Value.
Crude	7,969,871	$395,386	8,002,845	$455,372
Naphtha	73,405	14,169	4,327	1,334
Illuminating	581,222	73,312	282,160	51,101
Lubricating	605,249	103,999	769,566	156,250

CUBA AND PORTO RICO.

For a number of years petroleum has been known to exist in Cuba, both in the form of solid bitumen and the most volatile natural naphtha, with a gravity of .754. Yet so far no paying production exists on the island. Under the present schedule crude petroleum imported pays a duty of $1.40 per 100 kilos, or $1.95 per barrel. Refined petroleum pays just double this tax, or $2.80 per 100 kilos or $3.90 per barrel.

Owing to this there was about 16 barrels of crude petroleum exported to Cuba to 1 of refined petroleum. A large and complete refinery exists near Havana to which the crude is delivered in bulk. The amount of crude petroleum exported to Cuba from the United States during 1900 showed an increase of 80 per cent over that of 1899, and the value more than double, as the table will show. On the other hand there was only a small amount of crude petroleum exported to Porto Rico from the United States during 1900.

PERU.

Peruvian petroleum, as well as the heavy oils after the lighter products have been distilled, is being rapidly introduced as a fuel.

The production of crude petroleum has steadily increased since 1896. There was an increase of 16 per cent in the production in 1900 over that of 1899.

All of the Pacific coast petroleum is fully equal to that of the East for fuel purposes. It is remarkable how little difference there is in the fuel values of all the varieties of crude petroleum. The illuminating oils made from the Peruvian crude petroleum, as well as all other crudes found on the Pacific coast, is inferior to Eastern crudes in the manufacture of illuminating oils and naphtha. All of these Western derivitives have an excess of carbon in their composition, which, burned in an ordinary lamp, smokes the chimney.

The scarcity of other fuel along the Pacific coast gives a value to crude petroleum. There are three principal companies operating in Peru—the London Pacific (British), Faustino G. Piaggio (Italian), and the Compagnie Français (French).

The following statement of the production of petroleum in the Zorritos oil field of Peru has been furnished by Mr. Faustino G. Piaggio, who is operating in that field:

Production of petroleum in Zorritos oil field of Peru from 1896 to 1900.

Year.	Crude petroleum.	Refined.	Lubricating oil.	Benzine.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*
1896	1,996,520	608,900	896,450	4,560
1897	2,874,980	959,645	964,680	7,940
1898	2,880,000	600,000	1,250,000	8,350
1899	3,745,000	806,900	2,541,000	11,220
1900	4,325,000	*a* 400,000	....	13,000

a Kerosene.

Mr. Piaggio writes as follows: "With the known advantage of mineral oil as a combustible, not only has this liquid gained a market in the mines of Casapalca and the railway of Oroya, but in other railway enterprises, great and small manufactures, and in other cases where the consumer has before used coal. For that reason, and in view of the existence of stock on hand of kerosene from the year 1899, the manufacture of illuminating oil was reduced 50 per cent, the product of Zorritos being as above. Lubricating oil has not been refined and all the residue is employed in this country as fuel."

ECUADOR.

Petroleum was found by a priest during the last century on the north shore of the Gulf of Guayaquil, in Ecuador. Deposits are also found on the shores of the Pacific, and in many places signs of a liquid bituminous substance are found in schist. The oil-bearing formation stretches back quite a distance from the ocean. At numerous points, by digging down 3 or 4 feet into the earth, a dark, brown, sandy clay is found, which is saturated with salt water and petroleum. At St. Paula a number of shallow wells furnish considerable petroleum.

ARGENTINA.[1]

In the Argentine, Chilean, and Peruvian republics there are found in many places layers of red sandstone of enormous thickness, the age of which is uncertain and hard to determine, owing to the lack of fossiliferous remains in the rocks. Some geologists are of the opinion that it belongs to the Silurian, some classify it as Devonian and other systems, but as yet its age remains in doubt and is an enigma to geologists. The petrographic character of this sandstone, as well as that of the conglomerates and gypsum which accompany it, is in all points the same, and naturalists have observed that the outcrops in all places are completely analogous. They are largely distributed throughout the South American continent—worn away and exposed at places by erosion—and it is probable that all this formation belongs to the same age. Interspersed among the sandstones are lime and other rocks, and in many places petroleum drops from the crevices of the bituminous rocks and filters through to the alternate layers of limestone, being conducted along the same and probably collecting and forming subterranean deposits. These are the most important layers, and when bored through would undoubtedly furnish a large supply of mineral oil.

Petroleum springs are found on the surface in some places, the best known of which are Garrapatal and La Brea, their origin being due to subterranean deposits of unknown depths. The appearance at the surface through narrow crevices in the rocks is easily explained by the fact that gases generating in the interior naturally seek an exit, and force the liquid to the surface. These springs have existed for a long time, and the air has condensed and hardened the oil and converted it into a kind of asphalt. In this manner is formed a mixture resembling tar, out of which the oil oozes at the places mentioned. Near these springs are also found hot springs and sulphur springs. Another proof of subterranean vapors of great expansive force in the provinces of Jujuy and Salta is the frequent occurrence of earthquakes in that vicinity. Petroleum springs are also found in Vachenta, province of Mendoza.

Petroleum is found on the east slope of the Andes Mountains, in southwestern Argentina, not far from the town of Mendoza, and also at other places in the Republic.

It is used principally for locomotive fuel.

Petroleum springs are found in Garrapatal, La Brea, and Vachenta.

COLOMBIA.

Numerous natural springs of petroleum are reported in Colombia. They occur on the Rio Arboledas, near the mouth of the Magdalena River, and on the Usada River, near Curbarador.

[1] Extract from a report by Professor Blackebusch to the Argentine Government.

VENEZUELA.

There are numerous deposits of asphalt and petroleum reported in Venezuela, which is situated south of the valuable deposit of asphalt on the island of Trinidad. Deposits of asphalt are reported at Guanoco and Felicidad. In numerous localities the asphalt is associated with liquid petroleum. Southwest of Lake Maracaybo numerous springs of petroleum exist.

. Petroleum in large quantities is said to have been found on the island of Margarita (an island of the Caribbean Sea belonging to Venezuela, 30 miles north of Cumana) and at Maracaybo, a city of Venezuela, on the west shore of the strait connecting Lake Maracaybo with the sea.

BRAZIL.

So far no petroleum is known to exist in Brazil. A very extensive deposit of rich shale has been examined by Mr. John C. Branner which is said to contain more than those of the Camaragibe district. An average of five samples shows 33 per cent of volatile hydrocarbons. In describing these deposits Mr. Branner says:

The oil shales of the Brazilian coast are of Cretaceous age, and the parti-colored beds exposed in the bluffs along that coast are for the most part the weathered portions of this same Cretaceous series. The Cretaceous strata rests upon granites, gneisses, and other crystalline rocks, with a bed of very coarse conglomerates forming the base of the series. The only known exception to this is in the Serra d'Itabaina, in the State of Sergipe, where there is a series of beds between the granites and the Cretaceous that appear to be Paleozoic, though no fossils have been found in them. The failure of the Marahu Company was evidently due to extravagance and mismanagement, and can not be regarded as a sufficient reason for condemning the oil shales of Brazil as unworkable.

The total thickness of the Cretaceous beds does not much exceed the total thickness of the mottled and parti-colored beds exposed on the coast—that is, from 30 to 90 meters (100 to 300 feet). This is shown by the fact that at many places the basal conglomerates are exposed, while at several points the crystalline rocks themselves are uncovered.

No oil shales are now known in Pernambuco, Parahyba, Rio Grande del Norte, Sergipe, or Espirito Santo; but they may be expected in any of those States within the Cretaceous area.

PRODUCTION OF PETROLEUM IN COUNTRIES OF THE EASTERN CONTINENT.

RUSSIA.[1]

Russia maintained her position as the leading country of the world in the production of crude petroleum during 1900, and every indication points to a still greater production for 1901. More wells were drilled than during any previous year, and the Government concessions of February and November permitted a considerable enlargement of the productive territory. The increased production must be credited entirely to the new wells drilled. The average daily yield was over 21,000 barrels larger than that of 1899.

The gross production of the Baku oil field for the year 1900 was 73,571,637 barrels, while the Grosni field produced 3,658,924 barrels, making the aggregate production for the year 77,230,561 barrels. The production for 1899 was 66,452,240 barrels from the Baku and 2,906,059 from the Grosni fields, making a total of 69,358,299 barrels. The increase for the past year was 7,872,262 barrels, or 11.3 per cent. The increase of 1899 over 1898 was 5,854,696 barrels, or 9.66 per cent. The daily average production for 1900 was 211,590 barrels, and for 1899 190,000 barrels.

This enormous production was derived from 1,263 producing wells, the average number active during the year. The magnitude of these figures will be better understood by a comparison with the statistics of the American petroleum fields. At no time has the average production of the United States exceeded 161,000 barrels a day, and it required 80,000 or more wells to yield this amount of oil.

The prediction so freely made a year ago that it would be impossible for the Russian field to maintain its production up to the record established in 1899 was not verified. It is doubtless true that no increase in production in the future may be looked for from the deepening of the old wells, but the developments of the past year demonstrate that the limits of the productive oil territory have by no means been circumscribed. While the production of the wells finished in 1899 was much below that of 1898, different conditions prevailed in 1900. The initial production of the 448 wells completed in 1900 was 304 barrels a day, as compared with 202 barrels a day for the 370 wells completed in 1899. There were 258 wells completed in 1898, and their initial production averaged 653 barrels a day. The statistics indicate that gusher strikes in the Russian oil field are not so numerous or so persistent as a few years ago. The largest well of the year 1900 was struck in June and continued flowing until early in August, producing

[1] Most of the information contained in this article is derived from Consul James C. Chambers' elaborate report of April 4, 1901.

nearly 2,000,000 barrels before the pump had to be employed. Its production for July averaged 37,000 barrels a day. Mr. Chambers states that a number of wells have been struck in the Baku oil field during the past few years which have started off at over 100,000 barrels a day, and one of these produced over 4,000,000 barrels by actual gauge in less than forty days. Beside these monsters the alleged performances of the gusher strikes at Beaumont, Tex., cut a very small figure.

While the new wells showed a higher average than during the year preceding, the average production of all the wells was smaller than the average for 1899. Notwithstanding the fact that 448 new wells were added to the list in 1900, at the close of the year there were only 225 more producing than at the close of the year before. This indicates that it required more than half the new wells drilled to maintain the number producing. There were 1,081 wells actually producing at the close of 1899 and 1,306 at the close of 1900. The average daily production per well in 1900 was about 156 barrels, as compared with 174 barrels in 1899, 198 barrels in 1898, 211 barrels in 1897, and 226 barrels in 1896.

WELLS IN THE RUSSIAN OIL FIELDS

At the end of the year there were 2,748 wells enumerated in the Baku oil field, of which 1,306 were producing oil, 42 had finished drilling but were not yet producing, 608 were drilling, 83 were being drilled deeper, 123 were cleaning out and in a state of repair, and 586 were standing idle.

While the average depth of the Russian oil wells has been gradually increasing for several years past, the advent of new territory must bring about some changes in this particular. The wells in the new territory of the Bibi-Eibat and other districts will not have to be drilled so deep as in the older sections of the Apsheron Peninsula until the shallower strata have first been exhausted. Producers continue to complain of the difficulties experienced from the increasing presence of water in the oil wells. No effectual means of shutting it off have as yet been discovered. Cement is used quite extensively for this purpose, but in not more than one case out of a dozen has it proved successful. Another feature to which Consul Chambers calls attention in his report is the increasing diameter of the Russian oil wells. A few years ago wells were rarely started at Baku with a diameter greater than 20 inches or finished with larger than 12 or 14 inch pipe; now most wells commence with a 30 or 32 inch hole and are completed with 16 to 18 inch pipe. These larger holes, of course, diminish the probability of any gusher strikes, such as were comparatively frequent a few years ago. It requires a great deal more gas to make a flowing well than formerly, and the gas, along with the oil, is rapidly decreasing in pressure.

PRICE OF BAKU CRUDE.

The year 1900, upon the whole, proved a highly profitable one for both producers and refiners, but toward the close of the year prices began to show a decided weakness. Production had been largely increased and there had been no extraordinary increase in the demand. The price of Baku crude at the wells averaged 70.3 cents per barrel of 42 gallons in January, 70.8 cents in February, 73 cents in March, 75.1 cents in April, 77.8 cents in May, 77.2 cents in June, 73 cents in July, 70.8 cents in August, 64.4 cents in September, 49.3 cents in October, 53.6 cents in November, and 51.5 cents in December. The closing price for the year was 11 kopecks per pood, or about 47.2 cents per barrel.

At the beginning of the year the demand for fuel oil (astatki or residuum) appeared on the increase, and with little prospects of an increase in the production, prices were maintained at a good figure. In June production began to increase, and July showed an average daily yield of 234,000 barrels. Prices then commenced to decline, and continued to do so, with the exception of a slight upward turn in November, until the close of the year.

THE RUSSIAN PIPE LINE.

After many vexatious and long-continued delays the pipe line between Batum on the Black Sea, and Mikhailovo, a trans-Caucasian railway station on the top of the great divide between Batum and Baku, has been completed. It was put in operation in July, 1900, and has materially increased the oil transportation facilities of the railroad. It has made possible increased competition of the Russian oil in the European markets, and has been largely responsible for the decline in the foreign refined markets since the first of the year. This pipe line, which commences at Mikhailovo, a railway station about 143 miles east of Batum, and terminates at Batum, was constructed by the railway company for the purpose of assisting in the transportation of refined oil, and consequently of the other products also, by carrying refined over the most difficult part of the railway, as the grades on the railway over the mountains near Mikhailovo are so heavy that the railway could not carry much more than half the amount over them that it could bring from Baku to Mikhailovo. The pipe line is for refined only, and that product is now discharged from tank cars at Mikhailovo into tanks and piped to Batum. Mr. Chambers adds:

"Up to the present the pipe line has never been worked to its full capacity because of the inability of the railway to deliver sufficient refined at Mikhailovo to keep it going; but that it has materially added to the transportation is evidenced by the fact that while the average number of tank cars shipped from Baku monthly the first seven months in the year 1900 was only 8,827, the number shipped in August alone was 11,062, and in September 11,136."

THE GROSNI FIELD.

The Grosni oil field, which produced about 10,000 barrels of oil per diem the past year, lies nearly 500 miles due north of Baku, and is the principal property of the Terek Cossack army. Petroleum comes to the surface in small quantities, and its existence has been known for many years. The field has been worked by dug wells since 1835, but it was not until 1893 that any attempts were made to drill a deep well. The first drilled well was completed in October, 1893, at a depth of 434 feet. It started off at a big rate and averaged about 10,000 barrels a day for the first ten days. In November of the same year the second well was drilled; it started at the rate of 100,000 barrels a day, and for the first six days averaged 60,000 barrels a day. The field possesses many advantages over that of Baku, but for some reason or other developments have not proceeded very rapidly. The wells are inexpensive, oil being struck at less than 500 feet, and it would be a comparatively easy matter to construct a pipe line to Novorossisk, an important shipping port on the Black Sea, 100 miles nearer the Bosphorus than Batum. The production of the northern Caucasus increased from 18,000 barrels in 1877 to 200,000 barrels in 1889. The production of the Grosni field since 1897, in barrels, is given as follows:

Production of the Grosni, Russia, oil field from 1897 to 1900.

Year.	Production.	Daily average.
	Barrels.	*Barrels.*
1897	2,754,000	7,545
1898	2,200,000	6,030
1899	2,906,059	7,962
1900	3,658,924	10,244

Almost the entire production of this district is absorbed by the home market, and what little finds its way to the outside world is too insignificant to be deemed worthy of record.

According to Mr. Chambers the following figures show the operations in the Grosni field for the past three years:

Well records in the Grosni oil field in 1898, 1899, and 1900.

Description.	1898.	1899.	1900.
Wells producing	26	41	93
Wells idle	13	12	17
Wells drilling	24	38	25
Drilling deeper and repairing	1	9	7
Derricks up ready for drilling	10	14	12

In the following table the production and shipments of the Grosni field, by months, for the year 1900 are presented:

Monthly production in and shipments from the Grosni oil field in 1900.

[Barrels of 42 gallons.]

Month.	Production.	Average per day.	Shipments.
	Barrels.	*Barrels.*	*Barrels.*
January	201,780	6,509	188,855
February	185,652	6,630	144,333
March	222,714	7,184	269,643
April	301,645	10,055	224,786
May	353,076	11,390	378,684
June	290,076	9,669	237,238
July	298,428	9,629	364,156
August	306,696	9,893	307,315
September	336,222	11,207	320,155
October	412,884	13,319	334,920
November and December	749,751	12,290	570,384
Total	3,658,924	10,244	3,340,469
Total in 1899	2,906,059	7,962	2,626,415
Increase	752,865	2,282	714,054

BAKU OIL PRODUCTION.

The total production of crude petroleum in the Apsheron Peninsula and the shipments of the chief petroleum products from Baku from 1880 to 1900 have been as follows:

Total production of crude petroleum on the Apsheron Peninsula and shipments of petroleum products from Baku from 1880 to 1900.

[Barrels.]

Year.	Production.	Shipments from Baku.					
		Illuminating.	Lubricating.	Other products.	Residuum.	Crude oil.	Total.
1880	3,055,247	976,933			867,416		1,844,349
1881	4,889,640	1,564,337			1,136,228		2,700,565
1882	6,111,740	1,650,207	37,335		2,200,276		3,887,818
1883	7,333,838	1,833,149	139,384		2,297,347		4,269,880
1884	11,002,624	2,689,365	182,941		3,569,226		6,441,532
1885	14,179,833	3,666,297	195,386		4,144,185		8,005,868
1886	18,336,463	4,278,591	207,831		4,424,198		8,910,620
1887	20,170,856	5,378,729	281,257		5,072,582		10,732,568
1888	23,471,270	6,111,739	317,348		7,150,897		13,579,984
1889	25,060,496	7,469,438	415,648		10,831,296	550,122	19,266,504
1890	29,217,126	8,227,384	562,347		11,858,191	855,745	21,503,667
1891	35,206,905	9,046,454	623,472		12,640,386	1,454,969	23,765,281
1892	36,430,248	9,608,801	696,821		14,254,280	1,466,993	26,026,895
1893	41,198,085	10,501,222	709,046		17,542,787	1,577,018	30,330,073
1894	37,811,773	8,704,156	782,396		23,667,482	2,102,690	35,256,724
1895	47,713,983	9,898,288	825,489	130,465	22,050,232	1,849,780	34,754,254
1896	49,633,252	10,569,670	1,084,095	123,753	22,616,271	3,117,898	37,511,687
1897	54,744,303	11,042,054	1,114,180	144,988	27,106,357	2,896,333	42,303,912
1898	60,597,544	11,569,804	1,273,961	177,262	29,628,484	5,365,770	48,015,281
1899	66,452,240	12,612,469	1,398,044	150,367	29,933,496	2,986,186	47,080,562
1900	73,571,637	15,158,924	1,638,142	244,499	32,273,838	4,767,726	54,083,129

8.18 pood=1 U. S. barrel.

The foregoing table gives the total production of crude petroleum, and the shipments of refined products and residuum from Baku. It will be seen that for the year 1900 a little over 20 per cent of the total output was illuminating oil, while about 2.2 per cent was lubricating oil. The total output of illuminating and lubricating oil was 16,797,066 barrels. The United States produced less crude oil than Russia, but it leads the world in the production of illuminating and lubricating oils. Nearly 90 per cent of the entire product of our Eastern oil fields is converted into illuminating and lubricating oils. Over 50 per cent of the total production at Baku in 1900, or 37,041,564 barrels, was shipped out in the form of residuum for fuel purposes and as crude, to be converted into other products. The United States produces every year more than three times the amount of manufactured products from petroleum than is produced from the Russian product.

PROFITABLE PRODUCTION.

Two distinct statements are published in regard to the production of Russian crude petroleum. The total production includes all the crude produced at the wells. The profitable production is the amount of crude that is actually tanked in the reservoirs. A large amount of the Russian product goes to waste or is not collected, and considerable is consumed at the wells for pumping purposes. This is not considered in the table of profitable production.

The "profitable production" for the last thirteen years is shown in the following table:

"Profitable production" of crude petroleum in the Apsheron Peninsula from 1888 to 1900.

[Barrels of 42 gallons.]

Year.	Production.	Year.	Production.
1888	22,249,389	1895	46,140,174
1889	23,502,163	1896	47,220,633
1890	27,660,953	1897	51,645,568
1891	33,565,819	1898	59,409,357
1892	35,026,144	1899	64,205,063
1893	39,703,304	1900	73,443,032
1894	36,375,428		

The divisions of this "profitable production" among the four subfields on the Apsheron Peninsula are as follows:

"Profitable production" of the several fields of the Apsheron Peninsula from 1889 to 1900.

[Barrels.]

Year.	Balakhani.	Sabountchi.	Romani.	Bibi-Eibat.	Total.
1889	8,424,364	12,905,012	....	2,172,787	23,502,163
1890	7,742,995	17,525,134	189,022	2,203,802	27,660,953
1891	9,067,861	19,992,359	1,585,342	2,920,257	33,565,819
1892	7,025,973	18,916,516	5,017,286	4,066,369	35,026,144
1893	7,070,101	17,883,692	8,943,313	5,806,198	39,703,304
1894	7,217,054	17,485,232	7,542,922	4,130,220	36,375,428
1895	8,258,961	18,500,196	13,619,639	5,761,378	46,140,174
1896	10,470,315	18,664,322	9,546,250	8,539,746	47,220,633
1897	11,774,479	20,406,918	11,821,815	7,642,356	51,645,568
1898	12,921,001	22,396,000	12,292,016	11,800,340	59,409,357
1899	14,040,850	28,209,938	12,051,563	*a* 9,902,712	64,205,063
1900	15,242,054	30,762,347	14,038,509	*b* 13,400,122	73,443,032

a Includes 19,973 barrels produced in Binagadi, a new subfield.
b Includes 49,633 barrels produced in Binagadi, a new subfield.

WELLS AND THEIR PRODUCTION.

There are two classes of wells producing oil, which are known in Russia under the terms "flowing" and "bucketing." Flowing wells require no artificial aids. Owing to the loose sand that continually comes into the wells it is impossible to pump them by the American method. Every flowing well, after a certain lapse of time, when tne gas pressure is sufficiently exhausted, becomes a "bucketing" one. Instead of a pump to raise the oil from the wells that have ceased to flow naturally, a long pipe or bailer is used which goes inside the casing. It has a valve in the bottom and is attached to a wire rope, passing over the crown pulley at the top of the derrick and connected with a drum driven by power. The bailer is lowered to the bottom of the well; the valve opens and allows it to fill quickly with the oil. When the bailer is raised the valve closes, and, filled with oil, it is hoisted to the surface, where the valve opens automatically and the oil is discharged into a trough leading to the reservoir. The process of lowering and refilling is a very rapid one.

The production of crude petroleum from pumping (bucketing) and flowing wells for the last thirteen years has been as follows:

Production of crude oil from pumping and flowing wells in Baku from 1888 to 1900.

[Barrels.]

Year.	Pumping.	Flowing.
1888	13,325,184	8,924,205
1889	18,300,733	5,201,430
1890	21,589,242	6,071,711
1891	28,777,506	4,788,313
1892	25,765,482	9,260,662
1893	26,352,714	13,350,590
1894	28,814,428	7,561,000
1895	32,350,809	13,789,365
1896	36,586,526	10,634,107
1897	40,784,321	10,861,247
1898	45,577,083	13,832,274
1899	54,365,454	9,839,609
1900	65,150,611	8,292,421

The profitable production from pumping and flowing wells for the years 1892 to 1900 is given in the following table, by fields:

Production of crude petroleum from pumping wells, 1892 to 1900.

[Barrels of 42 gallons.]

Year.	Balakhani.	Sabountchi.	Romani.	Bibi-Eibat.	Total.
1892	7,025,973	14,234,073	2,558,238	1,947,198	25,765,482
1893	7,041,496	14,465,119	3,560,680	1,285,419	26,352,714
1894	7,217,054	16,245,868	4,221,278	1,130,228	28,814,428
1895	8,258,961	16,227,824	5,254,480	2,609,544	32,350,809
1896	10,452,222	16,938,528	7,021,311	2,174,465	36,586,526
1897	11,773,063	18,521,553	8,105,441	2,384,264	40,784,321
1898	12,742,529	19,908,639	8,450,123	4,475,792	45,577,083
1899	14,039,627	23,841,356	9,158,898	7,325,573	54,365,454
1900	15,242,054	29,399,755	10,362,225	*a* 10,146,577	65,150,611

a Includes 49,633 barrels produced in Binagadi.

Production of crude petroleum from flowing wells, 1892 to 1900.

[Barrels of 42 gallons.]

Year.	Balakhani.	Sabountchi.	Romani.	Bibi-Eibat.	Total.
1892	....	4,682,443	2,459,048	2,119,171	9,260,662
1893	28,605	3,418,573	5,382,633	4,520,779	13,350,590
1894	....	1,239,364	3,321,644	2,999,992	7,561,000
1895	....	2,272,372	8,365,159	3,151,834	13,789,365
1986	18,093	1,725,794	2,524,939	6,365,281	10,634,107
1897	....	1,883,602	3,718,302	5,259,343	10,861,247
1898	171,200	2,494,916	3,840,319	7,325,839	13,832,274
1899	1,223	4,368,582	2,892,665	2,577,139	9,839,609
1900	....	1,362,592	3,676,284	3,253,545	8,292,421

The following table shows the average daily production of crude petroleum in the Baku field in 1899 and 1900, taken from the consular report of Mrs. James C. Chambers:

Average daily production of the Baku fields in 1899 and 1900.

[Barrels of 42 gallons.]

Month.	Flowing wells.		Pumping wells.		Total.		Stocks at wells at end of month.	
	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.
January	38,744	11,252	130,075	155,815	168,817	167,067	809,740	1,031,470
February	53,636	16,270	131,808	157,900	185,144	174,170	1,018,898	916,532
March	40,072	25,471	140,973	157,921	181,045	183,392	759,351	780,971
April	34,432	6,824	138,745	163,535	173,177	172,359	769,334	775,027
May	46,653	11,453	136,599	175,815	183,252	187,268	802,190	773,810
June	24,284	39,603	142,589	171,963	166,873	211,366	747,872	834,604
July	20,103	62,775	148,237	180,767	168,340	243,542	893,651	948,450
August	15,344	29,795	149,839	186,658	165,183	216,453	688,413	958,664
September	10,092	27,820	157,931	175,560	168,023	203,380	643,592	827,115
October	14,728	15,560	158,392	180,973	173,120	196,533	640,599	984,586
November	14,948	24,668	157,044	186,512	171,992	211,180	684,827	1,060,109
December	6,193	12,108	158,129	184,580	164,322	196,688	858,238	1,088,342
Year	26,445	23,768	146,216	173,516	172,661	197,284	....	....

SHIPMENTS FROM BAKU.

The following table contains the shipments from Baku by railroad and by sea during 1899 and 1900, by months, as taken from the report of Mr. James C. Chambers:

Output of all petroleum products from Baku in the years 1899 and 1900.

[Gallons.]

Month.	Illuminating oil.		Lubricating oil.		Residuum.	
	1899.	1900.	1899.	1900.	1899.	1900.
BY RAIL.						
January	25,780,000	24,235,000	4,195,000	4,355,000	1,310,000	3,160,000
February	25,855,000	23,475,000	3,040,000	4,350,000	1,510,000	2,135,000
March	29,710,000	27,540,000	3,755,000	4,005,000	3,020,000	2,420,000
April	25,360,000	27,455,000	3,455,000	3,255,000	2,205,000	2,180,000
May	24,215,000	20,530,000	3,445,000	2,715,000	1,620,000	1,365,000
June	26,685,000	25,005,000	3,625,000	3,785,000	2,975,000	1,965,000
July	25,505,000	29,435,000	3,245,000	3,480,000	1,575,000	1,465,000
August	26,755,000	28,565,000	3,385,000	5,005,000	1,605,000	2,590,000
September	27,800,000	31,540,000	4,035,000	4,060,000	1,840,000	2,120,000
October	26,510,000	23,880,000	3,295,000	3,005,000	805,000	1,195,000
November	18,950,000	25,390,000	2,705,000	4,405,000	1,225,000	1,095,000
December	17,320,000	24,875,000	3,835,000	5,310,000	1,615,000	985,000
Total	300,445,000	311,925,000	42,015,000	47,730,000	21,305,000	22,675,000
BY SEA.						
January	4,465,000	12,970,000	30,000	220,000	6,735,000	11,735,000
February	3,065,000	15,835,000	390,000	215,000	6,830,000	11,635,000
March	17,040,000	16,995,000	1,165,000	665,000	133,105,000	35,730,000
April	20,680,000	40,120,000	1,700,000	3,615,000	157,810,000	182,015,000
May	22,625,000	31,310,000	2,535,000	2,485,000	174,085,000	184,820,000
June	24,275,000	35,865,000	1,340,000	2,675,000	167,400,000	184,530,000
July	26,145,000	36,395,000	2,215,000	2,250,000	163,885,000	188,960,000
August	28,980,000	35,775,000	2,375,000	2,555,000	149,415,000	196,175,000
September	27,240,000	31,380,000	1,610,000	1,990,000	135,445,000	174,065,000
October	20,985,000	27,865,000	1,235,000	2,055,000	89,490,000	114,620,000
November	10,430,000	9,745,000	365,000	190,000	9,580,000	6,015,000
December	9,460,000	11,070,000	40,000	410,000	9,220,000	5,615,000
Total	215,390,000	305,325,000	15,000,000	19,325,000	1,203,000,000	1,295,915,000
TOTAL.						
January	30,245,000	37,205,000	4,225,000	4,575,000	8,045,000	14,895,000
February	28,920,000	39,310,000	3,430,000	4,565,000	8,340,000	13,770,000
March	46,750,000	44,535,000	4,920,000	4,670,000	136,125,000	38,150,000
April	46,040,000	67,575,000	5,155,000	6,870,000	160,015,000	184,195,000
May	46,840,000	51,840,000	5,980,000	5,200,000	175,705,000	186,185,000
June	50,960,000	60,870,000	4,965,000	6,460,000	166,860,000	186,495,000
July	51,650,000	65,830,000	5,460,000	5,730,000	168,975,000	190,425,000
August	55,735,000	64,340,000	5,760,000	7,560,000	151,020,000	198,765,000
September	55,040,000	62,920,000	5,645,000	6,050,000	137,285,000	176,185,000
October	47,495,000	51,745,000	4,530,000	5,060,000	90,295,000	115,815,000
November	29,380,000	35,135,000	3,070,000	4,595,000	10,805,000	7,110,000
December	26,780,000	35,945,000	3,875,000	5,720,000	10,835,000	6,600,000
Total	515,835,000	617,250,000	57,015,000	67,055,000	1,224,305,000	1,318,590,000

Output of all petroleum products from Baku in the years 1899 and 1900—Continued.

[Gallons.]

Month.	Crude.		Total.	
	1899.	1900.	1899.	1900.
BY RAIL.				
January	4,630,000	3,195,000	35,915,000	34,945,000
February	4,280,000	5,310,000	34,685,000	35,270,000
March	5,260,000	6,160,000	41,745,000	40,125,000
April	4,675,000	4,530,000	35,695,000	37,420,000
May	4,390,000	3,595,000	33,670,000	28,205,000
June	4,395,000	4,960,000	37,680,000	35,715,000
July	4,720,000	4,745,000	35,045,000	39,125,000
August	4,905,000	5,190,000	36,650,000	41,350,000
September	4,205,000	4,670,000	37,880,000	42,390,000
October	4,655,000	4,525,000	35,265,000	32,605,000
November	3,860,000	4,685,000	26,740,000	35,575,000
December	2,720,000	6,015,000	25,490,000	37,185,000
Total	52,695,000	57,580,000	416,460,000	439,910,000
BY SEA.				
January	205,000	100,000	11,435,000	25,025,000
February	545,000	1,770,000	10,830,000	29,455,000
March	4,570,000	6,585,000	155,880,000	59,975,000
April	10,730,000	13,225,000	190,920,000	238,975,000
May	11,905,000	18,105,000	211,150,000	236,720,000
June	10,030,000	16,390,000	199,530,000	239,460,000
July	9,960,000	22,225,000	205,720,000	249,830,000
August	10,370,000	22,370,000	191,140,000	256,875,000
September	6,440,000	16,830,000	170,735,000	224,265,000
October	2,070,000	19,395,000	113,780,000	163,935,000
November	1,365,000	30,000	21,740,000	15,980,000
December	545,000	285,000	19,265,000	17,380,000
Total	68,735,000	137,310,000	1,502,125,000	1,757,875,000
TOTAL.				
January	4,835,000	3,295,000	47,350,000	59,970,000
February	4,825,000	7,080,000	45,515,000	64,725,000
March	9,830,000	12,745,000	197,625,000	100,100,000
April	15,405,000	17,755,000	226,715,000	276,395,000
May	16,295,000	21,700,000	244,820,000	264,925,000
June	14,425,000	21,350,000	237,210,000	275,175,000
July	14,680,000	26,970,000	240,765,000	288,955,000
August	15,275,000	27,560,000	227,790,000	298,225,000
September	10,645,000	21,500,000	208,615,000	266,655,000
October	6,725,000	23,920,000	149,045,000	196,540,000
November	5,225,000	4,715,000	48,480,000	51,555,000
December	3,265,000	6,300,000	44,755,000	54,565,000
Total	121,430,000	194,890,000	1,918,585,000	2,197,785,000

SHIPMENTS FROM BATUM.

The following table contains the shipments of the products of petroleum to different countries in 1899 and 1900 as reported by Mr. James C. Chambers:

Shipments of petroleum products from Batum in the years 1899 and 1900.

[Gallons.]

To—	Crude and residuum.		Lubricating.		Solar and distillate.	
	1899.	1900.	1899.	1900.	1899.	1900.
Austria-Hungary	426,320	193,550	3,598,125	2,902,725	8,974,820	....
Belgium	4,127,920	3,843,625	8,033,870	10,688,635	449,580	188,750
Bulgaria	4,850	10,450	70,050	49,050	....	....
Egypt	56,100	19,950	167,650	166,100	....	....
United Kingdom	1,412,670	482,135	5,037,320	7,927,890	9,674,655	18,357,275
France	1,814,095	1,315,765	8,514,075	9,318,970	15,074,440	8,448,130
Germany	991,440	1,090,080	10,579,140	9,920,875	97,495	36,000
Italy	1,948,040	1,982,270	350,900	464,850	....	....
Japan	....	....	....	2,500	....	....
Netherlands	....	....	103,500	317,200	....	....
Roumania	1,300	2,050	87,550	93,200	....	....
Spain	238,260	....	689,630	416,895	....	....
Turkey	56,750	39,350	37,300	77,250	....	....
Other countries	1,100	9,450	26,100	58,650	....	....
Total exports	11,078,845	8,988,675	37,295,210	42,404,790	34,270,990	27,030,155
Russia	687,075	143,630	1,441,165	1,110,795	51,800	38,550
Total shipments	11,765,920	9,132,305	38,736,375	43,515,585	34,322,790	27,068,705

To—	Refined.		Total.	
	1899.	1900.	1899.	1900.
Austria-Hungary	3,657,900	1,714,325	16,657,165	4,810,600
Belgium	6,562,280	8,385,600	19,173,650	23,106,610
Bulgaria	1,269,255	1,844,680	1,344,155	1,904,180
Cochin China	5,401,000	1,161,600	5,401,000	1,161,600
China	28,709,250	13,360,350	28,709,250	13,360,350
Egypt	4,439,720	11,754,170	4,663,470	11,940,220
United Kingdom	55,932,875	48,161,165	72,057,520	74,928,465
France	1,242,575	4,060,285	26,645,185	23,143,150
Germany	12,551,790	15,615,810	24,219,865	26,662,765
India	48,063,085	32,158,680	48,063,085	32,158,680
Italy	5,819,600	1,835,345	8,118,540	4,282,465
Japan	4,826,090	1,620,000	4,826,090	1,622,500
Java	8,672,320	7,864,030	8,672,320	7,864,030
Malta	1,369,775	1,312,275	1,369,775	1,312,275
Netherlands	2,124,905	....	2,228,405	317,200
Philippines	1,989,210	2,246,170	1,989,210	2,246,170
Portugal	3,310,190	2,695,650	3,310,190	2,695,650
Port Said, for orders	46,233,340	38,341,955	46,233,340	38,341,955
Roumania	479,175	403,760	568,025	499,010
Spain	....	....	927,890	416,895
Turkey	19,786,240	35,516,945	19,880,290	35,633,545
Other countries	2,169,400	668,350	2,196,600	736,450
Total exports	264,609,975	230,721,145	347,255,020	309,144,765
Russia	20,907,815	23,517,555	23,087,855	24,810,530
Total shipments	285,517,790	254,238,700	370,342,875	333,955,295

NOTE.—"Port Said, for orders," is bulk shipment to the Far East, destination unknown at Batum. "Solar and distillate" means illuminating distillate to France and gas oil to the United Kingdom.

SHIPMENTS FROM NOVOROSSISK IN 1899 AND 1900.

The following table exhibits the shipments of petroleum products to different countries from Novorossisk during 1899 and 1900:

Shipment of petroleum products from Novorossisk in 1899 and 1900.

[Gallons.]

To—	Crude and residuum.		Lubricating.		Solar and distillate.	
	1899.	1900.	1899.	1900.	1899.	1900.
Belgium	....	1,362,020	....	249,320	....	....
France	263,560	1,272,155	....	456,375	3,017,700	5,514,030
United Kingdom	2,984,695	8,099,560	....	87,760	1,861,010	6,525,890
Germany	916,845	1,091,405	....	456,490	....	....
Italy	....	1,365,090	....	....	....	....
Spain	....	193,495	....	46,640	....	....
Total exports	4,165,100	13,383,725	....	1,296,585	4,878,710	12,039,920
Russia	4,036,000	216,730	....	....	....	....
Total shipments	8,201,100	13,600,455	....	1,296,585	4,878,710	12,039,920

To—	Refined.		Total.	
	1899.	1900.	1899.	1900.
Austria-Hungary	1,664,565	1,112,770	1,664,565	1,112,770
Belgium	2,208,945	3,776,220	2,208,945	5,387,560
France	....	....	3,281,260	7,242,560
United Kingdom	7,765,450	13,871,110	12,611,155	28,584,320
Germany	3,788,445	3,964,265	4,705,290	5,512,160
Italy	3,081,915	3,881,940	3,081,915	5,247,030
Malta	594,080	598,485	594,080	598,485
Netherlands	928,780	1,120,610	928,780	1,120,610
Portugal	....	539,330	....	539,330
Port Said, for orders	13,849,965	31,142,300	13,849,965	31,142,300
Spain	....	....	....	240,135
Total exports	33,882,145	60,007,030	42,925,955	86,727,260
Russia	4,779,605	15,420,625	8,815,605	15,637,355
Total shipments	38,661,750	75,427,655	51,741,560	102,364,615

NOTE.—"Port Said, for orders," is bulk shipment to the Far East, destination unknown at Batum. "Solar and distillate" means illuminating distillate to France and gas oil to the United Kingdom.

Russia exported and sold in the markets of the world 395,872,025 gallons of petroleum and its products during the year 1900. Of this amount 290,728,175 gallons were illuminating oil, 22,372,400 gallons crude and residuum, 43,701,375 gallons lubricating, and 39,070,075 gallons solar and distillate. This last item embraces almost exclusively illuminating distillate to France and gas oil to England.

Of the Russian refined oil exported during 1900 Great Britain was the heaviest purchaser, having consumed over 62,000,000 gallons. Turkey came next, with 35,500,000 gallons, and India third, with 32,150,000 gallons. Germany took over 20,000,000 gallons; Belgium, 12,000,000; China, 13,360,000, and Egypt 11,754,000 gallons. There were also shipped to Port Said, for orders to the East, 69,500,000 gallons. The German, English, and Chinese markets at one time were dominated exclusively by American oil.

STOCKS AT BAKU.

The following table gives the stocks of crude petroleum at the wells and refineries, and the total stocks of illuminating, lubricating, and residuum at Baku, at the close of 1899 and 1900, taken from the report of Mr. Chambers:

Stocks of all products at Baku.

[Barrels of 42 gallons.]

Product.	January 1— 1900.	1901.	Increase.	Decrease.
Crude:				
At wells	1,088,342	858,238	230,104	....
At refineries	4,778,881	4,750,359	....	271,478
Total crude	5,567,223	5,608,597	....	41,374
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*
Illuminating	110,166,410	92,600,025	17,566,385	....
Lubricating	13,199,655	9,009,485	4,190,170	....
Residuum	301,550,745	189,541,720	111,009,025	....

SHIPMENTS FROM ASTRAKHAN.

Astrakhan is an important port at the mouth of the Volga River for the shipment of Russian petroleum that comes up the Caspian Sea direct from Baku. According to Russian official statistics the total shipments of petroleum products up the Volga during the season of 1900 amounted to 243,086,229 poods, and were valued at 55,295,000 rubles. These shipments were made up as follows:

Shipments of petroleum products from Astrakhan.

	Poods.	Barrels.
Kerosene	30,858,461	3,772,430
Residuum	208,619,857	25,503,650
Mineral oils	3,385,124	413,830
Benzine	154,627	18,900
Viscosine	21,260	2,600
Pyronaphtha	46,900	5,730
Total	243,086,229	29,717,140

The total exports of residuum by way of Novorissisk was only about 340,000 barrels for 1900, so that at least 25,000,000 barrels of the fuel oil that was shipped up the Volga River must have been for home consumption.

PRICES OF CRUDE AT WELLS.

The following were the average monthly prices of crude in 1900 at wells in the past year, in kopecks per pood and cents per barrel of 42 gallons, on a basis of 51.5 cents to the ruble:

Average monthly prices of crude oil at wells in 1900.

Month.	Per pood.	Per barrel.
	Kopecks.	*Cents.*
January	16.4	70.3
February	16.5	70.8
March	17	73
April	17.5	75.1
May	18.125	77.8
June	18	77.2
July	17	73
August	16.5	70.8
September	15	64.4
October	11.5	49.3
November	12.5	53.6
December	12	51.5

AUSTRIA-HUNGARY.

GALICIA.

The petroleum industry in Galicia is of great antiquity. The existence of petroleum was noted as early as 1506, and attempts to produce an illuminating fluid from it were made at various times early in the past century. A small refinery was operated at Kabieza a dozen years before the oil industry assumed any importance in the United States. In 1853 Galician oil replaced candles for lighting the stations of the Austrian imperial railway system, and a year later it was introduced into Vienna. The developments, however, were very slow and carried on in a sluggish manner. By 1870 the production of crude petroleum did not exceed 200 barrels a day. Twenty years later it had increased to something like 1,600 or 1,800 barrels a day. The first wells were pits excavated by hand, but in 1867 power was introduced and drilling was carried on to greater depths.

The Galician oil territory, so far as defined, extends for a distance of 220 miles in a general northwesterly and southeasterly direction along the flanks of the Carpathian Mountains, and is from 40 to 60 miles in width. The belt, however, is far from being uniform, and the several districts where oil is produced seem to be entirely distinct one from the other. The oil-producing strata are of the newer formations, from the Cretaceous up to the Miocene, and similar to those in which petroleum is found in California.

In August, 1900, the discovery of oil was reported at Zemplin, in

Hungary, on an extension of the Galician oil field into that province. A great many attempts had been made to find oil on the Hungarian side of the Carpathians, but hitherto they had proved unsuccessful. The oil in this well was said to be of much better quality than that of the Galician wells.

PRODUCTION OF GALICIAN FIELDS.

The production of the Galician oil fields for 1900 was equivalent to 2,346,505 American barrels of 42 gallons as compared with 2,313,047 barrels in 1899. This indicates an increase of 33,458 barrels, or about $1\frac{1}{2}$ per cent. The output for 1899 was 63,056 barrels below that of 1898.

While the Canadian pole system of drilling is in general use throughout the Galician oil fields, the method of reaching the oil-bearing strata by hand-dug shafts has not been entirely abandoned. The well record for 1899 shows 233 hand-dug shafts and 1,881 drilled wells. Not all of these were producing oil at the close of the year.

The number of petroleum firms in Galicia in 1900 was 170, of which 120 produced crude oil, 34 had started drilling operations, and 16 were closed down, either wholly or partially, at the end of the year.

While Galicia does not produce sufficient oil to supply the wants of the Austria-Hungarian Empire, as shown by the importation of petroleum from Russia and the United States, it finds it profitable to export some of its petroleum products to neighboring countries. A large proportion of these exports is in the form of ozocerite or mineral wax, mined at Boryslaw. For the year 1900 the exports of petroleum and its products from Austria-Hungary were valued at $1,345,729, while the imports were valued at $1,469,040.

Austria-Hungary imported from the United States in 1900, 653,329 gallons of lubricating oil, and from Russia 193,350 gallons of crude and residuum, 2,902,725 gallons of lubricating oil, and 2,827,095 gallons of illuminating oil. Some of its supply is also received from Roumania.

At Fiume, on the Adriatic, are located large refineries, which receive crude oil and distillate from Baku and manufacture it into illuminating and other oils for Austrian consumption. The advance in the import duty, noted by Consul Hossfield in a report to the State Department, has evidently had a most disastrous effect on this trade the past year. Nearly 9,000,000 gallons of distillate were received from Russia in 1899, while nothing at all was reported for 1900. Crude and residuum also show a heavy decline, while the imports of illuminating oil from Russia were decreased 2,495,370 gallons.

Production of crude petroleum in Galicia, by fields, in 1900.

Mining district.	Production.	
	Metric centners.	Barrels of 42 gallons.
Stanislaw	112,440	80,850
Drohobycz	2,216,960	1,594,105
Jaslo	933,940	671,550
Total	3,263,340	2,346,505

The following equivalents of value, weight, and length are given:

1 florin or gulden=48.2 cents.
1 metric ton=2,204.62 pounds.
1 metric ton=7.1905 barrels of crude petroleum of 42 gallons.
1 metric centner }
1 quintal } =100 kilos (220.462 pounds).
1 kilo=2.20462 pounds.
1 gallon refined petroleum=6.6 pounds
1 gallon crude petroleum=7.3 pounds.
1 quintal or 1 metric centner of refined petroleum=0.795317 barrel of 42 gallons.
1 quintal or 1 metric centner of crude petroleum=0.71905 barrel of 42 gallons.
1 kilometer=3,280.89 feet=0.6213 mile.

In the following table is given a statement of the production of crude petroleum in Galicia from 1886 to 1900, inclusive, as ascertained by the Statistical Bureau of the Galizischer Landes-Petroleum-Verein, Lemberg:

Production of crude petroleum in Galicia from 1886 to 1900.

Year.	Metric centners.	Barrels of 42 gallons.	Year.	Metric centners.	Barrels of 42 gallons.
1886	425,400	305,884	1894	1,320,000	949,146
1887	478,176	343,832	1895	2,020,720	1,452,999
1888	648,824	466,537	1896	3,397,650	2,443,080
1889	716,595	515,268	1897	3,096,263	2,226,368
1890	916,504	659,012	1898	3,304,510	2,376,108
1891	877,174	630,732	1899	3,216,810	2,313,047
1892	898,713	646,220	1900	3,263,340	2,346,505
1893	963,312	692,669			

Record of wells, pipe lines, and tankage in Galicia in 1900, by districts.

District.	Wells.				Pipe lines.		Tanks.	
	Hand-dug.	Borings.			Number.	Length.	Number.	Total capacity.
		Drilled.	Exploited.	Total.				
						Kilometers.		*Metric centners.*
Stanislaw	32	20	131	151	2	17.5	199	45,000
Drohobycz	92	151	751	902	10	94	763	1,152,000
Jaslo	108	114	713	827	13	95	698	756,000
Krakow (Rabka)	1	1		1				
Total	233	286	1,595	1,881	25	206.5	1,660	1,953,000

ROUMANIA.

The Roumanian oil fields are situated along the southeastern and southern slopes of the Southern Carpathian Mountains. They are similar in all important characteristics to the oil districts of Galicia, and are generally regarded as a continuation of them. The presence of liquid bitumen has been known for several centuries, but for a long time the industry was carried on in a very primitive manner. Thousands of hand-dug wells were sunk at trifling cost, which were of very small yield. In 1880 Prince Cantacuzene introduced the steam drilling machinery. There were numerous small refineries scattered through the smaller towns, where the oil purchased by the merchants from the collectors was treated. At the present time some larger works are in operation at Kronstadt, Bucharest, Campina, and other towns.

The increase to March, 1899, is shown by the following statement:

Number of oil wells in Roumania, March, 1899.

District.	Borings.		Hand wells.	
	Productive.	Nonproductive on being bored.	Productive.	Nonproductive on being dug.
Dimbovita	....	....	115	40
Prahova	42	45	400	450
Buzeu	4	10	90	10
Bacau	40	8	340	120
Total	86	63	945	620

The production of the above districts, which in 1895 did not exceed 14,600 tons, rose in 1897–98 to 134,180 tons, a very considerable increase.

Actually, owing to the results obtained from the different borings and wells at Baicoi, Tintca, and Campina, the production has risen to about 1,000 tons daily. In three years' time it is calculated that the production will reach nearly 1,000,000 tons annually.

According to the figures published by the Roumanian mining bureau, the number of productive wells in the several oil districts at the close of April, 1900, and their total production for twelve months, from April, 1899, to April, 1900, were as follows:

Twelve months' production of petroleum in Roumania.

District.	Borings.	Hand wells.	Production.
			Kilograms.
Dimbovitza	1	103	9,995,000
Prahova	84	335	197,330,070
Buzeu	9	77	6,059,234
Bacau	14	254	11,367,200
Total	108	769	214,751,504

At 140 kilograms to the barrel, this is the equivalent of 1,534,000 barrels.

The average number of hand-dug wells producing in 1899 was 620, and of drilled wells 51. About 70 per cent of the production comes from the drilled wells.

There are 80 refineries in the Roumanian oil districts, whose output for the first three months of the year 1900 amounted as follows: 4,071 tons of benzine, 12,503 tons of illuminating and 4,237 tons of lubricating and other oils. The largest and most important is that at Campina, belonging to the Steaua Romana Company.

From the following tables it will be seen that the production of Roumania increased 202,758 barrels in 1900, a gain of 14.2 per cent. The production for 1899 was 85 per cent greater than that of 1898.

The following statement, furnished by the Imperial and Royal Austro-Hungarian consulate in Plojest, gives the production of crude petroleum in Roumania from 1896 to 1900, by districts.

Production of crude petroleum in Roumania from 1896 to 1900, by districts.

[Tank carloads of 100 metric centners.]

Locality.	Production.				
	1896.	1897.	1898.	1899.	1900.
Baicoi	250	250	340	800	950
Glodeni	1,365	350	1,925	2,300	2,800
Campina	300	1,460	2,650	8,500	9,400
Dolftana and Bustenari	2,960	3,830	2,730	3,860	4,100
Ochisori and Matitza	178	150	160	380	500
Sarata (Buzeu) Tega	902	700	1,185	1,890	2,400
Other localities	1,602	1,200	1,667	2,100	2,500
Total	7,557	7,940	10,657	19,830	22,650

In the following table will be found the production of crude petroleum in the principal districts in Roumania from 1874 to 1900, inclusive:

Production of crude petroleum in Roumania from 1874 to 1900.

[Metric ton crude = 7.19 barrels.]

Year.	District.				Total.	
	Prahova.	Buzeu.	Bacau.	Dimbovitza.	Tank cars.	Barrels (42 U.S. gallons).
1874	155	780	220	280	1,435	103,176.5
1875	160	820	230	300	1,510	108,569
1876	150	760	280	320	1,510	108,569
1877	180	760	250	320	1,510	108,569
1878	210	750	250	300	1,510	108,569
1879	250	700	280	300	1,530	110,007
1880	290	710	300	290	1,590	114,321
1881	350	740	300	300	1,690	121,511
1882	540	700	310	350	1,900	136,610
1883	570	700	320	350	1,940	139,486
1884	1,560	700	300	370	2,930	210,667
1885	1,350	700	300	340	2,690	193,411
1886	880	750	290	425	2,345	168,605.5
1887	950	800	280	500	2,530	181,907
1888	890	840	360	950	3,040	218,576
1889	950	1,010	380	1,800	4,140	297,666
1890	1,030	1,100	600	2,600	5,330	383,227
1891	1,150	1,050	790	3,800	6,790	488,201
1892	1,600	1,100	850	4,700	8,250	593,175
1893	1,700	950	1,300	3,500	7,450	535,655
1894	2,600	925	1,650	1,880	7,055	507,254.5
1895	3,714	904	1,838	1,544	8,000	575,200
1896	3,688	902	1,602	1,365	7,557	543,348
1897	5,690	700	1,200	350	7,940	570,886
1898	5,880	1,185	1,667	1,925	10,657	766,238
1899	13,540	1,890	2,100	2,300	19,830	1,425,777
1900	14,950	2,400	2,500	2,800	22,650	1,628,535

GERMANY.

Germany's production of crude petroleum increased from 192,232 barrels in 1899 to 358,297 barrels in 1900. This is a gain of 166,065 barrels, or over 86 per cent. The gain of 1899 over 1898 was 8,808 barrels, or only 5 per cent. These are not very large figures comparatively, but they show that the industry is attracting more attention. An increase in the daily yield from 560 to 980 barrels is certainly worthy of note. The average price received in 1900 was $2.50 per barrel as compared with $1.97 per barrel in 1899 and $2.06 per barrel in 1898.

Hannover continues to supply the greatest amount of crude petroleum, while the Alsatian fields appear the most active. A small yield is recorded from Upper Bavaria. The Alsace Loraine production for 1900 amounted to 160,723 barrels, leaving 197,574 barrels as the yield from Hannover and Bavaria. The number of workmen employed in the German oil fields does not exceed 500. The greater proportion of the crude product is manufactured into lubricating oil.

Germany encourages the development of the petroleum resources by imposing heavy import duties on all the oil brought into the country. A protective tariff of 6 marks per 100 kilos ($1.43 per barrel) is levied on illuminating and 10 marks per 100 kilos ($2.38 per barrel) on lubricating oils.

Germany's production of petroleum is very small in comparison with her immense consumption. During the year 1899 Germany imported 37 barrels from the United States for every barrel produced at home. In 1900 Germany's petroleum imports from this country were as follows: Crude oil, 3,536,491 gallons; naphthas, 6,803,632 gallons; illuminating oils, 124,542,723 gallons; lubricating oil, 10,279,660 gallons. For the same year the imports from Russia amounted to: Crude and residuum, 2,181,485 gallons; lubricating, 10,377,365 gallons; solar and distillate, 36,000 gallons; illuminating oil, 19,580,075 gallons. The total is 32,174,925 gallons as compared with 145,162,506 gallons from the United States.

The production and value of petroleum in Germany from 1880 to 1900 is shown in the following table:

Production and value of petroleum in Germany from 1880 to 1900, inclusive.

Year.	Production.		Value.	
	Metric tons. (a)	Barrels (42 gallons).	Marks.	Dollars.
1880	1,309	9,310	159,000	38,160
1881	4,108	29,219	526,000	126,240
1882	8,158	58,024	751,000	180,240
1883	3,755	26,356	352,000	84,480
1884	6,490	46,161	551,000	132,240
1885	5,815	41,360	471,000	113,040
1886	10,385	73,864	962,000	230,880
1887	10,444	74,284	933,000	223,920
1888	11,920	84,782	1,028,000	246,720
1889	9,591	68,217	881,000	211,440
1890	15,226	108,295	1,242,000	298,080
1891	15,315	108,927	1,195,000	286,800
1892	14,257	103,323	880,000	211,200
1893	13,974	99,395	783,000	187,920
1894	17,232	122,563	972,447	233,387
1895	17,051	121,277	962,455	230,989
1896	20,395	145,061	1,188,511	285,243
1897	23,303	165,743	1,396,444	335,147
1898	25,789	183,424	1,578,208	378,770
1899	27,027	192,232	1,577,456	378,589
1900	50,375	358,297	3,726,086	894,260

a One ton crude = 7.1126 barrels.

ITALY.

The statistics for the petroleum production in Italy for 1900 are not yet available. That of 1899 was 16,121 barrels as compared with 14,489 barrels in 1898. The production for several years has been quite regular. There was a slight decline in the price, as $7.11 is quoted as the average value for 1899. This price ought to stimulate the search for petroleum and in a way it no doubt has, but the methods employed in Italy are rather crude. The duty imposed on refined petroleum causes the high price of the native production. There is an import duty amounting to 48 lires per 100 kilos, or $11.50 per barrel, as well as an excise duty of $2.25 per barrel.

A great variety of petroleum is found in Italy, ranging from the dark or black of heavy gravity to that almost equal in color to refined petroleum. This petroleum is usually found in anticlinals parallel to the Apennine range and is associated with sulphur and saline springs.

From the volumes of "Rivista del Servizio Minerario" the following statements are extracted regarding the production of crude and refined petroleum in this country:

Production of crude petroleum in Italy from 1860 to 1899.

Year.	Number of wells in operation.	Quantity.		Value.				Number of workmen employed.
		Metric tons.	United States barrels.	Unit value.		Total value.		
				Lire.	Dollars.	Lire.	Dollars.	
1860	3	5	36	800.00	21.44	4,400	772	5
1861	3	4	29	800.00	21.31	3,200	618	8
1862	4	4	29	800.00	21.31	3,200	618	9
1863	7	8	58	800.00	21.29	6,400	1,235	18
1864	7	10	72	800.00	21.41	8,000	1,544	32
1865	10	315	2,265	209.52	5.62	66,000	12,738	70
1866	12	138	992	269.86	7.24	37,240	7,187	57
1867	11	110	791	349.10	9.37	38,400	7,411	58
1868	9	51	367	435.29	11.67	22,200	4,285	52
1869	8	20	144	800.00	21.65	16,000	3,118	45
1870	6	12	86	800.00	21.55	9,600	1,853	30
1871	6	38	273	263.16	7.07	10,000	1,930	40
1872	6	46	331	208.69	5.60	9,600	1,853	36
1873	5	65	467	172.31	4.63	11,200	2,162	35
1874	4	84	604	152.38	4.00	12,800	2,470	37
1875	3	113	812	138.05	3.70	15,600	3,011	38
1876	3	402	2,890	123.38	3.31	49,600	9,573	72
1877	2	408	2,934	132.35	3.55	54,000	10,422	45
1878	4	602	4,328	102.99	2.76	62,000	11,966	98
1879	4	402	2,890	124.37	3.34	50,000	9,650	70
1880	2	283	2,035	313.05	8.40	88,595	17,099	24
1881	2	172	1,237	445.00	11.94	76,540	14,772	24
1882	4	183	1,316	474.55	11.97	86,844	15,761	121
1883	5	225	1,618	259.49	6.96	58,387	11,269	92
1884	6	397	2,854	341.18	9.16	135,452	26,142	110
1885	6	270	1,941	407.65	10.92	110,066	21,243	136
1886	7	219	1,575	416.11	11.16	91,130	17,588	145
1887	7	208	1,497	368.84	9.76	76,720	14,614	135
1888	5	174	1,251	319.71	8.58	55,630	10,737	75
1889	7	177	1,273	288.13	7.73	51,000	9,843	70
1890	9	417	2,998	289.21	7.77	120,603	23,276	177
1891	10	1,155	8,305	301.38	8.09	348,100	67,183	251
1892	7	2,548	18,321	296.11	7.95	754,500	145,619	267
1893	8	2,652	19,068	299.80	8.05	795,050	153,445	130
1894	9	2,854	20,520	296.88	7.97	847,260	163,521	194
1895	6	3,594	25,841	258.90	6.95	930,496	179,586	134
1896	9	2,524	18,149	255.34	6.85	644,468	124,383	222
1897	8	1,932	13,892	255.33	6.84	492,288	95,010	231
1898	7	2,015	14,489	292.30	7.85	589,129	113,702	217
1899	6	2,242	16,121	264.97	7.11	594,062	114,654	231

7.1905 barrels = 1 metric ton of crude.
7.955 barrels = 1 metric ton of refined.
1 lire = 19.3 cents.

Production of crude petroleum in Italy in 1895, 1896, 1897, 1898, and 1899.

Mining district.	Province.	Number of wells in operation.	Quantity.		Value.			
			Metric tons.	Barrels of 42 gallons.	Per ton.	Per barrel.	Total.	
1895.					*Lire.*		*Lire.*	
Emilia		3	3,532	25,395	260.00	$6.98	918,320	$177,236
Roma		3	62	446	196.71	5.27	12,176	2,350
Total		6	3,594	25,841	258.90	6.95	930,496	179,586
1896.								
Bologna		1	1	7	250.00	7.00	250	48
Milano	Parma	5	61	439	273.00	7.34	16,682	3,220
	Piacenza	2	2,388	17,171	260.00	6.98	620,896	119,833
Roma	Chieti	1	74	532	89.73	2.41	6,640	1,282
Total		9	2,524	18,149	255.34	6.85	644,468	124,383
1897.								
Milano	Parma	5	80	575	260.00	6.98	20,800	4,014
	Piacenza	2	1,791	12,878	260.00	6.98	465,660	89,872
Roma	Chieti	1	61	439	95.44	2.56	5,822	1,124
Total		8	1,932	13,892	255.33	6.84	492,282	95,010
1898.								
Milano	Parma	6	45	324	269.20	7.20	12,089	2,333
	Piacenza		1,910	13,734	300.00	8.05	573,180	110,624
Roma	Chieti	1	60	431	64.33	1.73	3,860	745
Total		7	2,015	14,489	292.30	7.85	589,129	113,702
1899.								
Milano	Parma	7	73	525	270.71	7.26	19,762	3,814
	Piacenza	2	1,806	12,986	300.04	8.05	541,870	104,581
Roma	Chieti	1	363	2,610	89.33	2.39	32,430	6,259
Total		10	2,242	16,121	264.97	7.11	594,062	114,654

GREAT BRITAIN.

Petroleum exists in small quantities in different parts of England, but the amount produced is insignificant. The total production for 1899 did not exceed 40 barrels, and this was obtained entirely in north Staffordshire. Other localities where its existence is known are at Worsley, Wigan, and West Leigh, in Lancashire; at Coalbrookdale and Wellington, in Shropshire; at Castleton and Alfreton, in Derbyshire, and near Shepton Mallet, in Somersetshire. At the Smith Gate colliery, near Chesterfield, an intermittent flow of petroleum and water was reported that for a long time averaged from 70 to 100 gallons a day.

An oil spring at Pitchford, in Shropshire, was noted as early as 1684. The name of the place was derived from a spring of "pitchy water," there being no distinction in the common mind between pitch and bitumen. This oil acquired a widespread reputation for its medicinal virtues, and gave name to the ancient family of the Pitchfords. The Shropshire coal pits are overlaid with a stratum of bituminous rock, which is very porous and impregnated with petroleum.

Thus far, however, the presence of oil in England has not proved of sufficient quantity to warrant any extensive development.

The mineral statistics of the United Kingdom give the production and value of petroleum from 1886 to 1900 as follows:

Production and value of petroleum in Derbyshire, England, from 1886 to 1900.

Year.	Production.		Value. (a)	
	Tons (2,240 pounds).	Barrels (42 gallons).	Pounds.	Dollars.
1886	43	314	129	627
1887	66	482	99	481
1888	35	256	....	....
1889	30	219	45	219
1890	35	256	52	253
1891	100	731	150	729
1892	218	1,594	409	1,988
1893	260	1,900	488	2,372
1894	49	358	92	448
1895	15	110	28	136
1896	12	88	29	141
1897	12	88	29	141
1898	6	44	14	68
1899	5	37	12	58

(*a*) Value at wells, £1 = $4.86.

THE SCOTCH SHALE-OIL INDUSTRY.

The shale-oil industry of Scotland is of some importance, and the quantity produced in 1900 shows a considerable gain over the preceding year. It requires a ton of bituminous shale to yield 42 American gallons of petroleum distillate, but it contains a large percentage of paraffin and some sulphate of ammonia. In spite of American competition, most of the manufacturers engaged in the shale-oil industry, by careful management, have been able to make a good profit on their investments for several years past.

In the following table is given the quantity and value of oil shale produced in Great Britain during the years 1897, 1898, and 1899:

Quantity and value of oil shale produced in Great Britain in 1897, 1898, and 1899.

Country.	1897.		1898.		1899.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*		*Tons.*	
England	10,568	£2,642	2,975	£744	200	£50
Scotland	2,211,617	552,904	2,133,409	533,352	2,208,249	552,062
Wales	1,560	390	1,609	402	2,375	891
Total	2,223,745	555,936	2,137,993	534,498	2,210,824	553,003

The quantity and value of oil shale produced in Great Britain from 1873 to 1900 are shown in the following table:

Production of oil shale in the United Kingdom from 1873 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Statute tons.			*Statute tons.*	
1873	524,095	£262,047	1887	1,411,378	£355,085
1874	362,747	181,373	1888	2,076,469	519,074
1875	437,774	218,887	1889	2,014,860	503,715
1876	603,538	301,769	1890	2,212,250	608,369
1877	801,701	400,850	1891	2,361,119	707,177
1878	788,704	394,352	1892	2,089,937	522,484
1879	783,748	391,824	1893	1,956,520	489,130
1880	837,805	418,902	1894	1,986,385	496,596
1881	958,255	479,127	1895	2,246,865	561,716
1882	1,030,915	310,685	1896	2,419,525	604,881
1883	1,167,943	299,676	1897	2,223,745	555,936
1884	1,518,871	386,780	1898	2,137,993	534,498
1885	1,770,413	447,302	1899	2,210,824	553,003
1886	1,728,503	435,963	1900	2,282,221	....

DUTCH EAST INDIES—SUMATRA, JAVA, AND BORNEO.

SUMATRA.

In the absence of a report of the production of crude petroleum in Sumatra the refined production will be considered. The entire output of refined petroleum from the Royal Langkat, the Palembang, and the Moeara Enim Company is placed at 38,324,960 gallons, or 912,500 barrels. If this represents 60 per cent of the crude production, the amount of crude produced would equal 1,520,000 barrels.

The production of refined oils showed a decided gain in 1900, amounting to nearly 60 per cent over that of 1899, but was only 73 per cent of what it was in 1898, in which year the production was greatest. This scarcity of crude petroleum, due to the failure of some of the old wells, has caused search to be made for other fields of petroleum, and has resulted in the finding of some new sections, where paying wells have been secured.

The Royal Dutch Company, of Langkat, have been particularly unfortunate in the loss of production in the original field near Langkat, and has been prospecting for petroleum in the district of Bajan with some success. This region, however, is many miles from the two large refineries at Langkat. This company has also developed a producing field in the district of Perlak, and has connected it by pipe line with its refineries.

The production of the Royal Dutch Company from its two refineries was 5,555,000 cases in 1898, 1,805,000 cases in 1899, and only 1,350,400 cases in 1900. The Sumatra Palembang Company has been very actively searching for new fields of crude petroleum. They secured five producing wells, four of which were spouters, as the result of a large number of trial wells in different localities. This company produced 694,000 cases of refined petroleum in 1899 and 797,000 cases in 1900. The Moeara Enim Company has drilled three wells at from 450 to 600 feet that were spouters; also eight wells that were from 600 to 700 feet in depth that gave a production of 3,500 barrels per day. The whole production of this company is about 6,500 barrels per day. The production of this company in 1900 was 1,690,200 cases of refined petroleum. This was the largest output of any of the refineries. The development of new fields of petroleum means large outlays of money, as after they have been found they must be connected with the refineries by pipe lines or tank vessels.

We are indebted to Mr. Adrian Stoop, of the Dordtsche Petroleum Maatschappij, for the following table, giving the production of refined petroleum in Sumatra from 1892 to 1900, inclusive:

Production of refined petroleum in Sumatra, 1892 to 1900.

Year.	Production.		
	Cases.	Liters.	Gallons.
1892	144,703	5,209,308	1,376,303
1893	401,370	14,449,320	3,817,149
1894	1,042,943	37,545,948	9,919,670
1895	1,334,249	48,032,964	12,690,347
1896	1,851,512	66,654,432	17,610,154
1897	4,564,987	164,339,532	43,418,635
1898	5,553,600	199,929,600	52,821,560
1899	2,543,050	91,549,800	24,187,530
1900	3,837,600	145,061,280	38,324,960

1 case=37.8 liters=9.9867 gallons in round numbers.
1 liter=61.02 cubic inches.
1 gallon=231 cubic inches.
1 quart=57.75 cubic inches.

In the following table are given statistics of the production of refined petroleum in Sumatra, by districts and months, in cases, 1898, 1899, and 1900:

Production of refined petroleum in Sumatra.

[Cases.]

Month.	Royal Langkat.			Palembang.		Moeara Enim.
	1898.	1899.	1900.	1899.	1900.	1900.
January	520,000	205,000	137,000	43,500	96,500	
February	580,000	170,500	106,500	49,000	84,000	90,000
March	710,000	171,000	111,000	31,000	96,000	
April	740,000	160,000	109,900	58,000	73,500	
May	839,000	149,500	106,000	56,000	79,000	400,800
June	471,000	137,000	100,000	49,000	76,000	
July	382,500	127,500	90,000	42,000	59,000	
August	300,000	129,000	92,500	75,000	54,000	633,700
September	270,000	133,500	82,500	68,000	47,000	
October	250,000	129,000	86,500	67,000	38,000	
November	270,500	128,500	143,000	63,000	44,000	565,700
December	221,500	164,500	185,500	92,500	50,000	
Total	5,555,000	1,805,000	1,350,400	694,000	797,000	1,690,200

The following table is compiled and the translation made by Mr. Theodore H. Johnson, of Washington, D. C., from the official governmental report of the Netherlands:

Production of refined petroleum, by districts, fiscal year 1899–1900.

District.	Cases. (*a*)	Liters.	Gallons.
Palembang	694,000	26,233,200	6,930,832
Langkat:			
Telaga Said	1,798,053	67,966,403	17,950,678
Boekit Mas	8,800	333,640	88,148
Boeloe Telang	166,878	6,307,988	1,666,575
Boekit Tinggi	24,381	921,602	243,488
Total	2,692,112	101,762,833	26,879,721

(*a*) 1 case equals 37.8 liters.

During 1899 thirty-one new wells were drilled, of which five are producing.

JAVA.

Sumatra, Java, and a portion of Borneo belong to Holland, forming the Dutch East Indies. The statistics of the production in 1900 have not been secured. The production up to 1899 has very slightly increased since 1896.

One of the peculiarities of the petroleum produced in Java is that a large portion of it contains a high percentage of paraffin, from which candles are manufactured. The residency of Rembang continues to produce about 60 per cent of the production.

The producing companies are the Dordtsche Petroleum Maatschappij and the Maatschappij Exploitatie der Petroleum Conzessie Tinawoen. The latter produces the petroleum and the former is the refining company, owning three large refineries at Soerabaya, Ngareng-Palora, and Samarang. There are three other refineries that do not operate extensively. The most of the wells flow naturally. They are so numerous that they are not taxed to any extent. Most of them have been drilled by the Canadian system. The production in 1899 was 25,839,200 gallons, or 615,224 barrels, that of Sumatra being about 2½ times as large.

Production of crude petroleum in Java, 1896, 1897, 1898, and 1899, by districts, in liters and gallons.

Districts.	1896.		1897.	
	Liters.	Gallons.	Liters.	Gallons.
Residency of Rembang:				
Panolan	12,532,070	3,310,973	27,595,979	7,290,879
Tinawoen	10,418,959	2,752,689	19,550,504	5,165,259
Total	22,951,029	6,063,662	47,146,483	12,456,138
Residency of Soerabaya:				
Djabakotta	21,759,028	5,748,735	6,270,545	1,656,683
De Twaalf Dessa's			18,393,433	4,859,559
Lidah Koelon			14,705,675	3,885,251
Goenong Sari	22,896	6,049	21,000	5,548
Total	21,781,924	5,754,784	39,390,653	10,407,041
Grand total	44,732,953	11,818,446	86,537,136	22,863,179

Districts.	1898.		1899.	
	Liters.	Gallons.	Liters.	Gallons.
Residency of Rembang:				
Panolan	34,473,474	9,107,919	28,494,958	7,528,390
Tinawoen	23,118,014	6,107,797	33,712,928	8,906,982
Total	57,591,488	15,215,716	62,207,886	16,435,372
Residency of Samarang:				
Troeko	22,680	5,992	*a* 1,183,000	*a* 312,550
Residency of Soerabaya:				
Djabakotta	5,250,000	1,387,054	5,840,000	1,542,933
De Twaalf Dessa's	12,477,238	3,296,496	8,618,598	2,277,040
Lidah Koelon	10,897,653	2,879,169	19,951,890	5,271,305
Metatoe	6,425,000	1,697,490	(*b*)	(*b*)
Total	35,049,891	9,260,209	34,410,488	9,091,278
Grand total	92,664,059	24,481,917	97,801,374	25,839,200

a Of this amount 429,368 liters, or 113,439 gallons, were lost through leakage, fire, etc.
b Not given.

To reduce liters to gallons divide by 3.785 or multiply by 0.2642.
To reduce gallons to liters multiply by 3.785 or divide by 0.2642.

The production of petroleum in Java for eight years past is shown in the following table in gallons:

Production of crude petroleum in Java from 1893 to 1899.

Year.	Gallons.	Year.	Gallons.
1893	16,800,000	1897	22,857,631
1894	7,056,000	1898	24,481,917
1895	12,333,468	1899	25,839,200
1896	21,211,203		

In the residency of Soerabaya 63 wells were drilled during 1899, distributed as follows: In the district of Djabakotta, De Twaalf Dessa's, and Metatoe, 17, 19, and 20, respectively, of which 5, 17, and 7 proved to be producing in more or less degree. In the district of Lidah Koelon 7 wells were drilled, all of which proved to be successful. In the residency of Rembang a gushing well has been discovered near Semanggi. It will be connected with the refinery at Ngareng.

PHILIPPINE ISLANDS.

The existence of petroleum on most of these islands has been known for many years. It has been produced in a small way by the natives under conditions that are unknown elsewhere. Since the occupation by the Americans numerous efforts have been made in a small way to secure it in merchantable quantities. So far as known no well-equipped expeditions have been organized to test the territory. The position of these islands would indicate that large paying deposits of petroleum would be found, situated as they are between the Dutch East India developments on the island on the south and the island of Formosa on the north, as well as from the general similarity of the geological conditions which exist. Petroleum is known to be found on the islands of Panay, Leyte, Guimaras, Negros, Bohol, Mindanao, and Cebu.

Most of the refined petroleum used in this country is imported from Russia and the near-by islands of the Dutch East Indies. Outside of the seaport towns, the extreme poverty of the natives, together with the substitution of vegetable oils, has kept down the consumption of mineral oils.

The following table gives the exports to the Philippine Islands for the year ending June 30, 1900:

Exports of petroleum from the United States to the Philippine Islands in the year ending June 30, 1900.

Kind of oil.	Quantity.	Value.
	Gallons.	
Naphthas	500	$147
Illuminating oil	100	12
Lubricating oil	29,261	7,762
Total	29,861	7,921

JAPAN.

The production for 1900 (in the absence of official figures) has been estimated to be 1,440,000 barrels or 57,000,000 gallons in Japan, as compared with 800,000 barrels or 32,000,000 gallons in 1899, an increase of 80 per cent. The daily production of the several important fields (lesser districts) has been estimated as follows:

Estimated daily production of crude petroleum in Japan.

Field.	Barrels.
1. Nagamine and Kamada (new field)	2,400
2. Nagasaki and Mitsu (the eastern field)	1,000
3. Minor fields and provinces	600
Total	4,000

The total petroleum imported into Japan from all sources in 1900 was 81,220,000 gallons, equal to 1,933,800 barrels. The production of the lighter oils in Japan amounted approximately to 30 per cent of that imported from all sources in 1900.

Production of petroleum in Japan, 1875 to 1898, inclusive.

Year.	Production.				Value received for crude and refined sold.	
	Crude.		Refined. (*a*)			
	Koku. (*b*)	Gallons.	Koku. (*b*)	Gallons.	Yen. (*c*)	Dollars.
1875	4,830	191,751				
1876	8,155	323,753				
1877	10,114	401,526				
1878	18,920	751,124				
1879	24,816	985,195				
1880	26,974	1,070,868				
1881	17,721	703,524				
1882	16,450	653,065				
1883	21,659	859,862				
1884	29,541	1,172,778	6,215	246,735	107,964	92,633
1885	30,931	1,227,961	7,326	290,842	98,496	84,510
1886	40,113	1,592,486	13,487	535,434	136,911	110,898
1887	30,304	1,203,069	8,830	350,551	126,298	99,018
1888	39,605	1,572,318	4,511	179,087	138,602	104,367
1889	55,871	2,218,079	7,097	281,751	250,977	184,217
1890	54,399	2,159,640	11,180	443,846	221,478	166,551
1891	55,983	2,222,525	13,012	516,576	207,029	172,041
1892	72,893	2,893,852	13,431	533,211	207,245	154,398
1893	83,644	3,320,667	10,941	434,358	178,290	117,850
1894	138,077	5,481,657	13,980	555,006	245,697	136,608
1895	149,497	5,935,031	17,241	684,468	351,607	172,639
1896	208,500	8,277,450	(*d*)	(*d*)	(*d*)	(*d*)
1897	231,221	9,179,474	(*d*)	(*d*)	468,546	239,427
1898	280,764	11,146,331	(*d*)	(*d*)	(*d*)	(*d*)

a This production of refined oil is not the whole amount of refined oil made in Japan, but is only that portion which is refined by those who produce crude oil and refine it themselves. Most of the crude oil goes into the hands of others, by whom it is refined, and as yet there is no means of ascertaining this quantity.

b 1 koku = 39.7 English gallons = 1.1 United States barrels.

c Value of yen on January 1, 1885, in United States money, 85.8 cents; 1886, 81 cents; 1887, 78.4 cents; 1888, 75.3 cents; 1889, 73.4 cents; 1890, 75.2 cents; 1891, 83.1 cents; 1892, 74.5 cents; 1893, 66.1 cents; 1894, 55.6 cents; 1895, 49.1 cents; 1896, 52.9 cents; 1897, 51.1 cents; 1898, 49.8 cents; 1899, 49.8 cents; 1900, 49.8 cents.

d Not ascertained.

CHINA.

Exports of refined mineral oil from the United States to China, 1890 to 1900.

Year ending June 30—	Naphthas, including all lighter products of distillation.		Illuminating.		Lubricating and heavy paraffin oil.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Gallons.		*Gallons.*		*Gallons.*	
1890			13,072,000	$1,251,201	2,669	$1,888
1891			27,160,660	2,586,321	20,518	5,339
1892			17,370,600	1,249,215	3,367	1,810
1893			27,874,230	1,808,026	3,825	1,411
1894			40,377,296	2,435,794	9,793	2,842
1895			18,022,800	1,175,173	20,675	6,037
1896			25,694,890	2,158,800	48,322	8,178
1897	250	$40	42,516,120	3,352,935	110,814	18,962
1898	1,250	125	44,324,344	2,839,345	197,958	25,625
1899	1,000	150	22,683,425	1,791,108	185,368	25,307
1900	200	39	32,775,880	3,266,395	480,412	68,616

There was a large increase in the quantity of refined petroleum shipped to China in 1900 over that of 1898.

Exports of refined mineral oil from the United States to Hongkong, 1890 to 1900.

Year ending June 30—	Illuminating.		Lubricating.	
	Quantity.	Value.	Quantity.	Value.
	Gallons.		*Gallons.*	
1890	11,150,220	$1,137,255		
1891	10,814,630	1,040,208		$1,191
1892	16,529,790	1,304,380		347
1893	12,758,820	840,211		2,102
1894	16,888,820	1,019,667		4,406
1895	10,595,610	819,276		7,884
1896	10,499,000	876,050		7,683
1897	14,977,050	1,146,038		11,012
1898	15,637,420	966,517		25,335
1899	18,095,260	1,380,799		
1900	19,181,230	1,952,495	255,024	32,008

Quantity and value of kerosene oil imported into the Chinese Empire, 1886 to 1899.

Year.	American.		Russian.	
	Gallons.	Haikwan taels. (a)	Gallons.	Haikwan taels. (a)
1886	(b)	(b)	(b)	(b)
1887	(b)	(b)	(b)	(b)
1888	(b)	(b)	(b)	(b)
1889	14,999,942	2,178,722	5,655,471	696,768
1890	23,591,113	3,262,049	7,237,611	830,825
1891	39,348,477	4,308,839	10,000,902	958,212
1892	31,884,013	3,330,116	8,649,318	872,795
1893	36,720,382	4,086,661	13,286,198	1,484,534
1894	51,670,853	5,905,228	17,500,283	2,036,175
1895	23,055,940	3,098,214	26,566,979	3,195,106
1896	33,520,649	4,833,573	28,285,000	3,521,873
1897	48,212,505	6,935,155	36,924,125	4,618,148
1898	50,084,015	6,797,922	19,926,246	2,202,244
1899	40,724,989	6,501,789	35,695,116	4,891,380

Year.	Sumatran.		Total.	
	Gallons.	Haikwan taels. (a)	Gallons.	Haikwan taels. (a)
1886			23,038,101	2,211,000
1887			12,015,135	1,365,000
1888			16,613,090	2,219,332
1889			20,655,413	2,875,490
1890			30,828,724	4,092,874
1891			49,349,379	5,267,051
1892			40,533,331	4,202,911
1893			50,006,580	5,571,195
1894	534,280	63,911	69,705,416	8,005,314
1895	2,395,035	321,977	52,017,954	6,615,297
1896	5,151,873	727,875	66,957,522	9,083,321
1897	14,212,278	1,745,833	99,348,908	13,299,136
1898	26,871,865	2,914,533	96,882,126	11,914,699
1899	11,993,202	1,608,474	88,413,307	13,001,643

a Value of Haikwan tael on January 1, 1888, in United States money, \$1.151; 1890, \$1.148; 1891, \$1.27; 1892, \$1.137; 1893, \$1.01; 1894, \$0.849; 1895, \$0.749; 1896, \$0.808; 1897, \$0.78; 1898, \$0.697; 1899, \$0.722; 1900, \$0.742.

b Not ascertained.

One tael = $1\frac{1}{3}$ ounces of silver (troy).

Imports of case oil to China from America and Russia in 1899 and 1900.

From—	1899.	1900.
	Cases.	*Cases.*
America	4,470,854	4,340,383
Russia	2,652,975	1,336,035

Quantity of kerosene oil imported at port of Chefoo, 1892 to 1899.

[Gallons.]

Year.	America.	Russia.	Sumatra.
1892	1,056,580		
1893	2,255,870		
1894	1,833,790		
1895	1,967,900		
1896	2,388,250	610,000	
1897	5,281,060	577,800	
1898	4,500,060	109,940	142,000
1899	3,342,890	401,940	None.

Imports of kerosene oil at port of Canton, 1898 and 1899.

From—	1898.	1899.
	Gallons.	*Gallons.*
America	1,011,440	3,026,600
Russia	1,419,630	3,237,565
Sumatra	4,005,055	1,448,015
Total	6,436,125	7,712,180

To show the effect of the Boxer uprising in China (which broke out in June of 1900) on the petroleum trade with America, we give the following statement of imports to the ports of Chefoo, Tientsin, and Niuchwang for the quarters ending June 30, 1899 and 1900:

Imports of kerosene oil into the ports of Chefoo, Tientsin, and Niuchwang for the quarters ending June 30 and September 30, 1899 and 1900.

Port.	June 30—		September 30—	
	1899.	1900.	1899.	1900.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*
Chefoo	994,040	2,214,930	857,100	5,000
Tientsin	585,000	713,600	588,000	20,000
Niuchwang	760,000	616,000	658,000	25,000
Total	2,339,040	3,544,530	2,103,100	50,000

The quantity of kerosene oil imported to these three ports from Russia for quarter ending September 30, 1899 and 1900, is reported as follows:

1899	gallons..	1,581,000
1900	do....	15,000

INDIA.

The tables show a large increase in the production in the Burma field, which has for several years produced close to 98 per cent of the total output.

The entire production for 1900 was 1,078,264 barrels, or 37,729,211 imperial gallons, as compared with 940,970 barrels, or 32,934,007 imperial gallons. Without the complete figures a close estimate of the total imports of refined petroleum into India has been placed at 75,000,000 imperial gallons in 1899, which paid a duty of 1d. per gallon, of which the United States furnished 58 per cent, as compared with 42 per cent furnished by Russia.

The following table gives the production of petroleum in India from 1889 to 1900 in imperial gallons reduced to barrels of 42 gallons:

Production of petroleum in India from 1889 to 1900.

Year.	Production.	
	Imperial gallons.	Barrels (42 U. S. gallons).
1889	3,298,737	94,250
1890	4,931,093	140,888
1891	6,136,495	175,328
1892	8,725,331	249,295
1893	10,359,812	295,994
1894	11,450,906	327,169
1895	13,013,990	371,828
1896	15,057,094	430,203
1897	19,128,828	546,538
1898	18,973,878	542,110
1899	32,934,007	940,971
1900	37,729,211	1,078,264

PERSIA.

Petroleum fields discovered in Persia.—According to Mining and Metallurgy, the Belgian minister at Teheran, the capital of the Shah's Empire, reports that an extensive oil field has been discovered in the neighborhood of Talish Doulab, a village situated near Enzeli, on the Caspian Sea. As soon as the attention of the Persian Government was called to this discovery, the Shah ordered one of his ministers to investigate the matter, and it was found that these fields had already been exploited by natives before the Russo-Persian war, in the beginning of the nineteenth century. After the war, however, work was abandoned. The Belgian minister says that the field is about 5 miles in length and 1 mile wide. The oil is reported to be of the same quality as that of Baku. The Persian minister of mines has recommended the formation of a Government society for the exploitation of this field.

AFRICA: EGYPT AND ALGERIA.

Exports of refined petroleum from the United States to Egypt, Turkey in Africa, year ending June 30, 1900.

Kind of oil.	Quantity.	Value.
	Gallons.	
Illuminating	746,600	$78,480
Lubricating	28,379	8,503
Total	774,979	86,983

During the year 1899 there were imported into Algeria 1,121,220 pounds of petroleum and mineral oil.

NATURAL GAS.

By F. H. Oliphant.

INTRODUCTION.

No other fuel, natural or artificial, has the value and convenience of natural gas. All other fuels require a large amount of labor to fit them for combustion, and most of them must be converted into gaseous form before they can be consumed. Natural gas, however, has reached that form, and is in condition to take to itself the amount of oxygen necessary for combustion. The great natural reservoirs require only to be pierced by the drill when the gas may be brought to the surface, where it is at once ready to be used as fuel or to become a direct source of power in the gas engine. No preparation is necessary for its combustion and no residue is left.

It is easily distributed in pipes to points of consumption many miles distant, and no known method for the distribution of power equals in economy that of the transportation of a gaseous fuel in pipes.

The great natural reservoirs of this ideal fuel, so far as known, are found on the northwestern flank of the Appalachian Mountains, extending from northern-central New York to central Tennessee, and on the summit of the great Cincinnati arch in northwestern Ohio and northern Indiana. It is more or less associated with the pools of petroleum found within these areas. These two fields furnish about 97 per cent of all the natural gas produced in the United States. Outside of these fields there are smaller fields of natural gas in Kansas, Colorado, California, Illinois, Missouri, Texas, and South Dakota. The original pools have all suffered great depletion, as a vast quantity of gas has been allowed to escape into the air in the early development, and when first used it was consumed in the most extravagant manner. Only after the visible supply had been greatly lessened was it realized that the proportion already taken out of the reservoirs was a large percentage of the original volume.

The introduction of the meter and other appliances for the more careful manipulation of gas wells and pipe lines has brought about a large saving in the amount of gas required to produce the same heating effect. The value of natural gas sold in the United States in 1900 exceeded that for any previous year, although the quantity was less than was sold several years after it was largely introduced, when the price was very low. The lowest values recorded were in the years 1895, 1896, and 1897, when it was slightly over $13,000,000 a year. Since 1897 the price and quantity have both increased. The value of natural gas consumed in 1900 was $23,606,463, as compared with $20,074,873 in 1899, a gain of $3,531,590, equal to 17½ per cent. Allowing 18½ cents per thousand as the average price at which it was sold in 1900, the amount sold would represent, in round numbers, 127,602,500,000 cubic feet. This quantity would fill a vessel having an area of 1 square mile to a height of 4,580 feet if it were possible to have the same density throughout. If this amount of gas was burned in an economical way it would replace 6,380,000 tons of coal.

The total number of wells producing at the close of 1900 was 10,506, as compared with 9,738 producing wells at the close of 1899, a gain of 768 wells. There were 991 wells abandoned and 359 dry holes or non-producing wells drilled in 1900. There was 11,570,204 feet of pipe line 2 inches and larger, amounting to 2,191 miles, completed in 1900. The total length of all natural gas mains of 2 inches and larger reported in the United States at the close of 1900 was 21,048 miles.

The largest sized pipe in use is 36 inches in diameter.

THE GAS FIELDS.

The known area of natural gas in Pennsylvania has been increased during the year 1900 by the extension of the "Bayard sand" pool from near the State line of West Virginia to a point several miles north of Waynesburg, in Greene County, Pa., many miles of gas-producing territory being thus added to the field in this portion of the State. This "Bayard sand" is found at a distance of 2,410 feet below the Pittsburg coal, none of the older wells having gone deep enough to find it. Wells in this sand have a rock pressure of over 1,000 pounds to the square inch and a volume which ranges from 10,000,000 to 20,000,000 cubic feet in twenty-four hours. A very large gas well was found near Taylorstown by the Forest Oil Company during the year. In Lewis and Harrison counties, W. Va., a number of powerful gas wells were developed in the Gordon and Fifth sands. Outside of the areas named there has been a general decline in all of the fields in Pennsylvania, West Virginia, and New York, although several of the gas companies centering at Pittsburg have arranged to use the gas found in these far-off high-pressure districts when the demand is light, and thus save the gas in the near-by fields until demands upon them shall be greater.

The northwestern Ohio gas field has gradually declined in pressure until few wells show any whatever. One after another of its wells has been sealed up by salt water. It still supplies some gas to the town of Findlay, and a few wells are still used in connection with the gas compressors that supply Toledo, Ohio. The Lancaster field in Ohio showed a rapid decline during 1900. The original pressure four years ago was 750 pounds; now, owing to the very heavy drain on this field, it is less than 300 pounds.

The original rock pressure in the Indiana field in 1886 was 325 pounds to the square inch. At the close of 1900 it averaged 110 pounds, a pressure which represents only 34 per cent of the total original amount sealed up in the rock. The close proximity of the salt water in this rock to the gas pays will prevent the complete exhaustion of the gas over a large area of this field. The great connected area of this field operates to hold up the pressure to some extent, however, or it would have been exhausted long ago in many localities. The consumption is greater in this State than in any other, although the amount received from the sale of gas is much less than that in Pennsylvania, owing to the comparatively low price at which it is marketed. The declining pressure in nearly all of the fields has so lessened the capacity of the lines of the gas companies that they would be unable to deliver by natural pressure their former supply of gas. Their revenues would therefore be very much decreased by the diminished pressure, but to overcome this nearly all of the large natural gas companies have found it necessary to add to their plants powerful gas compressors. These are located at points where the supply of gas can be concentrated in the neighborhood of the wells. These compressors are driven by steam generated by natural gas or by gas engines in which natural gas is exploded. Many of these compressor plants are models of the highest mechanical efficiency, some of the individual compressors developing as much as 1,000 horsepower and weighing 250 tons complete. The more recent ones are so constructed as to use natural gas engines for motive power instead of steam engines. By operating compressors with the gas engine there is a saving of 40 to 50 per cent, or about one-half, in the amount of gas used as compared with the method of consuming it under boilers supplying double-expansion engines. One of these gas-compressor plants, using natural gas as a motive power, built by the National Transit Company, at Oil City, Pa., is in use at Halsey Station, McKean County, Pa.

This gas compressor plant consists of four horizontal gas cylinders set tandem, two on each side of the main shaft, having a diameter of 25 inches and a stroke of 4 feet. The main shaft carries two 13-foot fly wheels and connects with four gas compressing cylinders, two on each side of the main shaft. Two of these are high-stage compressors and two low-stage compressors, the former being 15 inches in diameter and the latter 31 inches in diameter; the stroke is 2 feet. The main dimensions are: Length, 75 feet; breadth at fly wheel 18 feet. Mr. H. E. Hastings and Mr. E. D. Parker, of Cornell University, recently made the following test of this compressor:

The engine works on the Otto cycle—that is, an impulse every two revolutions for each cylinder—and as there are four cylinders the crank receives an impulse every stroke. The compressor is double acting. The cylinders of the compressor and engine are both well jacketed. A sufficient quantity of water is sent around them to keep the discharge water at about 110°. A small amount of this water is sprayed into the opening of the exhaust to keep the exhaust valve cool.

The gas comes in from the low-pressure wells at varying pressures and is cut down by regulators to the required pressure before being taken into the compressors. After leaving the regulators the gas goes into the top of the low-stage compressors and is there compressed to about 55 pounds. From there the pipes lead into the intercooler, where the gas is cooled to nearly the temperature of the entering gas. After it leaves the intercooler it passes to the high stage, where it is compressed, depending upon the load, from about 50 to between 250 and 310 pounds. The intercooler is a pond in which there are 16 lengths of 8-inch pipe, about 200 feet long, over which water is continually flowing.

The power developed by the engine was measured by Thompson indicators on the compressors. As the load was constant, the same conditions could be maintained during the run. The jacket water was measured by an 8-inch weir, and the temperature of the water was taken as it passed over the weir. The water sprayed into the exhaust could not be measured, and it was of so small an amount that it could be neglected, the heat carried off in this way being taken in with radiation and loss. The gas supplied to the engine was measured by a Westinghouse wet meter of 10,000,000 cubic feet capacity.

The calorific value of the gas and the specific heat of the exhaust gases were found from samples taken and analyzed by the chemical department of the university. Taking Stilman on Engineering Chemistry as an authority for the heating value of the various compounds, a value of 1,175.4 B. T. U. was obtained as the thermal equivalent of a cubic foot of gas. This high value for even natural gas is due to the large per cent of ethane (C_2H_6) found in the sample. Three runs were made at different loads of four hours each, but by reason of an accident the engine was shut down before the last run was completed. The method of varying the load was by varying the pressure of the gas taken into the low-stage compressors.

Test of efficiency of gas compressors, Halsey Station, Pennsylvania.

	Run.		
	1.	2.	3.
Intake pressure..........pounds..	1	2	atmos.
Discharge..........do....	262.4	275.7	266.3
Standard gas per hour in cubic feet..........	5,620	6,053	5,425
Jacket water per hour..........pounds..	22,970	37,610	36,670
Jacket water range temp. comp. F..........	9	5	5
Jacket water range temp. engine F..........	89	69	60
Temperature of exhaust:			
Water off..........	702	725	640
Water on..........	465	507	410
Indicated M. E. P.:			
Cylinder 1..........	80.7	87.2	80.2
Cylinder 2..........	97.02	104.3	94.04

Test of efficiency of gas compressors, Halsey Station, Pennsylvania—Continued.

	Run. 1.	Run. 2.	Run. 3.
Indicated M. E. P.—Continued.			
Cylinder 3	91.5	92.2	87.8
Cylinder 4	97.7	102.8	98.9
Indicated H. P.:			
Cylinder 1	164.4	177.8	163.8
Cylinder 2	197.7	211.9	192
Cylinder 3	186.2	202	179.3
Cylinder 4	199.2	209.4	201.6
Total	747.5	801.1	736.7
Developed H. P. (comp.):			
Cylinder 1	155.2	176.9	157.1
Cylinder 2	156.1	171.9	149.5
Cylinder 3	152.8	166.3	146.7
Cylinder 4	139.8	150.5	141.2
Total	603.9	665.6	594.5
Friction H. P.	143.6	135.5	142.2
Mechanical efficiency per cent	80.8	83.08	80.7
Thermal efficiency do	28.8	28.65	29.4
Absolute efficiency do	23.3	23.8	23.7
Cubic feet gas per I. H. P. per hour	7.52	7.55	7.37
Cubic feet gas per D. H. P. per hour	9.31	9.06	9.13
Pounds jacket water per I. H. P. hour	30.73	46.95	49.77
Pounds jacket water per D. H. P. hour	38.03	56.50	61.68
Cubic feet gas pumped per hour	169,650	184,558	158,271
Cubic feet gas pumped per hour per cubic foot used	30.2	30.5	29.8

HEAT BALANCE.

	Run. 1.		Run. 2.		Run. 3.	
	B. T. U.	Per cent.	B. T. U.	Per cent.	B. T. U.	Per cent.
Supplied per hour	6,607,000	100	7,115,000	100	6,377,000	100
Absorbed per hour by jacket water	2,051,000	31	2,606,000	36.6	2,237,000	35.1
Exhausted	835,000	12.6	916,000	12.9	762,000	11.9
Thermal equivalent of I. H. P. hours	1,902,000	28.8	2,039,000	28.7	1,875,000	29.4
Radiation and loss	1,819,000	27.6	1,554,000	21.8	1,503,000	23.6

Evaporative test of natural gas from wells at Halsey, McKean County, Pa., consumed in Klein burners under an 80-horsepower boiler at Tarport, Pa., December, 1900.

Time.	Gas.	Water.	Pressure of steam.	Temperature of feed water.
	Feet.	*Pounds.*		*Degrees.*
8 to 9 a. m	6,980	6,584	80	36
9 to 10 a. m	7,280	6,572	80	35
10 to 11 a. m	7,440	6,983	80	35
11 a. m. to 12 m	7,630	7,166	80	35
12 m. to 1 p. m	7,190	6,780	75	36
1 to 2 p. m	6,690	6,311	80	36
2 to 3 p. m	6,860	6,440	80	36
3 to 4 p. m	6,950	6,756	80	36
4 to 5 p. m	6,910	6,340	80	36
5 to 6 p. m	6,880	6,869	80	30
	70,810	66,801	....	....

From and at 212° = 81390 = (66801 × 1.2185).
.87 foot of gas to 1 pound of water.
1 foot of gas to 1.15 pounds of water.
500° stack temperature.
0.4 inch of mercury taken as standard pressure.
Single boiler, 5 feet diameter, 14 feet long, with 82 3-inch tubes, built in brick setting.

VALUE OF NATURAL-GAS PRODUCTION.

In the following table is given the approximate value of natural gas produced in the United States from 1888 to 1900, by States:

Approximate value of natural gas produced in the United States from 1888 to 1900.

State.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Arkansas	....	$375	(*a*)	$250	$100	$100	$100
California	....	12,680	$33,000	30,000	55,000	62,000	60,350
Colorado	....	....	....	....	....	....	12,000
Illinois	....	10,615	6,000	6,000	12,988	14,000	15,000
Indiana	$1,320,000	2,075,702	2,302,500	3,942,500	4,716,000	5,718,000	5,437,000
Kansas	....	15,873	12,000	5,500	40,795	50,000	86,600
Kentucky	....	2,580	30,000	38,993	43,175	68,500	89,200
Missouri	....	35,687	10,500	1,500	3,775	2,100	4,500
New York	332,500	530,026	552,000	280,000	216,000	210,000	249,000
Ohio	1,500,000	5,215,669	4,684,300	3,076,325	2,136,000	1,510,000	1,276,100
Pennsylvania	19,282,375	11,593,989	9,551,025	7,834,016	7,376,281	6,488,000	6,279,000
South Dakota	....	25	(*a*)	....	....	....	....
Texas	....	1,728	(*a*)	....	100	50	50
Utah	....	150	(*a*)	....	....	500	500
West Virginia	120,000	12,000	5,400	35,000	500	123,000	395,000
Other States	75,000	1,600,000	1,600,000	250,000	200,000	100,000	50,000
Total	22,629,875	21,107,099	18,792,725	15,500,084	14,800,714	14,346,250	*b* 13,954,400

a Total value of gas produced in Arkansas, South Dakota, Texas, and Utah, $6,000.
b Does not include value of gas produced in Canada and consumed in the United States.

Approximate value of natural gas produced in the United States, etc.—Continued.

State.	1895.	1896.	1897.	1898.	1899.	1900.
Arkansas	$100	$60	$40			
California	55,000	55,682	50,000	$65,337	$86,891	$79,083
Colorado	7,000	4,500	4,000	3,300	1,480	1,800
Illinois	7,500	6,375	5,000	2,498	2,067	1,700
Indiana	5,203,200	*a* 5,043,635	*a* 5,009,208	*b* 5,060,969	*c* 6,680,370	*d* 7,254,539
Kansas	112,400	124,750	105,700	174,640	332,592	356,900
Kentucky	98,700	99,000	90,000	103,133	125,745	*e* 194,032
Missouri	3,500	1,500	500	145	290	547
New York	241,530	256,000	200,076	229,078	294,593	363,367
Ohio	1,255,700	1,172,400	1,171,777	1,488,308	1,866,271	*f* 2,178,234
Pennsylvania	5,852,000	*g* 5,528,610	*h* 6,242,543	*i* 6,806,742	*j* 8,337,210	*k* 10,187,412
South Dakota					3,500	9,817
Texas	20			765	8,000	20,000
Utah	20,000	20,000	15,050	7,875		
West Virginia	100,000	*l* 640,000	*m* 912,528	*n* 1,334,023	*o* 2,335,864	*p* 2,959,032
Other States	50,000	50,000	20,000	20,000		
Total	*q* 13,006,650	*q* 13,002,512	*q* 13,826,422	*q* 15,296,813	*q* 20,074,873	*q* 23,606,463

a Includes value of some gas produced in Indiana but consumed in Ohio and Illinois.
b Includes $1,098,568 worth of gas produced in Indiana but consumed in Ohio and Illinois.
c Includes $1,807,000 worth of gas produced in Indiana but consumed in Ohio and Illinois.
d Includes $1,842,232 worth of gas produced in Indiana but consumed in Ohio and Illinois.
e Includes $92,211 worth of gas produced in Kentucky but consumed in Ohio and West Virginia.
f Includes $11,976 worth of gas produced in Ohio but consumed in West Virginia.
g Includes $912,000 worth of gas produced in Pennsylvania but consumed in New York and Ohio.
h Includes $999,882 worth of gas produced in Pennsylvania but consumed in New York, Ohio, and West Virginia.
i Includes $1,242,265 worth of gas produced in Pennsylvania but consumed in New York, Ohio, and West Virginia.
j Includes $1,404,790 worth of gas produced in Pennsylvania but consumed in New York, Ohio, and West Virginia.
k Includes $1,595,469 worth of gas produced in Pennsylvania but consumed in New York, Ohio, and West Virginia.
l Includes $126,000 worth of gas produced in West Virginia but consumed in Pennsylvania and Ohio.
m Includes $269,336 worth of gas produced in West Virginia but consumed in Pennsylvania and Ohio.
n Includes $589,438 worth of gas produced in West Virginia but consumed in Pennsylvania and Ohio.
o Includes $1,212,233 worth of gas produced in West Virginia but consumed in Pennsylvania and Ohio.
p Includes $1,682,971 worth of gas produced in West Virginia but consumed in Pennsylvania and Ohio.
q Does not include value of gas produced in Canada and consumed in the United States.

The above table is conspicuous for the showing of a general increase in the value of natural gas produced in nearly all of the fields in the United States during 1900. There has been an increase in the price of natural gas sold amounting to about 5 per cent, yet the value of the amount sold has increased 17½ per cent, leaving 12½ per cent to represent the increase in the amount of gas marketed as compared to that of 1899. Outside of a new pool found in Greene County, Pa., the production comes from the old fields. Texas and South Dakota have added a considerable amount to their former production. The use of powerful gas compressors, and in some cases the enlargement of gas mains, are the main factors working the increased output. The footnotes in this table show that a very large amount of gas marketed in one State was produced in another. The value of the gas, however, is credited to the State producing it.

Pennsylvania furnished natural gas to New York, Ohio, and West Virginia; Ohio furnished gas to West Virginia in a limited amount; West Virginia furnished gas to Pennsylvania and Ohio; Indiana furnished gas to Ohio and Illinois, and Kentucky furnished natural gas to Ohio and West Virginia. There was $5,224,859 worth of natural gas sold outside of the States producing it, indicating that a large amount of skill and labor is necessary to distribute the value of the production properly.

Notwithstanding all the care exercised in collecting statistics, there is a considerable amount of natural gas consumed in field operations, such as drilling wells and afterwards pumping them, operating natural-gas engines, driving gas compressors, pumping wells, etc., and supplying farming districts, which it is impossible to determine without a personal canvass of the entire gas-producing regions. It is estimated, however, that the number of domestic fires supplied by all the gas fields in the United States is not far from 1,000,000. This number of fires must reach at least 4,000,000 people, and furnish 5,000,000 people an ideal light when used in connection with the Welsbach mantle. The following table enumerates the number of individuals and companies that have made returns in the several States for 1900. Only 266 companies and individuals report from Pennsylvania. This State shows by far the largest revenue of any State, indicating that very large companies are operating there.

The second column gives the value of the natural gas consumed in the States. Pennsylvania, as shown by the footnotes, received $1,220,672 worth of gas from West Virginia, yet $1,595,469 worth of natural gas went out of Pennsylvania into the State of New York, leaving $9,812,615 worth of gas that was consumed inside the State. Ohio consumed $3,823,209 worth of natural gas; $1,656,951 worth was furnished by Pennsylvania, West Virginia, Indiana, and Kentucky, amounting to 43 per cent of the amount consumed. There are more companies and individuals in Indiana that furnish themselves and others with natural gas than in any other State, as the number reporting in 1900 was 670.

The third column gives the estimated value of the natural gas as compared to the value of coal and wood displaced. It will be noticed in this column that most of the values outside of the State of Indiana range very close to the value of the fuel whose place it takes. The total shows considerably increased value of the other fuel as compared with the natural gas. A very large portion of this difference is due to the unconformity of the value of the fuel displaced in the State of Indiana. The gas in this State is sold at a very low price, although the coal probably costs about as much as it does in the State of Ohio.

Value of natural gas consumed in the United States in 1900, by States, and the value of coal or wood displaced by same, as reported by 1,438 persons, firms, and corporations.

State.	Companies or individuals reporting.	Amount received for sale of gas or value of gas consumed.	Estimated value of coal, wood, or other fuel displaced by gas.
Pennsylvania	266	*a* $9,812,615	$9,789,065
Indiana	670	*b* 6,412,307	11,862,768
Ohio	281	*c* 3,823,209	3,565,142
West Virginia	34	*d* 1,530,378	1,712,462
New York	89	*e* 1,456,286	1,387,258
Kansas	32	356,900	499,660
Kentucky	19	*f* 101,821	217,123
California	12	79,083	110,785
Texas	2	20,000	25,000
South Dakota	2	9,817	18,400
Illinois	23	1,700	1,700
Colorado	2	1,800	1,800
Missouri	6	547	547
Total	1,438	23,606,463	29,191,710

a Includes $1,220,672 worth of gas produced in West Virginia.
b Includes gas consumed in city of Chicago, Ill.
c Includes $1,656,951 worth of gas produced in Pennsylvania, West Virginia, Kentucky, and Indiana.
d Includes $254,317 worth of gas produced in Pennsylvania, Ohio, and Kentucky.
e Includes $1,092,919 worth of gas produced in Pennsylvania.
f Does not include $92,211 worth of gas consumed in Ohio and West Virginia.

Uses to which natural gas produced in the United States in 1900 was put, as reported by 1,438 persons, firms, and corporations.

State.	Companies or individuals reporting.	Domestic fires supplied.	Establishments supplied.				
			Iron mills.	Steel works.	Glass works.	Other establishments.	Total.
Pennsylvania	266	229,730	*a* 55	....	80	1,161	1,296
Indiana	670	181,751	12	3	101	2,635	2,751
Ohio	281	135,743	7	3	10	1,072	1,092
West Virginia	34	45,943	0	2	14	168	184
New York	89	89,837	0	0	4	134	138
Kansas	32	9,703	0	0	0	65	65
Kentucky	19	12,319	0	1	0	114	115
California	12	736	0	0	0	10	10
Texas	2	300	0	0	0	20	20
South Dakota	2	76	0	0	0	8	8
Illinois	23	83	0	0	0	0	0
Colorado	2	70	0	0	0	0	0
Missouri	6	18	0	0	0	0	0
Total	1,438	706,309	*a* 74	9	209	5,387	5,679

a Includes steel works in Pennsylvania.

RECORD OF WELLS AND PIPE LINES, BY STATES.

In the following table will be found the number of companies and individuals reporting, the producing wells at the close of 1899 and 1900, the producing wells drilled, and the nonproducing or dry holes drilled in 1900, together with the total feet of pipe in use at the close of 1900:

Record of wells and amount of pipe line, as reported by 1,438 persons, firms, and corporations in 1900.

State.	Companies or individuals reporting.	Wells.					Total pipe laid to Dec. 31, 1900.	
		Producing, Dec. 31, 1899.	Producing, drilled in 1900.	Abandoned in 1900.	Producing, Dec. 31, 1900.	Nonproducing holes drilled in 1900.	Feet.	Miles.
Pennsylvania	266	3,407	513	210	3,710	142	43,865,000	8,307.95
Indiana	670	4,333	861	648	*a* 4,546	156	33,958,001	6,431.44
Ohio	281	853	97	60	890	19	15,030,304	2,846.65
West Virginia	34	328	129	37	420	6	10,185,093	1,929.00
New York	89	487	57	11	533	11	5,772,796	1,093.33
Kansas	32	169	54	4	219	15	1,446,283	273.90
Kentucky	19	77	18	0	*b* 95	8	617,528	117
California	12	23	1	1	23	0	129,050	24.44
Texas	2	20	25	12	33	0	80,000	15.15
South Dakota	2	5	1	0	*c* 6	0	26,400	5
Illinois	23	31	2	8	25	2	10,000	1.89
Colorado *d*	2	.....	.....	.....	.....	.....	12,000	2.3
Missouri	6	5	1	0	6	0	1,700	.32
Total	1,438	9,738	1,759	991	10,506	359	111,134,155	21,048.37

a Twenty-four wells shut in.
b Ten shut in; not used in 1900.
c Three wells used in 1900.
d Gas from oil wells.

COMPARISON OF COMPANIES MAKING COMPLETE RETURNS.

In the following table is given a comparison of the total returns made by the same companies reporting in Pennsylvania, Indiana, and Ohio in the years 1899 and 1900. It will be seen from this table that 134 companies in Pennsylvania received $1,349,285 more for gas supplied in 1900 than in 1899; 399 companies in Indiana received $135,747 more, while 60 companies in Ohio received $520,750 more. The table also shows an increase in the number of establishments supplied by these companies. No comparison of number of fires is necessary. Meters are in general use throughout the States of Pennsylvania and Ohio, and it is impossible to give a correct statement of the number of fires supplied, but we give the figures as reported to us, which are no doubt the best estimates that could be given. In Indiana large quantities of gas are consumed and not metered, therefore a great waste. When not metered, the gas is furnished by contract—so much for the first fire and so much for each additional fire, on a gradually declining scale as the number increases. The figures in this table are not the full returns, but are the returns from companies making complete returns in 1899 and 1900, and therefore are capable of being compared, as they represent a very large proportion of the value of natural gas marketed in the States named.

Natural gas records in 1899 and 1900 of companies in Pennsylvania, Indiana, and Ohio making complete returns.

	Pennsylvania.		Indiana.		Ohio.	
	1899.	1900.	1899.	1900.	1899.	1900.
Amount received for sale of gas or value of gas consumed	$7,666,201	$9,015,486	$4,017,225	$4,152,972	$1,983,795	$2,504,545
Value of coal or wood displaced	$7,497,142	$8,993,329	$6,953,816	$7,682,998	$2,092,823	$2,335,488
Domestic fires supplied	240,525	239,631	163,020	147,595	60,215	115,771
Iron and steel works supplied	49	54	9	10	8	7
Glass works supplied	72	76	61	59	12	8
Other establishments supplied	1,095	1,113	1,466	2,359	387	787
Total establishments supplied	1,216	1,243	1,536	2,428	407	802
Total wells producing Jan. 1	2,490	2,740	2,576	2,895	401	412
Total producing wells drilled	403	457	639	654	89	70
Total wells abandoned	153	199	320	562	78	55
Total wells producing Dec. 31	2,740	2,998	2,895	2,987	412	427
Total dry holes drilled	86	130	80	99	12	16
Total feet of pipe laid	34,289,670	37,980,228	23,201,929	23,899,287	11,227,183	11,327,056
Total establishments reporting	134	134	399	399	60	60

RECORDS, BY STATES AND COUNTRIES.

PENNSYLVANIA.

The important development in this State in 1900 was the extension of the "Bayard sand" pool, in Greene County. This pool and the other recent developments in this county have helped to swell the increased output in Pennsylvania. The increase of $1,850,202 for the value of the natural gas marketed that came from this State in 1900 over that of 1899 is partially due to the workings of the gas compressor pumps in the different fields, whereby a larger amount was supplied to the consumer. The price has advanced in very many localities, all of which have contributed to increase the amount and value of the gas sold. The amount received in 1900 has not been equaled since the year 1889, as is shown in the following table. Pennsylvania furnished the States of New York, Ohio, and West Virginia a large quantity of natural gas, amounting to $1,595,469, receiving from the State of West Virginia a somewhat smaller amount in value.

The value of the natural gas produced in 1900 in this State exceeded that of any other State, being greater than that of Indiana by $2,933,873. There were 3,710 producing gas wells at the close of 1900, as compared with 3,407 wells in 1899, or of this number 513 were drilled during 1900. Two hundred and ten wells were abandoned and 142 wells were dry during 1900.

Value of natural gas produced in Pennsylvania from 1885 to 1900.

Year.	Value.	Year.	Value.
1885	$4,500,000	1893	$6,488,000
1886	9,000,000	1894	6,279,000
1887	13,749,500	1895	5,852,000
1888	19,282,375	1896	5,528,610
1889	11,593,989	1897	6,242,543
1890	9,551,025	1898	6,806,742
1891	7,834,016	1899	8,337,210
1892	7,376,281	1900	10,187,412

INDIANA.

The value of the natural gas marketed during 1900 shows a very considerable increase over that of 1899. Indiana produces more natural gas than any other State. A large amount is sold at a low figure, based on a price of a certain-sized opening, and whether a greater or less amount of gas goes through, the price is the same. This is wrong in practice and theory, as when sold by the cubic foot through a meter the tendency of the consumer is to burn it in the most economical manner known. The original rock pressure was 325 pounds, in 1886, over the great area of about 2,850 square miles. At this date the pressure has been reduced to about an average of 110 pounds, showing that only 34 per cent of the original volume of the gas remained in the rock. The nearness of salt water to the gas strata in this field will probably seal up the flow long before the pressure is exhausted, so that a large percentage will not become available. There are at present 30 natural-gas pumping stations in the State. There were 4,546 wells producing gas at the close of 1900, as compared with 4,333 wells at the close of 1899—a gain of 213 wells. There were 861 wells drilled that were producers of gas; 156 wells drilled that were nonproducers—dry wells—and 648 wells were abandoned during 1900.

In the following table will be found a statement of the value of the natural gas produced in Indiana from 1886 to 1900:

Value of natural gas produced in Indiana from 1886 to 1900.

Year.	Value.	Year.	Value.
1886	$300,000	1894	$5,437,000
1887	600,000	1895	5,203,200
1888	1,320,000	1896	5,043,635
1889	2,075,702	1897	5,009,208
1890	2,302,500	1898	5,060,969
1891	3,942,500	1899	6,680,370
1892	4,716,000	1900	7,254,539
1893	5,718,000		

Of this total value of $7,254,539, representing the output for 1900, it is estimated that $1,842,232 worth of natural gas was sold in Ohio and Illinois, leaving $5,412,307 to represent the amount consumed in the State.

Mr. J. C. Leach, State natural-gas supervisor of Indiana, in his report to Prof. W. S. Batchley for 1900, says, in referring to the declining rock pressure:

At first the decline of the rock pressure throughout the field was gradual and fairly uniform, showing the greatest, of course, during the periods of greatest consumption. During the summer season, when the consumption was light, the gas seemed to flow more freely through the rock and the pressure became equalized to a certain extent. As the supply of gas has decreased, the pressure has become less uniform. The gas rock is not uniform in thickness, both the upper and lower surface being more or less undulating.

As the salt water rises, it may reach the upper surface of the gas rock at points and hermetically seal the gas in the more elevated portions of the same, and thus, as the field progresses, it is possible that the entire gas territory will become divided and subdivided into numerous small gas areas, varying in gas pressure, the draft on one not affecting the others. To a certain extent this condition exists at this time. The draft on the wells is becoming less uniform as the rock pressure decreases.

Those pipe lines connected with compressors maintain a pressure above that of the wells located below the compressing station, and as a consequence these wells are useless, part of the time at least.

The term Indiana natural gas field refers to a line south of an east-and-west line parallel with the south boundary of Hamilton County. The original area of this section of the field contains approximately 2,850 square miles. As has been stated in a former report, it presents three well-defined divisions.

First, there is an outer zone surrounding the entire section. This zone varies greatly in width and has been abandoned for pipe-line purposes. A part of it supplies domestic consumption.

Second, there is a middle zone, which is the territory supplying pipe lines and a large majority of the factories. It varies in productiveness and has been systematically drilled in most localities. In December, 1899, this zone contained approximately 1,350 square miles. It has decreased in area very materially during the past year.

Third, there is the center of production, or that part of the field not invaded by pipe lines. This is a small area located in the vicinity of the northwest corner of Delaware County. It is being rapidly drilled.

It is very difficult to ascertain the exact area of these divisions. Regarding the productive area, it is probably sufficient to say that the south two-thirds of Grant County, the south half of Blackford County, and the north half of Madison and Delaware counties supply a large per cent of natural gas consumed from this field. The pressures given in this report were taken from wells located in the middle and center zones only, and are the averages of a large number of tests made in various localities. On account of the presence of salt water it is very difficult to ascertain the exact rock pressure in many instances, but the results given here were secured under the most favorable conditions possible.

This territory or zone of the gas field is decreasing annually in area, and the average pressure given for each year is made from tests of the territory as it was at that time.

Tests made in this territory in November, 1897, showed an average rock pressure of 197 pounds. The same territory in 1898 showed an average rock pressure of 173 pounds. In December, 1899, this had decreased to 155 pounds, and at the present the pressure varies from 75 to 160 pounds, and the average is about 115 pounds.

WEST VIRGINIA.

Although the increase in the value of natural gas produced in this State in 1900 showed over 26 per cent as compared with 1899, it was not so large as the increase in 1899 over that of 1898; this amount was $1,001,841. The increase in 1900 over that of 1899 was $623,168. This State furnished $1,682,971 worth of natural gas to Pennsylvania and Ohio. It also received a small amount furnished by Pennsylvania and Ohio. The year 1900 has developed large areas of natural gas in Lewis, Harrison, and Wetzel counties in the very deep sands. There was a very large area developed in Lewis County around the rim of the deep basin found near the headwaters of Sand Fork of the Little Kanawha River and on the anticlinals of Chestnut Ridge and the Wilsonburg arches. Some of these wells found the gas in the Gordon sand, in the stray sand, and in the fifth and the Elizabeth sands. Many of them are from 2,700 to 3,000 feet deep, having a volume of from 10,000,000 to 20,000,000 cubic feet in twenty-four hours, and many show a rock pressure of over 1,200 pounds to the square inch, the force being sufficient to blow the tools and rope out of the hole when the gas pay was tapped. In some instances before the pay was completely opened up small pays of gas were encountered with powerful pressure back of them. The rarification of the gas from these small bleeders was sufficient to turn any moisture into ice and bridge the hole over completely or freeze the tools solid at the bottom of the well. In several instances the volume of the well was not known until on pulling the casing a large amount of water was allowed to drop into the well, thereby melting the ice plug, letting loose the imprisoned gas, which immediately blew out the water with chunks of ice almost the diameter of the hole. Indications show that this section of Lewis County will furnish a large amount of natural gas when the wells in the counties farther north have diminished their volume.

West Virginia must furnish to Pennsylvania and Ohio in the years to come a vast quantity of this most valuable fuel, and this amount must increase year after year as the older fields of the States named become exhausted.

The counties furnishing natural gas in West Virginia are named in the order of their importance: Wetzel, Marion, Monongalia, Harrison, Lewis, Tyler, Ritchie, Doddridge, Marshall, Pleasants, Wood, Wirt, Roane, Calhoun, Mingo, Kanawha, Logan, and Gilmer.

A number of the largest natural-gas companies in western Pennsylvania and Ohio get their supply or in part from West Virginia.

Value of natural gas produced in West Virginia from 1889 to 1900.

Year.	Value.	Year.	Value.
1889	$12,000	1895	$100,000
1890	5,400	1896	640,000
1891	35,000	1897	912,528
1892	500	1898	1,334,023
1893	123,000	1899	2,335,864
1894	395,000	1900	2,959,032

Owing to the fact that natural gas in this State is invariably associated with the areas producing petroleum also, a considerable amount is used in firing boilers for pumping and drilling wells and supplying steam to feed the oil pump by which the petroleum is forced to market, also to supply the numerous operatives and farmers in this region. It is difficult to get at the full value of all of the natural gas consumed in this State. No doubt if the complete returns could be secured the figures given above should be increased by 25 to 30 per cent in this instance.

OHIO.

This State has felt the loss due to the exhaustion of the original fields. The great broad arch of the Trenton limestone in northwestern Ohio, a continuous reservoir covering an area of over 500 square miles, gave up its store too readily to continue over a period of many years. The original rock pressure, close to 425 pounds to the square inch, has been reduced almost to no pressure whatever. There was considerable gas produced in Guernsey, Belmont, Noble, and Perry counties that came from the Berea sand, which supplied the towns of Barnesville, Cambridge, Corning, New Lexington, together with many smaller towns and villages in their vicinity.

The value of the natural gas produced in this field in 1880 was over $5,000,000, when it was consumed in a most extravagant manner and at a lower cost. Now this great area produces an insignificant amount, the value of which during 1900 was less than $200,000. The Sugar Grove or Lancaster field furnished by far the largest portion of the natural gas consumed in this State. West Virginia, Pennsylvania, and Indiana, however, furnished a very large percentage of the amount that was consumed in the eastern, southeastern, and western portions of Ohio. This is credited to the States in which it is produced.

The following table shows that the value of gas produced in Ohio has been steadily advancing since the years 1896 and 1897, when the production was at its lowest. A considerable amount of natural gas that came from Canada was consumed in Ohio in 1898 and 1899. Ohio furnished West Virginia with natural gas to the value of $11,976 during 1900.

There is a vast number of individual natural-gas wells producing gas from the Ohio shale in the counties bordering on Lake Erie, in northeastern Ohio. Some gas was also found at Peninsula, in Summit County, and at Jefferson, in Ashtabula County.

Value of natural gas produced in Ohio from 1885 to 1900.

Year.	Value.	Year.	Value.
1885	$100,000	1893	$1,510,000
1886	400,000	1894	1,276,100
1887	1,000,000	1895	1,255,700
1888	1,500,000	1896	1,172,400
1889	5,215,669	1897	1,171,777
1890	4,684,300	1898	1,488,308
1891	3,076,325	1899	1,866,271
1892	2,136,000	1900	2,178,234

The Sugar Grove field.—Through the courtesy of the superintendent of one of the largest natural gas plants in this field we are enabled to give the following information:

The Sugar Grove field began to be investigated in 1887, and, contrary to geological prediction, a high-pressure gas field was found. The source of the gas supply is the Clinton, which is found here at a depth of from 2,000 to 2,200 feet below the surface, and 1,200 to 1,550 feet below tide water. A well is usually drilled in about nine hundred and sixty hours actual working time. Wells are generally started with 10-inch drive pipe, comprising from 30 feet to 120 feet, according to locality, to reach through the drift to bed rock. This is then followed by a string of $8\frac{1}{4}$-inch casing, reaching into the Berea, which is found from 200 to 350 feet above tide water. Then follows a string of $6\frac{5}{8}$-inch casing into the "Big Lime," reaching nearly to the bottom of the Niagara, from 1,200 to 1,400 feet below tide. No casing is then used beyond this point. The wells are tubed with 4-inch tubing, unless the flow of the well is small, in which case 2-inch tubing is used. In general, however, the wells start with 8-inch drive pipe and follow with $6\frac{5}{8}$-inch casing into the Berea, then finish with $5\frac{3}{16}$-inch to bottom, 3-inch and 2-inch tubing being used. The usual contract price for drilling, with rig furnished to contractor, is $1 per foot. New rigs cost about $400. The thickness of the Clinton seems to be from 6 to 50 feet or more. The original rock pressure in the field was about 750 pounds. Through the center of the field runs the Hocking River, and this is the valley which has been the most drilled over. In this valley, where wells are numerous, the rock pressure is not now more than 300 pounds, but where wells are fewer it is over 400 pounds to the square inch. Out of the valley where but few wells have been drilled the rock pressure still approximates the original, and within a month wells have been "drilled in" giving an "open flow" of 10,000,000 cubic feet in twenty-four hours. The character of the "sand" varies from very loose and open to very hard and compact. From this it results that frequently the greatest rock pressure is found with the smallest "open flow." I know of no wells in this field which have "given out," except, through neglect, some have been permitted to be drowned out. The field is gradually deteriorating, no doubt, and yet to what degree it is hard to determine, for while a given well may gage less and less from constant use, yet if it be "rested" it will revive to a considerable degree and probably adjust itself to the normal. The data at hand indicates a "terrace" of considerable extent in the Clinton in this field.

The following is a diagram of "open flow" of three groups of wells in the Sugar Grove field 100 per cent being taken as the flow at completion:

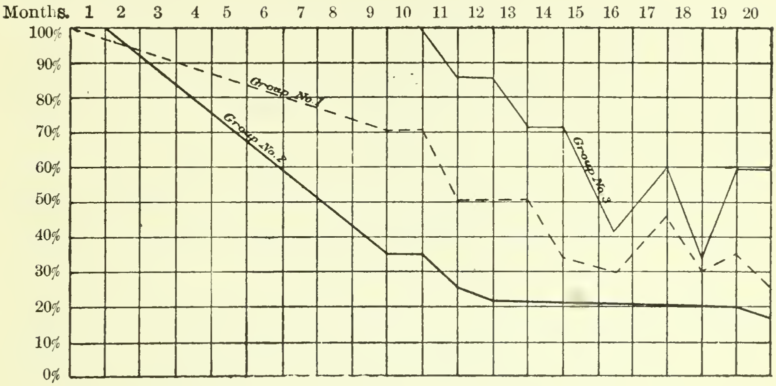

FIG. 1.—Open-flow pressure of three groups of wells in the Sugar Grove district, Ohio.

The above chart shows the "open flow" of representative wells in each of three groups of wells in different regions of the Sugar Grove field. Group No. 1 consists of wells drilled in but not connected with the main line and not in use for nine months. Hence the deterioration of these wells, as indicated by the chart through the first nine months, represents the deterioration of this region of the field as a whole. The same is true of group No. 2. The wells of group No. 3 were connected with the main as soon as drilled in, hence act under a law of their own.

The sustained capacity shown by the horizontal courses in the lines (viz, in the tenth month of groups 1 and 2, and others) is caused by a reenforced supply which "rests" the wells. The sharp rise at the end of the seventeenth month, and again in the nineteenth month, is from the same cause.

A diagram of the rock pressures show the same irregularities. Hence we conclude—

1. A well exhausts the sand in its immediate vicinity and then receives its supply from the parts of the field more and more remote, decreasing in open flow and rock pressure directly as the distance of the "draw" in the sand increases.

2. By shutting in the well and "resting" it, there will follow a revival of both open-flow capacity and rock pressure to a degree approaching the limit of the field, allowing for a depreciation of the field as a whole.

3. That where the "open flow" is not in proportion to the "rock pressure" it is because of a less porous condition of the "sand;" and if this compactness is very limited in extent, "shooting" the well will permanently benefit it. If otherwise, it will not.

Examinations in this field have led to the following conclusions:

1. From a study of pieces of the "sand" brought up from the bottom of the well it is not believed that the gas is found in the Clinton limestone, but in strata of sandstone occurring in the Clinton.

2. The water in a "wet" well does not come from the gas rock, but from strata above, and ought to be kept out by better work in casing; although in time, as the casing is acted on by chemicals, the well will eventually become wet.

3. There is an economic limit to the pressure under which wells should be worked in producing gas, and an economic number of wells to be drilled on a given area; and these facts have relation to the necessary main-line pressure and the condition of the field, and are determinable.

4. That the danger of "drowning" the gas field is not from water following the gas as it is exhausted from the field (that is, in the gas rock), but from overworking the single wells or neglecting to care for them, and thus allowing local discharges of water from the strata above into the gas rock through the holes made by the drill.

5. If the foregoing are true the probabilities are that rock pressure is not caused by water, but by the conditions under which the gas was generated.

In order to verify the theory, it is added, that the salt water which is supposed to follow the gas into the field and to replace the gas in the gas rock as the gas fails comes from overlying strata instead of through the gas rock itself, a number of chemical analyses of the water found in the well and the waters from the overlying strata are being made, with a view of identifying the water found at the bottom of the gas well if possible.

NEW YORK.

No other State furnishes so small an amount of gas in proportion to its productive area as does New York.

Almost the entire length of the shore line on Lake Erie and Ontario in this State furnishes a moderate supply of gas. Many of these wells are small, with only sufficient gas to supply a single family. There are other sections in western New York where the Corniferous limestone, the Medina sandstone, and the Trenton limestone furnish a number of small towns and a small part of the supply to Buffalo. The value of the natural gas product in this State in 1900 was $363,367, showing an increase of $68,774 over that of 1899. Over $1,200,000 worth of natural gas was furnished to New York by the State of Pennsylvania and by Canada in 1900, so that this State furnishes only about 25 per cent of the value of the total amount consumed.

The counties furnishing natural gas in New York are Allegany, Cattaraugus, Erie, Livingston, Niagara, Onondaga, Ontario, Oswego, Seneca, and Steuben.

The value of natural gas produced in New York from 1885 to 1900 is given in the following table:

Value of natural gas produced in New York from 1885 to 1900.

Year.	Value.	Year.	Value.
1885	$196,000	1893	$210,000
1886	210,000	1894	249,000
1887	333,000	1895	241,530
1888	332,500	1896	*a* 256,000
1889	530,026	1897	200,076
1890	552,000	1898	229,078
1891	280,000	1899	294,593
1892	216,000	1900	363,367

a A portion of this amount should be credited to Pennsylvania, but it was impossible to make the separation.

KANSAS.

Natural gas is found in the counties of Montgomery, Labette, Allen, Miami, Wilson, Franklin, Crawford, and Neosho. The gas is found in what is known as the Cherokee shales, in porous brown sandstone, 40 to 60 feet above the top of the Mississippian limestone. This sand is not unlike the Bradford sand of Pennsylvania in color and texture. Its thickness ranges from 10 to 25 feet. The depth varies from 900 to 1,150 feet. The volume of many of these wells is as high as 5,000,000 cubic feet, but some go as high as 10,000,000. The production and value has increased very largely in the years 1899 and 1900. It has been very successfully applied to the reduction of the zinc ores at Iola.

The Iola gas field in Allen County is, on an average, 8 miles east and west and 4 miles north and south. There are about 64 wells located in this field, averaging fully 6,000,000 cubic feet each twenty-four hours. The rock pressure is 310 to 325 pounds. The gas is found in coarse and fine sand near the bottom of the Cherokee shales, at depths of 850 to 980 feet. Wells are generally cased with 3-inch, sometimes 5-inch pipe. Drilling costs $1 per foot. The quality of the gas is very good, free from sulphur and impurities. Very little petroleum is found in this field. The gas is used for domestic purposes, also largely used for zinc smelters, brick plants, acid works, etc. The reduction of pressure in this field has been slight.

In Neosho County wells are from 550 to 650 feet deep. The gas sand is 14 to 35 feet thick, and pressure about 150 pounds. The gas is dry; petroleum accompanies the gas in small quantities.

The value of the natural gas produced in Kansas from 1889 to 1900 has been as follows:

Value of natural gas produced in Kansas from 1889 to 1900.

Year.	Value.	Year.	Value.
1889	$15,873	1895	$112,400
1890	12,000	1896	124,750
1891	5,500	1897	105,700
1892	40,795	1898	174,640
1893	50,000	1899	332,592
1894	86,600	1900	356,900

KENTUCKY.

The principal gas-producing area in this State is in Martin County, on the eastern border, where several additional wells were drilled during the year 1900. Some fair gas wells in the past years have been found in Floyd County, and now find some use in furnishing fuel for the wells that are pumped in that region and also in operating the pumps which force the oil to the railroad at Whitehouse, from that section. The Tripple State Oil and Gas Company has enlarged its production and marketed considerable more natural gas in 1900 than in the previous year. Louisa, Catlettsburg, Ashland, Ky., Huntington, Credo, and Kenova, W.Va., and Ironton, Ohio, are supplied by this company. There is still some gas furnished by Meade County to Louisville. Wayne County furnishes gas for several gas engines on Beaver Creek, near the Tennessee State line. There is some gas found in Breckinridge County in the vicinity of Cloverport; also in Hardin and Jefferson counties, but the supply is limited, so far as developed. The increase during the year 1900 was $68,287, amounting to 54 per cent, as compared with 27 per cent in 1899 over that of 1898.

Value of natural gas produced in Kentucky from 1889 to 1900.

Year.	Value.	Year.	Value.
1889	$2,580	1895	$98,700
1890	30,000	1896	99,000
1891	38,993	1897	90,000
1892	43,175	1898	103,133
1893	68,500	1899	125,745
1894	89,200	1900	194,032

CALIFORNIA.

Although there are numerous small gas wells in this State, by far the greatest production comes from wells at the city of Stockton, in the great San Joaquin Valley. It is also found near the city of Sacramento, in the Sacramento Valley. Also in Tulare County, near Tulare

Lake, and Tehama County. To a small extent it is produced by a few wells at the city of Los Angeles. In the two former instances it is associated with artesian water flows. At Stockton the wells are 2,000 feet deep, yet none of them has passed through the alluvial deposit into the solid stratified measures. Under the pressure of 2,000 feet water will absorb a large amount of gas, which is gradually liberated as it ascends in the well and the pressure diminishes. Ten of these wells at Stockton yield about 30,000 cubic feet of natural gas a day. It is questionable whether the flow of most of the water from artesian wells is not due to gas pressure rather than to artesian head in a porous stratum to which it is generally credited.

The production was somewhat less in 1900 than in 1899, as the following table will show:

Value of natural gas produced in California from 1889 to 1900.

Year.	Value.	Year.	Value.
1889	$12,680	1895	$55,000
1890	33,000	1896	55,682
1891	30,000	1897	50,000
1892	55,000	1898	65,337
1893	62,000	1899	86,891
1894	60,350	1900	79,083

ILLINOIS.

The production of natural gas in this State comes from shallow wells of small production in Bureau County. The shallow wells of Randolph County have been gradually failing.

The production of natural gas in Illinois from 1889 to 1900 was valued as follows:

Value of natural gas produced in Illinois from 1889 to 1900.

Year.	Value.	Year.	Value.
1889	$10,615	1895	$7,500
1890	6,000	1896	6,375
1891	6,000	1897	5,000
1892	12,988	1898	2,498
1893	14,000	1899	2,067
1894	15,000	1900	1,700

UTAH.

No natural gas has been produced in this State for two years. The wells, 12 miles north of Salt Lake City, have become choked up by the decomposition of the slate forming the walls of the gas wells.

The value of natural gas produced in Utah from 1893 to 1900 has been as follows:

Value of natural gas produced in Utah from 1893 to 1900.

Year.	Value.	Year.	Value.
1893	$500	1897	$15,050
1894	500	1898	7,875
1895	20,000	1899	0
1896	20,000	1900	0

TEXAS.

This State has increased its production of natural gas to such an extent that the value of that produced in 1900 was $20,000, all of which comes from two pools near Corsicana. Many of the artesian wells scattered over a large portion of the State produced more or less gas, none of which is known to have been utilized.

SOUTH DAKOTA.

At Pierre, S. Dak., there are 3 wells in use that supply the town with water, as well as sufficient natural gas to furnish the town with heat for cooking purposes, enough being left over to run the electric-light plant and a 60-horsepower pumping plant also.

The value of the natural gas at this place is placed at $9,817 in 1900. The combined products of these 3 wells are the most remarkable of any on record.

CANADA.

The Welland County field in Ontario, near Buffalo, continues to furnish gas to Buffalo, N. Y. The Essex County field furnished a large amount of natural gas to Detroit, Mich. The drain on both of these fields has been felt, as there has been a very considerable reduction in the rock pressure. There is some natural gas found in the oil region between Petrolia and Sarnia, which is mostly used in gas engines that are pumping oil wells. The value of the natural gas used has been increasing for the past three years, as the following table will show, although the quantity has decreased. These values are taken from the Annual Report of Mineral Statistics and Mines, Ottawa, Canada.

Value of natural gas produced in Canada from 1892 to 1900.

Year.	Value.	Year.	Value.
1892	$150,000	1897	$325,873
1893	366,233	1898	364,699
1894	313,754	1899	387,271
1895	423,032	1900	417,097
1896	364,156		

Most of this gas was transported by pipe lines and marketed at Detroit, Mich.; Buffalo, N. Y., and Toledo, Ohio, where its value for the year 1900 was $672,362.

The following table, furnished by the Bureau of Mines, Toronto, shows the number of producing wells, miles of pipe, workmen employed, value of the gas product at the point of production, and the wages for labor. The values are generally placed at the points of consumption.

Statistics of natural gas production in the Province of Ontario, Canada.

Year.	Producing wells.	Miles of gas pipe.	Workmen employed.	Value of gas product.	Wages for labor.
1893	107	117	59	$238,200	$24,592
1894	110	183½	99	204,179	53,130
1895	123	248	92	282,986	73 328
1896	141	287¼	87	276,710	47,527
1897	140	297	84	308,448	42,338
1898	142	315¼	85	301,599	31,457
1899	150	341½	95	440,904	40,149
1900	175	306	161	392,823	43,636

IMPORTS.

In the following table will be found a statement of the value of the natural gas imported into the United States from 1891, when it was first enumerated, as assigned by the United States custom-house:

Value of natural gas imported into the United States from 1891 to 1900.

Calendar year.	Value.	Calendar year.	Value.
1891 (latter half)	$25,540	1896	$87,446
1892	74,737	1897	80,607
1893	90,653	1898	95,527
1894	62,253	1899	121,311
1895	89,419	1900	127,614

ASPHALTUM AND BITUMINOUS ROCK.

By Edward W. Parker.

PRODUCTION.

In addition to crude petroleum which occurs in such liberal quantities in the United States, and which is treated in a separate chapter in this report, there are numerous varieties of hydrocarbons existing in every condition, from a liquid to a solid form, and having an asphaltic base, to which the general term "asphaltum" may be applied. Some of these varieties exist as sandstones and limestones impregnated with asphaltum, or bitumen, and are known as bituminous or asphaltic limestone, bituminous sandstone, etc. These latter are usually classified in the trade as bituminous rock and are so considered in this report. The term "asphaltum," as used here, includes all the purer forms of hard and soft bitumen which are known as elaterite, gilsonite, albertite, wurzilite, uintaite, nigrite, maltha, brea, etc. It must be stated here, however, that the large quantity of asphaltic oils produced in California, and which are refined for the production of illuminating and lubricating oils, are included in the report on petroleum. It is difficult in many cases to establish a line dividing the oils which should be included with petroleum from those which should be considered as asphaltum. The general practice has been to consider that the material used for the same purposes for which asphaltum is used in other cases should be classed as asphaltum, and those which are refined should be considered as petroleum. In some cases, however, the residuum from the refining processes is sold as asphaltum and becomes, therefore, a factor in the asphaltum report and is included in the production of asphaltum. This possibly causes in a few instances a slight duplication, but it has been found impossible to make an accurate separation of the two products.

Bituminous rock is usually sold and shipped without having been previously treated or refined. It is used principally for street paving, and is mixed with other ingredients at the locality where it is to be used. In some cases the asphaltum, or bitumen, is extracted from the bituminous rock and sold as refined or gum asphaltum.

The following table shows the annual production of asphaltum and bituminous rock in the United States since 1882:

Production of asphaltum and bituminous rock from 1882 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1882	3,000	$10,500	1892	87,680	$445,375
1883	3,000	10,500	1893	47,779	372,232
1884	3,000	10,500	1894	60,570	353,400
1885	3,000	10,500	1895	68,163	348,281
1886	3,500	14,000	1896	80,503	577,563
1887	4,000	16,000	1897	75,945	664,632
1888	50,450	187,500	1898	76,337	675,649
1889	51,735	171,537	1899	75,085	553,904
1890	40,841	190,416	1900	54,389	415,958
1891	45,054	242,264			

As will be seen from the foregoing table, the production in 1900 shows a decrease from that of 1899 of 20,696 short tons in amount and of $137,946 in value. The production in 1900, both in amount and value, was the smallest in the last five years.

The production of crude asphaltum in California decreased from 10,894 short tons, valued at $227,480, in 1899 to 9,175 short tons, valued at $176,473, in 1900.

The production of bituminous sandstone decreased from 43,041 short tons in 1899 to 38,334 short tons in 1900. The value decreased slightly, from $121,023 in 1899 to $119,779 in 1900. Bituminous limestone decreased from 15,650 short tons in 1899 to 2,434 short tons in 1900, with a decrease of $68,178 in value.

The production of hard and refined asphaltum, which includes gilsonite and varieties of a similarly pure nature, decreased from 4,800 tons in 1899 to 3,192 tons in 1900, and the value fell off from $116,250 in 1899 to $80,320 in 1900.

The production of liquid asphaltum or maltha, all of which was from California, increased from 700 tons in 1899 to 1,254 tons in 1900, while the value was almost trebled.

No sales of mastic were reported in 1899 or 1900, the material from which it was made being reported before treatment and included in the output of bituminous sandstone and bituminous limestone.

The following table exhibits the production and value of the several kinds of asphaltum and asphaltum products in 1896, 1897, 1898, 1899, and 1900. Both the amounts and value are for the product in the condition in which it was first sold.

Varieties of asphaltum, etc., produced in 1896, 1897, 1898, 1899, and 1900.

Variety.	1896.		1897.		1898.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Crude asphaltum	6,500	$78,000	5,971	$71,404	11,300	$179,900
Bituminous sandstone	56,971	170,913	48,801	158,914	43,624	126,831
Bituminous limestone *a*	4,300	21,500	2,100	10,600	5,502	26,412
Mastic	100	900	483	9,864	1,158	17,840
Hard and refined or gum *b*	3,122	92,240	3,940	102,500	1,878	53,666
Liquid or maltha	9,510	214,010	14,650	311,350	12,875	271,000
Total	80,503	577,563	75,945	664,632	76,337	675,649

Variety.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*	
Crude asphaltum	10,894	$227,480	9,175	$176,473
Bituminous sandstone	43,041	121,023	38,334	119,779
Bituminous limestone *a*	15,650	79,500	2,434	11,322
Mastic	....	....	....	....
Hard and refined or gum *b*	4,800	116,250	3,192	80,320
Liquid or maltha	700	9,651	1,254	28,064
Total	75,085	553,904	54,389	415,958

a Not including mastic or refined asphaltum made from bituminous limestone.
b Including gilsonite from Colorado and Utah, gum asphaltum from Texas, and "Ventura," hard asphaltum, from California.

IMPORTS.

The United States draws its chief supply of foreign asphaltum from the island of Trinidad, off the coast of Venezuela. In addition to the Trinidad asphaltum we import also some from Bermudez, in Venezuela; bituminous limestone from Neuchatel and Val de Travers in Switzerland, Seysel in France, and small amounts from Germany, Cuba, Mexico, and scattering lots from other countries.

It will be observed from the following table of imports, taken in connection with the table of production, that the value of the domestic product in 1900 was about 9 per cent less than that of the imported material, but it should be stated that the value of the imported asphaltum is for the material at the point of shipment and before any expenses of freight charges or import duties have been added.

The following table shows the imports of crude asphaltum since 1867:

Crude asphaltum imported into the United States from 1867 to 1900.

Year ending—	Quantity.	Value.	Year ending—	Quantity.	Value.
June 30—	*Long tons.*		June 30—	*Long tons.*	
1867	....	$6,268	1885	18,407	$88,087
1868	185	5,632	Dec. 31—		
1869	203	10,559	1886	32,565	108,528
1870	488	13,072	1887	30,808	95,735
1871	1,301	14,760	1888	36,494	84,045
1872	1,474	35,533	1889	61,952	138,163
1873	2,314	38,298	1890	73,861	223,368
1874	1,183	17,710	1891	102,433	299,350
1875	1,171	26,006	1892	120,255	336,868
1876	807	23,818	1893	74,774	196,314
1877	4,532	36,550	1894	102,505	313,680
1878	5,476	35,932	1895 *a*	79,557	210,556
1879	8,084	39,635	1896 *a*	96,192	304,596
1880	11,830	87,889	1897 *a*	115,528	392,770
1881	12,883	95,410	1898 *b*	69,857	203,385
1882	15,015	102,698	1899 *c*	106,474	425,263
1883	33,116	149,999	1900 *d*	118,771	454,732
1884	36,078	145,571			

a In addition to the crude asphaltum imported in 1895 there was some manufactured or refined gum asphaltum, valued at $36,664. In 1896 the value of the manufactured asphaltum imported was $77,449 and in 1897, $25,095. The quantity was not reported.

b Includes 3,069 long tons, "dried or advanced," valued at $17,005.

c Includes 4,264 long tons, "dried or advanced," valued at $35,395.

d Includes 5,141 long tons, "dried or advanced," valued at $49,242.

The following statement shows the amount and value of the asphaltum imported during the fiscal years ending June 30, 1897, 1898, 1899, and 1900, with the countries from which it was exported. The amount credited to Italy in 1897 was probably wholly or in part from Switzerland and shipped through some Italian seaport.

The most noticeable showing in this table is the largely increased imports from both Trinidad and Venezuela in 1900. The imports from Trinidad have increased nearly 36 per cent, from 68,916 long tons in 1899 to 93,687 long tons in 1900. The amount reported from Venezuela (Bermudez) in 1900 was nearly three times that imported from that country during the preceding year. The imports from these two sources in 1900 amounted to 105,266 long tons, out of a total of 106,162 long tons, leaving less than a thousand tons imported from other countries.

Imports of asphaltum during the fiscal years 1897, 1898, 1899, and 1900, with the countries from which exported.

Country.	1897.		1898.	
	Quantity.	Value.	Quantity.	Value.
West Indies:	*Long tons.*		*Long tons.*	
British (Trinidad)	85,034	$198,786	71,992	$217,660
Dutch	400	2,000	....	....
Cuba	223	4,180	137	2,172
Switzerland	....	....	98	830
Italy	*a* 14,581	*a* 77,456	1,260	7,531
Venezuela (Bermudez)	13,807	75,943	2,000	10,006
Germany	6,896	25,986	2,302	9,066
France	861	3,327	779	3,377
Mexico	273	3,992	438	5,773
Turkey in Asia	31	3,439	41	3,744
Great Britain	11	309	13	597
United States of Colombia	3	130	....	9
Canada	2	6	....	....
Total	122,122	395,554	79,060	260,765

Country.	1899.		1900.	
	Quantity.	Value.	Quantity.	Value.
West Indies:	*Long tons.*		*Long tons.*	
British (Trinidad)	68,916	$199,108	93,687	$277,378
Dutch	....	....	25	263
Cuba	109	2,090	553	14,009
Switzerland	837	7,653	....	....
Italy	6,443	28,276	....	....
Venezuela (Bermudez)	3,609	18,112	11,579	58,298
Germany	1,482	7,815	50	185
France	649	2,616	105	2,202
Spain	700	7,000	....	....
Mexico	32	714	40	642
Turkey in Asia	84	8,770	108	9,548
Great Britain	23	997	....	....
United States of Colombia	....	....	5	48
Canada	3	80	....	....
Netherlands	6	209	10	718
Total	82,893	283,440	106,162	363,291

a Probably including Switzerland.

PRODUCTION IN OTHER COUNTRIES.

TRINIDAD.

The island of Trinidad, off the coast of Venezuela, South America, one of the British West Indian possessions, is, next to France, the largest producer of asphaltum in the world.[1] The deposits are oper-

[1] The French asphaltum is in reality a bituminous limestone of which the bitumen contents average only about 14 per cent. Trinidad Lake asphaltum, on the other hand, averages approximately 55 per cent bitumen. The product of France in 1898 was 252,358 short tons, of which the bitumen contents were about 35,300 short tons. The shipments of lake asphaltum in crude and crude equivalent from Trinidad in the same year amounted to 86,959 long tons, or 97,394 short tons, of which the bitumen contents, reckoned at 55 per cent, would be about 53,509 short tons. It will be seen from this that while France produced the largest amount in crude, Trinidad is the leader of the world in the bitumen contents of its product. Land asphaltum, of which Trinidad produces over 20,000 tons annually, has not been included in this comparison.

ated by an American corporation under a concession from the British Government, and, independently, from land not belonging to the Crown and which was acquired by purchase. The chief source of the supply is a lake of pitch filling the crater of an extinct volcano. This lake lies 138 feet above sea level and has an area of 114 acres. The supply is being partly renewed by a constant flow of soft pitch into the center of the lake from a subterranean source. The shipments of lake pitch for the last ten years have averaged over 80,000 tons per year. The flow into the lake is at the rate of about 20,000 tons per year, so that the renewal of supply is less than one-fourth the amount taken out. The depth of the lake, however, is about 135 feet at the center, and considering the extent of the deposit, there need be little apprehension of the early exhaustion of supply of Trinidad asphaltum. The material from this lake is known as "lake pitch." Distinctive from this is what is known as "land pitch," the overflow in past times of pitch from the lake and deposits of similar nature but different origin. The overflow pitch mingled with the soil, and while it, with the other land deposits, forms another source of supply, the amount of mineral matter it contains is greater than the lake pitch, and the latter is in consequence preferred.

Exports of Pitch Lake asphaltum from Trinidad, 1881 to 1900, inclusive.

Year.	To United States.			To Europe.			To other countries.			Grand total of exports in crude equivalent.
	Crude.	Dried.	Total equivalent in crude.	Crude.	Epuré and dried.	Total equivalent in crude.	Crude.	Épuré and dried.	Total equivalent in crude.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1881	5,600	....	5,600	10,656	6,174	19,917	....	....	....	25,517
1882	12,710	....	12,710	24,712	12,007	42,722	....	....	....	55,432
1883	22,885	....	22,885	11,744	4,668	18,746	....	....	....	41,631
1884	17,885	....	17,885	15,910	6,561	25,751	....	....	....	43,636
1885	15,505	....	15,505	12,135	7,636	23,589	....	....	....	39,094
1886	22,225	....	22,225	5,130	5,394	13,221	....	....	....	35,446
1887	21,915	....	21,915	10,205	5,771	18,861	....	....	....	40,776
1888	24,321	....	24,321	8,445	8,248	20,817	....	....	....	45,138
1889	45,410	....	45,410	9,378	9,581	23,750	....	....	....	69,160
1890	39,907	....	39,907	11,755	9,951	26,681	668	....	*a* 668	67,256
1891	52,510	....	52,510	9,984	9,969	24,937	901	....	*a* 901	78,348
1892	70,806	....	70,806	11,596	9,458	25,783	1,076	....	*a* 1,076	97,665
1893	65,436	....	65,436	10,640	6,650	20,615	....	....	....	86,051
1894	71,860	....	71,860	8,967	9,413	23,086	....	....	....	94,946
1895	61,702	2,256	64,976	5,058	7,365	16,104	....	....	....	81,080
1896	60,637	....	60,637	8,320	8,052	20,391	....	1,300	*b* 1,918	82,946
1897	71,969	1,769	74,407	14,629	13,510	34,856	....	500	680	109,243
1898	46,089	1,692	48,423	15,703	13,228	35,537	*a* 693	*b* 1,646	2,999	86,959
1899 *c*	70,111	666	70,777	21,337	20,618	41,955	....	2,359	2,359	115,091
1900 *c*	67,758	3,180	70,938	23,386	23,966	47,352	1,422	3,031	4,453	122,743

a Australia.

b Argentina and Mexico.

c The dried and "épuré" in 1899 and 1900 are not reduced to crude equivalents.

Exports of land asphaltum from Trinidad, 1886 to 1900, inclusive.

Year.	To United States.			To Europe.			To other countries.			Grand total of exports in crude equivalent.
	Crude.	Épuré.	Total equivalent in crude.	Crude.	Épuré.	Total equivalent in crude.	Crude.	Épuré.	Total equivalent in crude.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1886	2,297	....	2,297	....	....	....	....	....	....	2,297
1887	1,195	2,100	4,345	220	....	220	....	....	....	4,565
1888	5,316	1,536	7,620	619	....	619	....	....	....	8,239
1889	10,490	2,052	13,568	....	....	....	833	....	*a* 833	14,401
1890	15,406	1,341	17,417	....	....	....	....	....	....	17,417
1891	20,507	7	20,517	139	....	139	40	....	*b* 40	20,696
1892	17,406	....	17,406	699	....	699	....	....	....	18,105
1893	3,450	....	3,450	2,432	1,862	5,225	110	178	*b* 377	9,052
1894	3,365	325	3,853	2,200	4,699	9,249	13	94	*b* 154	13,256
1895	4,445	199	4,744	1,770	2,368	5,322	....	169	*b* 254	10,320
1896	11,943	71	12,049	842	1,988	3,824	....	....	....	15,873
1897	19,243	....	19,243	293	700	1,343	415	178	682	21,268
1898	15,160	....	18,160	700	258	1,087	404	312	872	20,119
1899 *c*	24,622	542	25,164	275	250	525	80	298	378	26,067
1900 *c*	33,936	860	34,796	251	....	251	127	70	197	35,244

a Australia.
b Canada, Venezuela, and West Indies.
c The dried and "épuré" in 1899 and 1900 are not reduced to crude equivalents.

Total exports of all asphaltum from Trinidad, 1886 to 1900, inclusive.

Year.	To United States.			To Europe.			To other countries.			Grand total.
	Lake.	Land.	Total.	Lake.	Land.	Total.	Lake.	Land.	Total.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1886	22,225	2,297	24,522	13,221	....	13,221	....	....	....	37,743
1887	21,915	4,345	26,260	18,861	220	19,081	....	....	....	45,341
1888	24,321	7,620	31,941	20,817	619	21,436	....	....	....	53,377
1889	45,410	13,568	58,978	23,750	....	23,750	....	833	833	83,561
1890	39,907	17,417	57,324	26,681	....	26,681	668	....	668	84,673
1891	52,510	20,517	73,027	24,937	139	25,076	901	40	941	99,044
1892	70,806	17,406	88,212	25,783	699	26,482	1,076	....	1,076	115,770
1893	65,436	3,450	68,886	20,615	5,225	25,840	....	377	377	95,103
1894	71,860	3,853	75,713	23,086	9,249	32,335	....	154	154	108,202
1895	64,976	4,744	69,720	16,104	5,322	21,426	....	254	254	91,400
1896	60,637	12,049	72,686	20,391	3,824	24,215	1,918	....	1,918	98,819
1897	74,407	19,243	93,650	34,856	1,343	36,199	680	682	1,362	130,511
1898	48,423	18,160	66,583	35,537	1,087	36,624	2,999	872	3,871	107,078
1899 *a*	70,777	25,164	95,941	41,955	525	42,480	2,359	378	2,737	141,158
1900 *a*	70,938	34,796	105,734	47,352	251	47,603	4,453	197	4,650	157,987

a The dried and "épuré" in 1899 and 1900 are not reduced to crude equivalents.

OTHER COUNTRIES.

Outside of Trinidad and the United States the more important asphaltum-producing countries are Germany, France, Switzerland, and Spain. No statistics are available regarding the production of Switzerland. Small quantities of asphaltum are also produced in Russia, Mexico, Turkey in Asia, Great Britain, the United States of Colombia, Canada, and the Netherlands.

In the following table is given a statement of the production of asphaltum in the principal producing countries since 1890:

Production of asphaltum in principal producing countries since 1890.

Year.	United States.		Trinidad.		Germany.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1890	40,841	$190,416	94,834	$254,019	59,361	$89,961
1891	45,054	242,264	110,923	297,132	54,163	89,419
1892	87,680	445,375	129,438	347,310	58,713	99,686
1893	47,779	372,232	106,515	285,309	52,056	84,962
1894	60,570	353,400	121,186	324,606	61,691	107,350
1895	68,163	348,281	102,368	274,200	65,638	108,153
1896	80,503	577,563	110,667	296,457	67,830	107,908
1897	75,945	664,632	146,172	292,344	67,933	91,984
1898	76,337	675,649	112,220	553,890	75,550	99,088
1899	75,085	553,904	153,870	745,242	82,397	123,984

Year.	France.		Italy.		Spain.	
	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1890	198,934	$335,092	49,728	$232,351	47	$94
1891	278,316	402,631	31,054	131,028	274	505
1892	246,848	323,854	38,107	162,308	554	1,014
1893	244,641	311,116	28,630	109,200	904	1,235
1894	254,562	339,294	66,663	270,854	1,085	1,939
1895	294,234	355,700	51,478	197,584	870	1,525
1896	249,052	336,013	50,092	171,507	1,231	2,156
1897	257,127	328,002	60,984	183,017	1,825	3,196
1898	252,358	322,117	103,312	256,347	2,604	4,605
1899	285,208	356,719	90,350	222,519	2,801	4,964

STONE.[1]

INTRODUCTION.

The value of the stone product increased from $44,090,670 in 1899 to $48,008,739 in 1900, a gain of $3,918,069. This increase showed in all kinds of stone, but the greatest in limestone. The table given below shows for the first time the value of granite exclusive of trap rock, and the value of sandstone exclusive of bluestone. The value of sandstone made into whetstones and grindstones is not included in the 1899 and 1900 report, in order that no duplication of figures may occur. These products are treated of under the heading "Abrasive materials," by Dr. Joseph Hyde Pratt. A large amount of limestone used in the manufacture of Portland cement is not included in the value of limestone.

VALUE OF STONE PRODUCED FROM 1890 TO 1900.

The following table shows the value of the different kinds of stone produced in the United States from 1890 to 1900, inclusive:

Value of the different kinds of stone produced in the United States from 1890 to 1900, inclusive.

Year.	Granite.	Trap rock.	Marble.	Slate.	Sandstone.	Bluestone.	Limestone.	Total.
1890....	$14,464,095	....	$3,488,170	$3,482,513	$10,816,057	$1,689,606	$19,095,179	$53,035,620
1891....	13,867,000	....	3,610,000	3,825,746	8,700,000	*a* 1,500,000	15,792,000	47,294,746
1892....	12,642,000	....	3,705,000	4,117,125	8,315,500	*a* 1,600,000	18,342,000	48,721,625
1893....	8,808,934	....	2,411,092	2,523,173	5,295,151	*a* 1,000,000	13,947,223	33,985,573
1894....	10,029,156	....	3,199,585	2,790,324	3,955,847	*a* 900,000	16,190,118	37,065,030
1895....	8,894,328	....	2,825,719	2,698,700	4,211,314	*a* 750,000	15,308,755	34,688,816
1896....	7,944,994	....	2,859,136	2,746,205	4,023,199	*a* 750,000	13,022,637	31,346,171
1897....	8,905,075	....	3,870,584	3,524,614	4,065,445	*a* 900,000	14,804,933	36,070,651
1898....	9,324,406	....	3,629,940	3,723,540	4,724,412	*a* 1,000,000	16,039,056	38,441,354
1899....	10,343,298	$1,275,041	4,011,681	3,962,733	*b* 4,924,670	815,284	18,757,963	44,090,670
1900....	10,969,417	1,706,200	4,267,253	4,240,466	*b* 5,272,865	1,198,519	20,354,019	48,008,739

a Estimated. *b* Does not include grindstones and whetstones.

[1] Owing to the continued severe illness of Dr. William C. Day, the stone report is again limited to tables of production and review of the industry in each State, for which credit is due to Miss Altha T. Coons, statistical expert.—Ed.

Value of various kinds of stone produced in 1900, by States.

State.	Granite.	Sandstone.	Slate.	Marble.	Limestone.	Total.
Alabama		$7,132		$500	$533,608	$541,240
Arizona		64,000		5,000	165	69,165
Arkansas	$62,500	104,923			71,407	238,830
California	*a* 738,993	200,090	$26,500	17,500	407,489	1,390,572
Colorado	143,054	119,658			160,587	423,299
Connecticut	*a* 507,754	192,593			148,060	848,407
Delaware	608,028					608,028
Florida					128,381	128,381
Georgia	380,434	600	9,375	631,241	54,451	1,076,101
Idaho	2,450	438		1,250	34,587	38,725
Illinois		19,141			1,881,151	1,900,292
Indiana		*c* 36,513			2,344,818	2,381,331
Iowa		19,063			586,410	605,473
Kansas	30,000	55,173			339,466	424,639
Kentucky		56,178			178,252	234,430
Louisiana		*d* 118,192				*f* 118,192
Maine	1,568,573		177,342		691,312	2,437,227
Maryland	486,822	6,655	128,673	70,000	317,207	1,009,357
Massachusetts	*a* 1,698,605	153,427		130,735	209,359	2,192,126
Michigan	3,957	*c* 132,650			425,636	562,243
Minnesota	221,684	267,000	700		441,554	930,938
Missouri	139,103	53,401		900	1,079,343	1,272,747
Montana	*b* 9,091	59,630		1,200	141,093	211,014
Nebraska					107,305	107,305
New Hampshire	870,646					870,646
New Jersey	*a* 1,170,555	198,234	13,600		170,006	1,552,395
New Mexico		2,500		4,500		7,000
New York	*a* 446,171	*e* 1,467,496	62,755	332,518	1,730,162	4,039,102
North Carolina	257,962	27,210			(*f*)	285,172
Ohio		*c* 1,683,980			1,969,387	3,653,367
Oklahoma					25,586	25,586
Oregon	5,313	5,450			10,900	21,663
Pennsylvania	*a* 396,271	*c e* 1,043,321	2,713,598	151,167	3,800,318	8,104,675
Rhode Island	444,316				16,828	461,144
South Carolina	500,802				*g* 38,415	539,217
South Dakota	114,115	12,675			47,762	174,552
Tennessee		11,300	250	424,054	238,505	674,109
Texas	76,069	37,038			124,728	237,835
Utah	2,170	66,733			12,749	81,652
Vermont	1,113,788		917,462	2,484,852	188,100	4,704,202
Virginia	211,080	6,000	190,211		403,318	810,609
Washington	48,900	68,133		11,836	249,163	378,032
West Virginia		*e* 65,615			53,701	119,316
Wisconsin	407,711	81,571			989,685	1,478,967
Wyoming	8,700	27,671			3,065	39,436
Total	*a* 12,675,617	*c e* 6,471,384	4,240,466	4,267,253	20,354,019	48,008,739

a Includes trap rock.
b Includes small amount of Nevada.
c Excludes value of grindstones and whetstones.
d Includes small amount for Mississippi.
e Includes bluestone.
f Included with South Carolina.
g Includes small amount for North Carolina.

GRANITE.

The granite product in 1900 showed an increase of $1,057,278 over the previous year, being valued at $12,675,617 in 1900, and at $11,618,339 in 1899. This increase was divided among all the uses to which the rock was put, except riprap and monumental work, which showed a slight decline. The greatest advance was shown in the value of stone dressed for building purposes, which advanced from $2,625,289 in 1899 to $3,233,224 in 1900, a gain of $607,935. A considerable gain was shown in the product of stone crushed for road-building purposes, being $2,044,797 in 1899 and $2,571,899 in 1900, or a gain of $527,102.

The following table shows the value of the granite output for 1897, 1898, 1899, and 1900, by States:

Value of granite produced in 1897, 1898, 1899, and 1900.

State.	1897.	1898.	1899.	1900.
Arkansas			$39,470	$62,500
California	$167,518	$247,429	471,665	738,993
Colorado	44,284	25,923	78,261	143,054
Connecticut	616,215	682,768	516,886	507,754
Delaware	272,469	677,754	1,039,349	608,028
Georgia	436,000	339,311	411,344	380,434
Idaho Kansas				32,450
Maine	1,115,327	1,032,621	1,321,082	1,568,573
Maryland	247,948	317,258	423,823	486,822
Massachusetts	1,736,069	1,650,508	1,798,294	1,698,605
Michigan				3,957
Minnesota	92,412	79,309	159,459	221,684
Missouri	97,857	78,423	151,688	139,103
Montana Nevada	3,050		9,950	9,091
New Hampshire	641,691	683,595	802,636	870,646
New Jersey	561,782	753,513	779,822	1,170,555
New York	422,216	516,847	306,711	446,171
North Carolina	59,236	79,969	225,544	257,962
Oregon	1,125		3,012	5,313
Pennsylvania	349,947	237,780	385,101	396,271
Rhode Island	629,564	320,242	400,128	444,316
South Carolina	37,820	169,518	361,034	500,802
South Dakota	68,961	17,443	91,049	114,115
Texas	3,500	4,685	84,945	76,069
Utah	3,854	3,545	4,735	2,170
Vermont	1,074,300	1,084,218	1,212,967	1,113,788
Virginia	88,096	136,180	223,380	211,080
Washington	5,800	9,700	42,766	48,900
Wisconsin	126,134	175,867	270,538	407,711
Wyoming			2,700	8,700
Total	8,905,075	9,324,406	11,618,339	12,675,617

The following table shows the value of the granite production in 1899 and 1900, by States and uses:

Value of granite produced in 1899 and 1900, by States and uses.

1899.

State.	Sold in rough.	Dressed for building purposes.	Dressed for monumental work.	Made into paving blocks.	Curbing.	Crushed for roads.	Riprap.	Total.
Arkansas	$6,100	$12,270	$2,800	$750	$300	$15,000	$2,250	$39,470
California	45,940	41,678	32,134	41,176	12,603	292,863	5,271	471,665
Colorado	22,850	48,152	1,082	....	75	95	6,007	78,261
Connecticut	79,720	167,889	82,766	26,526	12,964	130,145	16,876	516,886
Delaware	11,408	1,935	8,252	17,511	3,748	46,495	950,000	1,039,349
Georgia	69,370	185,135	13,227	37,500	68,748	30,564	6,800	411,344
Maine	302,731	637,616	77,350	184,084	94,237	7,860	17,204	1,321,082
Maryland	104,167	137,377	21,518	24,075	27,500	106,636	2,550	423,823
Massachusetts	508,781	533,004	257,820	226,909	88,685	88,414	94,681	1,798,294
Minnesota	19,769	38,913	63,395	1,588	28,835	2,500	4,459	159,459
Missouri	14,860	12,000	2,970	34,213	61,500	25,995	150	151,688
Montana, Nevada	1,650	6,850	1,200	....	250	....	....	9,950
New Hampshire	180,109	272,368	256,397	54,099	23,437	7,480	8,746	802,636
New Jersey	56,276	48,035	....	67,793	138	606,780	800	779,822
New York	30,768	23,477	2,460	12,575	447	236,736	248	306,711
North Carolina	34,028	60,128	361	40,873	71,414	11,925	6,815	225,544
Oregon	12	....	....	3,000	....	....	....	3,012
Pennsylvania	60,692	11,809	1,339	46,290	13,445	250,520	1,006	385,101
Rhode Island	73,866	151,521	145,001	16,147	3,360	4,915	5,318	400,128
South Carolina	13,189	75,750	10,500	8,222	1,500	43,497	208,376	361,034
South Dakota	27,220	21,303	21,500	13,506	....	5,700	1,820	91,049
Texas	16,222	1,605	35,038	....	....	30,580	1,500	84,945
Utah	4,700	....	....	35	....	....	....	4,735
Vermont	563,475	125,775	509,358	3,500	7,086	1,931	1,842	1,212,967
Virginia	32,336	10,349	28,812	37,127	8,683	55,666	50,407	223,380
Washington	42,250	350	166	....	....	....	....	42,766
Wisconsin	26,742	....	112,521	72,000	16,700	42,500	75	270,538
Wyoming	2,700	....	....	....	....	....	....	2,700
Total	2,351,931	2,625,289	1,687,967	969,499	545,655	2,044,797	1,393,201	11,618,339

Value of granite produced in 1899 and 1900, by States and uses—Continued.

1900.

State.	Sold in rough.	Dressed for building purposes.	Dressed for monumental work.	Made into paving blocks.	Curbing.	Crushed for roads.	Riprap.	Total.
Arkansas	$12,000	....	....	$4,000	$7,000	$28,500	$11,000	$62,500
California	47,539	$256,990	$34,159	33,006	17,116	238,991	111,192	738,993
Colorado	14,356	106,784	4,509	8,750	215	8,440	....	143,054
Connecticut	94,080	112,010	52,535	15,670	25,224	176,743	31,492	507,754
Delaware	7,912	5,348	1,000	28,191	3,459	36,558	525,560	608,028
Georgia	52,975	84,052	24,100	28,652	130,065	43,240	17,350	380,434
Idaho	....	....	2,450	....	....	....	....	2,450
Kansas	....	....	....	....	....	30,000	....	30,000
Maine	286,781	887,786	98,380	145,966	96,271	5,012	48,377	1,568,573
Maryland	127,608	164,181	13,400	71,855	24,520	84,151	1,107	486,822
Massachusetts	569,119	429,077	80,573	267,148	89,692	122,661	140,335	1,698,605
Michigan	3,957	....	....	....	....	....	....	3,957
Minnesota	19,598	104,955	72,934	3,896	11,199	5,450	3,652	221,684
Missouri	15,073	215	217	71,154	11,056	38,749	2,639	139,103
Montana Nevada	285	2,202	4,922	....	1,682	....	....	9,091
New Hampshire	193,471	299,418	242,026	58,512	37,427	15,126	24,666	870,646
New Jersey	100,130	176,608	800	51,697	337	838,621	2,362	1,170,555
New York	40,290	48,275	730	8,341	3,155	345,115	265	446,171
North Carolina	15,508	56,133	6,621	46,414	81,426	25,778	26,082	257,962
Oregon	993	1,500	2,500	320	....	....	....	5,313
Pennsylvania	71,454	14,761	507	13,189	10,664	285,296	400	396,271
Rhode Island	70,800	120,428	232,144	13,382	3,461	3,483	618	444,316
South Carolina	6,376	143,750	26,498	7,077	2,625	99,459	215,017	500,802
South Dakota	61,915	7,245	5,645	10,344	6,195	12,645	10,126	114,115
Texas	19,808	130	25,616	....	3,500	6,015	21,000	76,069
Utah	918	32	920	....	....	....	300	2,170
Vermont	526,370	49,763	527,053	225	2,735	1,472	6,170	1,113,788
Virginia	54,225	55,296	21,461	16,605	8,810	38,850	15,833	211,080
Washington	15,500	13,500	10,000	....	9,500	....	400	48,900
Wisconsin	19,335	90,985	107,142	101,902	5,875	81,544	928	407,711
Wyoming	6,900	1,800	....	....	....	....	....	8,700
Total	2,455,276	3,233,224	1,598,842	1,006,296	593,209	2,571,899	1,216,871	12,675,617

The quarrying of trap rock for road-making purposes has in recent years become an important feature of the trade, and is included in the above table.

Trap rock outcrops and is quarried commercially in all the New England States, New York, New Jersey, Pennsylvania, Maryland, and Virginia, and in the West chiefly in California, where basaltic rock is also included in the road-making materials. New Jersey produces more trap rock than any other State. The trap-rock quarries in this State are situated within easy reach of transportation, and the ease with which the stone is quarried, together with the demands for good roads, as encouraged by the State and Government, renders the quarries of great importance. Pennsylvania, New York, and Connecticut follow next after New Jersey. The following table shows the production of trap rock in the States where it forms a large factor in the trade:

Value of trap rock produced in the United States in 1899 and 1900, by States and uses.

1899.

State.	Sold in rough.	Made into paving blocks.	Crushed for roads or ballast.	Other purposes.	Total.
California	....	$3,500	$44,307	$4,500	$52,307
Connecticut	....	804	109,085	865	110,754
Massachusetts	$9,000	....	56,835	400	66,235
New Jersey	4,973	63,918	574,905	5,225	649,021
New York	....	....	162,250	....	162,250
Pennsylvania	10,250	2,000	221,224	1,000	234,474
Total	24,223	70,222	1,168,606	11,990	1,275,041

1900.

State.	Sold in rough.	Made into paving blocks.	Crushed for roads or ballast.	Other purposes.	Total.
California	$750	$10,000	$117,062	$4,523	$132,335
Connecticut	3,701	767	144,293	1,427	150,188
Massachusetts	1,000	....	80,545	....	81,545
New Jersey	28,014	46,247	793,621	13,766	881,648
New York	....	....	171,773	12,627	184,400
Pennsylvania	5,573	21	270,444	46	276,084
Total	39,038	57,035	1,577,738	32,389	1,706,200

The total value, $1,706,200, shows a gain of $431,159 over the value for 1899, which was $1,275,041.

GRANITE INDUSTRY IN INDIVIDUAL STATES.

ARKANSAS.

The granite output in Arkansas increased from $39,470 in 1899 to $62,500 in 1900, or $23,030, with excellent prospects for 1901.

CALIFORNIA.

The value of the granite produced in the State of California increased from $471,665 in 1899 to $738,993 in 1900. This represents a gain of $267,328. These figures include the value of trap rock and basaltic rock used largely for riprap, macadam, and railroad ballast.

COLORADO.

The granite production of Colorado in 1900 exceeded that of 1899 by $64,793, the value being $143,054 in 1900 against $78,261 in 1899. The chief increase was due to the large amount of building stone used, the amount of granite used in building operations being $48,152 in 1899 and $106,784 in 1900. The granite product of Colorado includes basalt and lava rock.

CONNECTICUT.

The granite industry in Connecticut in 1900 was reported as being dull, several quarries only working part of the time. There was also more or less trouble on account of strikes. The value of the output fell from $516,886 in 1899 to $507,754 in 1900, a decrease of $9,132. An increase was noted in the value of stone crushed for roads. The Connecticut product includes trap rock, valued at $150,188.

DELAWARE.

The production of granite in Delaware decreased considerably in 1900 owing to less stone being quarried for breakwater and riprap purposes.

GEORGIA.

The most interesting feature in the production of granite in Georgia is the increase in the amount of stone used for curbing, riprap work, and road making, and the decrease in value of stone used for building. The entire product of Georgia decreased from $411,344 in 1899 to $380,434 in 1900, a loss of $30,910.

MAINE.

The value of the granite product of Maine in 1900 was $1,568,573. This is the highest figure reached since 1892, when the production was given as $2,300,000, and it about equaled the product in 1894, which had a value of $1,551,036. The value in 1899 was $1,321,082, which was $247,491 less than 1900. Notwithstanding the increase in value quarrymen reported that the quarries were operated only part of the time, and that labor troubles were also frequent.

MASSACHUSETTS.

Massachusetts ranks first as a granite-producing State, exceeding Maine by $130,032. The value of granite produced in 1900 was slightly lower than that of 1899, being $1,698,605 in 1900 and $1,798,294 in 1899, a loss of $99,689.

Many quarrymen make note of strikes, which affected the production, and some report working their quarries but part of the time.

The most important trade change which took place during the year was the combination of most of the quarries at Quincy into The Quincy Granite Quarries Company.

The value of trap rock included in the granite production in 1900 was $81,545, which is $15,310 more than the value in 1899, when it was $66,235.

MINNESOTA.

The granite production in Minnesota in 1900 was $221,684, which is a gain of $62,225 over 1899, when the value was $159,459. Almost every firm reported increased operations.

MISSOURI.

The value of the granite product in Missouri decreased from $151,688 in 1899 to $139,103 in 1900.

NEW HAMPSHIRE.

The production in 1900 slightly increased in value, although strikes were reported.

NEW JERSEY.

The granite production in New Jersey is almost entirely represented by trap rock, used for road-making purposes.

The value of the granite in 1900 was $288,907 and of the trap rock $881,648, or a total of $1,170,555. The corresponding figures for 1899 were: Granite, $130,201; trap rock, $649,021; total value, $779,222. This shows an increase of $158,706 in the value of the granite, $232,627 in the value of trap rock, and $391,333 in the total value.

NEW YORK.

New York shows an increase of $139,460 in granite production in 1900 over 1899. The value in 1899 was $306,711 and in 1900 $446,171. Trap rock to the amount of $184,400 is included in the total for 1900 and to the value of $162,250 in the total for 1899.

NORTH CAROLINA.

The granite production of North Carolina increased from $225,544 in 1899 to $257,962 in 1900, or a gain of $32,418.

PENNSYLVANIA.

Trap rock, valued at $276,084, forms the greater part of the granite production in Pennsylvania in 1900. The value of granite was $120,187, making a total of $396,271. This shows a slight increase over the total value in 1899, which was $385,101. The value of trap rock in 1899 was $234,474, showing a gain of $41,610 in 1900. The value of granite in 1899 was $150,627, or a decline of $30,440 in 1900.

RHODE ISLAND.

The value of the granite production of Rhode Island in 1900 showed an increase of $44,188 over the value in 1899. The production in 1899 was $400,128; in 1900, $444,316. The increase was chiefly in the value of stone dressed for building purposes and for monumental work.

SOUTH CAROLINA.

The granite product of South Carolina advanced from $361,034 in 1899 to $500,802 in 1900, a gain of $139,768. No new operations were undertaken, but the old ones showed great activity. The increase was shown in the use of granite for all purposes except that sold in the rough and in the paving-block industry.

SOUTH DAKOTA.

The production of granite in South Dakota advanced from $91,049 in 1899 to $114,115 in 1900.

TEXAS.

The Texas production of granite declined from $84,945 in 1899 to $76,069 in 1900.

VERMONT.

In 1899 the value of granite produced in Vermont was $1,212,967; in 1900 it was $1,113,788, showing a decrease of $99,179. The decline was shown mostly in the value of stone used for building purposes; this was $125,775 in 1899 and $49,763 in 1900. There was, however, an increase in the value of granite used for monumental work from $509,358 in 1899 to $527,053 in 1900.

VIRGINIA.

The granite product in Virginia decreased from $223,380 in 1899 to $211,080 in 1900, or $12,300.

WASHINGTON.

The granite product of Washington increased slightly in 1900, being valued at $42,766 in 1899 and $48,900 in 1900.

WISCONSIN.

The granite product of Wisconsin increased from $270,538 in 1899 to $407,711 in 1900, being an increase of $137,173. The increase was in the values of stone dressed for building, made into paving blocks, and crushed for roads.

SANDSTONE.

The total value of the sandstone produced in 1900 was $7,149,300. The production in 1899 was valued at $6,362,944.

These figures include bluestone produced in New York and Pennsylvania to the value of $1,198,519 in 1900 and $815,284 in 1899. They also include grindstones and whetstones valued at $677,916 in 1900 and $622,990 in 1899. Deducting these values from the entire total as given above, the value of the sandstone product by itself was $5,272,865 in 1900 and $4,924,670 in 1899.

The figures given above for grindstones and whetstones are the values as obtained from quarrymen who produce other kinds of stone as well, and do not include the product of those operators who manufacture only whetstones and grindstones.

The following table shows the value of the sandstone production in the United States in 1897, 1898, 1899, and 1900, by States:

Value of sandstone produced in the United States in 1897, 1898, 1899, and 1900, by States.

States.	1897.	1898.	1899.	1900.
Alabama	$3,000	$27,882	$71,675	$7,132
Arizona	15,000	57,444	4,168	64,000
Arkansas	3,161	24,825	73,616	104,923
California	4,035	358,908	261,193	200,090
Colorado	60,847	89,637	129,815	119,658
Connecticut	364,604	215,733	271,623	192,593
Georgia	....	....	....	600
Idaho	....	....	....	438
Illinois	14,250	13,758	16,133	19,141
Indiana	35,561	45,342	35,636	*d* 36,513
Iowa	14,771	7,102	24,348	19,063
Kansas	20,953	19,528	49,629	55,173
Kentucky	40,000	72,525	119,982	56,178
Louisiana	8,000	200,500	*a* 226,503	*c* 118,192
Maryland	....	13,646	24,426	6,655
Massachusetts	194,684	91,287	131,877	153,427
Michigan	171,127	222,376	320,192	*d* 132,650
Minnesota	158,057	175,810	294,615	267,000
Missouri	57,583	48,795	57,662	53,401
Montana	25,644	3,682	26,160	59,630
New Jersey	190,976	257,217	147,768	198,234
New Mexico	....	3,500	1,829	2,500
New York	544,514	566,133	*b* 1,218,053	*b* 1,467,496
North Carolina	11,500	9,100	10,300	27,210
Ohio	1,600,058	1,494,746	1,775,642	*d* 1,683,980
Oregon	....	7,864	4,153	5,450
Pennsylvania	380,813	478,451	*b* 717,053	*b d* 1,043,321
South Dakota	....	9,000	18,325	12,675
Tennessee	....	....	....	11,300
Texas	30,030	77,190	35,738	37,038
Utah	7,907	15,752	29,091	66,733
Virginia	....	....	8,000	6,000
Washington	16,187	15,575	58,395	68,133
West Virginia	47,288	14,381	33,860	*d* 65,615
Wisconsin	33,620	80,341	132,901	81,571
Wyoming	11,275	6,382	32,583	27,671
Total	4,065,445	4,724,412	6,362,944	*d* 6,471,384

a Includes small amounts for Idaho and Nevada.
b Includes bluestone.
c Includes Mississippi.
d Does not include value of grindstones and whetstones.

The following table shows the value of sandstone produced in the United States in 1899 and 1900, by States and uses:

Value of sandstone produced in the United States in 1899 and 1900, by States and uses.

1899.

States.	Sold in rough.	Dressed for building purposes.	Sold for curbing and flagstone.	Sold for grindstones.	Sold for whetstones.	Other purposes.	Total.
Alabama	$17,500	$39,175	$15,000				$71,675
Arizona	3,680	488					4,168
Arkansas	34,091	13,475	26,050				73,616
California	186,216	73,009				$1,968	261,193
Colorado	60,138	25,673	37,229			6,775	129,815
Connecticut	175,918	62,839				32,866	271,623
Illinois	3,162	10,800	256			1,915	16,133
Indiana	24,030	4,150	376		$7,080		35,636
Iowa	4,744	17,904	1,700				24,348
Kansas	3,735	1,010	34,069			10,815	49,629
Kentucky	45,203	71,629	2,650			500	119,982
Louisiana	*a*226,503						226,503
Maryland	759	23,667					24,426
Massachusetts	60,244	70,433				1,200	131,877
Michigan	102,447	51,682	109	$138,115	4,039	23,800	320,192
Minnesota	59,181	144,732	88,702			2,000	294,615
Missouri	49,368	6,541	1,297	27		429	57,662
Montana	19,160					7,000	26,160
New Jersey	57,978	89,390	400				147,768
New Mexico	1,030	18	781				1,829
New York *b*	306,168	328,147	554,914			28,824	1,218,053
North Carolina		10,000	300				10,300
Ohio	249,211	434,978	572,111	480,963	3,440	34,939	1,775,642
Oregon	4,153						4,153
Pennsylvania *b*	184,464	350,525	119,156			62,908	717,053
South Dakota	14,050	3,425	575			275	18,325
Texas	3,338	9,600	21,800			1,000	35,738
Utah	3,970	24,341	20			760	29,091
Virginia	2,000	6,000					8,000
Washington	42,495	12,550	2,550			800	58,395
West Virginia	7,040	18,660	600	3,510		4,050	33,860
Wisconsin	36,118	83,537	7,165	375		5,706	132,901
Wyoming	9,938	15,145				7,500	32,583
Total	1,998,032	2,003,523	1,487,810	622,990	14,559	236,030	6,362,944

a Includes small amounts for Idaho and Nevada. *b* Includes bluestone.

Value of sandstone produced in the United States in 1899 and 1900, by States and uses—Cont'd.

1900.

States.	Sold in rough.	Dressed for building purposes.	Sold for curbing and flag-stone.	Sold for grind-stones.	Sold for whet-stones.	Other pur-poses.	Total.
Alabama	$3,745	$2,250	$1,137				$7,132
Arizona	14,000	50,000					64,000
Arkansas	58,538	8,055	31,010			$7,320	104,923
California	176,592	16,114	7,384				200,090
Colorado	59,387	31,478	22,793			6,000	119,658
Connecticut	52,646	127,540				12,407	192,593
Georgia		400	200				600
Idaho		438					438
Illinois	3,483	13,577	2,081				19,141
Indiana	23,096	6,394	320		$8,550	6,703	45,063
Iowa	3,058	15,052	771			182	19,063
Kansas	3,625	6,164	44,080			1,304	55,173
Kentucky	17,598	29,348	9,232				56,178
Louisiana *a*	118,192						118,192
Maryland	6,655						6,655
Massachusetts	47,283	78,644				27,500	153,427
Michigan	73,850	58,800		$102,000	4,000		238,650
Minnesota	74,318	84,895	107,787				267,000
Missouri	28,462	5,404	19,278			257	53,401
Montana	34,410	20,400	1,200			3,620	59,630
New Jersey	29,760	166,264	2,210				198,234
New Mexico		1,000	1,500				2,500
New York	59,405	301,109	*b* 948,553			158,429	1,467,496
North Carolina	15,660	8,216	1,000			2,334	27,210
Ohio	501,071	530,005	612,968	542,721	6,895	39,936	2,233,596
Oregon	4,890	155	55			350	5,450
Pennsylvania	247,586	412,633	243,118	6,727	200	139,984	1,050,248
South Dakota	5,500	6,800	375				12,675
Tennessee		11,300					11,300
Texas	15,066	12,847	9,125				37,038
Utah	9,029	52,548	5,006			150	66,733
Virginia		6,000					6,000
Washington	38,211	29,172				750	68,133
West Virginia	6,615	58,700	300	6,823			72,438
Wisconsin	30,237	47,680	404			3,250	81,571
Wyoming	16,354	8,317				3,000	27,671
Total	1,778,322	2,207,699	2,071,887	658,271	19,645	413,476	7,149,300

a Includes Mississippi. *b* Includes $225,592 used for paving purposes.

The following table shows the value and uses of bluestone produced in the United States in 1900, by States:

Value and uses of bluestone produced in the United States in 1900, by States.

State.	Flagging.	Curbing.	Gutters and crossings.	Coping, sills, lintels.	Other purposes.	Total.
New York	$340,087	$169,332	$60,644	$181,773	$165,229	$917,065
Pennsylvania	90,609	46,227	7,031	12,179	125,408	281,454
Total	430,696	215,559	67,675	193,952	290,637	1,198,519

The production of bluestone in 1899 was valued at $815,284. Of this New York produced $664,484 and Pennsylvania $150,800. No record was made of the production by uses.

SANDSTONE PRODUCTION IN INDIVIDUAL STATES.

ALABAMA.

Alabama showed a large decrease in the output of sandstone in 1900. Several companies reporting last year did not operate in 1900.

ARIZONA.

Arizona showed a considerable increase, owing to the inclusion of stone used by railroads for ballast, bridge masonry, etc.

ARKANSAS.

In 1900 Arkansas showed an increase in the value of sandstone production of $31,307, or from $73,616 in 1899 to $104,923 in 1900. This increase was in the value of stone sold in the rough, of which a large part was used for riprap, and in the stone used for curbing and flagstone. The amount used for building purposes decreased somewhat.

CALIFORNIA.

The value of sandstone produced in California in 1900 decreased from $261,193 in 1899 to $200,090 in 1900. A large amount of the rough stone used was for breakwater purposes.

COLORADO.

The value of the sandstone produced in Colorado in 1900 was $119,658, and in 1899 $129,815. There was an increase in the value of the stone used for building purposes. The other products decreased slightly in value.

CONNECTICUT.

The production of sandstone in Connecticut decreased in value from $271,623 in 1899 to $192,593 in 1900. The value of the rough stone sold was less than in 1899, and the value for building increased.

ILLINOIS.

The sandstone product of Illinois increased from $16,133 in 1899 to $19,141 in 1900. This gain was chiefly in the value of stone used for building purposes.

INDIANA.

The production of sandstone in Indiana increased from $35,636 in 1899 to $45,063 in 1900, or a gain of $9,427.

IOWA.

The value of the sandstone product of Iowa decreased from $24,348 in 1899 to $19,063 in 1900.

KANSAS.

The value of the sandstone produced in Kansas in 1900 was $55,173. The value in 1899 was $49,629. The chief increase was in the value of the stone used for curbing and flagstone.

KENTUCKY.

There was a decrease in the value of sandstone produced in Kentucky from $119,982 in 1899 to $56,178 in 1900. This was due to business changes, and the trade will in all probability return to its former condition in 1901.

MASSACHUSETTS.

The value of the sandstone production in Massachusetts increased from $131,877 in 1899 to $153,427 in 1900. This gain was confined chiefly to stone used for building. The value of the rough stone sold decreased in value.

MICHIGAN.

Diminished production, as reported by several quarries, caused the sandstone produced in Michigan to decrease somewhat in value. The value in 1899 was $320,192, and in 1900 $238,650.

MINNESOTA.

The value of sandstone decreased from $294,615 in 1899 to $267,000 in 1900.

MISSOURI.

There was a slight decrease in the sandstone production of Missouri in 1900.

MONTANA.

An increase in the value of stone used for building purposes and sold in the rough caused the value of the sandstone production to increase from $26,160 in 1899 to $59,630 in 1900, a gain of $33,470.

NEW JERSEY.

A small amount of bluestone is quarried in New Jersey, but as this does not form any considerable amount it is included in the sandstone production without note being made as to its value. The value of the sandstone quarried in New Jersey in 1900 was $198,234. In 1899 the value was $147,768. This shows an increase of $50,466. The increase is shown chiefly in the stone used for building purposes, which advanced from $89,390 in 1899 to $166,264 in 1900, a gain of $76,874. The value of rough stone sold decreased.

NEW YORK.

The total value of the sandstone produced in New York in 1900 was $1,467,496. This includes bluestone, valued at $917,065, and sandstone, valued at $550,431. The total value in 1899 was $1,218,053, which included bluestone, valued at $664,484, and sandstone, valued at $553,569. This shows an increase in the total value of $249,443, an increase in the bluestone value of $252,581, and a loss of $3,138 in the value of the sandstone. The value, $948,553, noted for curbing and flagstone includes $225,592 used for paving purposes.

NORTH CAROLINA.

The value of the sandstone product of North Carolina increased from $10,300 in 1899 to $27,210 in 1900, a gain of $16,910. The increase was chiefly in the value of rough stone sold.

OHIO.

Ohio ranks first in the list of the sandstone producing States, the value of the product in 1900 being $2,233,596, and in 1899, $1,775,642. This shows an increase of $457,954. This total includes grindstones and whetstones to the value of $549,636. The value of grindstones and whetstones in 1899 was $484,403.

There was a decided increase in the value of stone sold in the rough—from $249,211 in 1899 to $501,071 in 1900. The stone for building purposes increased from $434,978 in 1899 to $530,005 in 1900. This is a larger amount than attained by any other State.

PENNSYLVANIA.

The total value of the sandstone production in Pennsylvania in 1900 was $1,050,248. This includes $281,454 for bluestone and $768,794 for sandstone. The corresponding figures for 1899 were a total value of $717,053, which included $150,800 for bluestone and $566,253 for sandstone. This gives an increase in the total of $333,195, in the bluestone of $130,654, and in sandstone of $202,541.

SOUTH DAKOTA.

South Dakota decreased slightly in the value of its sandstone production. The product was valued at $12,675 in 1900 and $18,325 in 1899.

TENNESSEE.

An output of sandstone valued at $11,300 was reported as used for building purposes in Tennessee in 1900. This is more than has ever been reported before.

TEXAS.

The output of sandstone in Texas in 1900 was $37,038. This is but a slight gain over the production in 1899, which was $35,738.

UTAH.

The sandstone production in 1900 in Utah showed a decided increase over the value for 1899. The production for 1900 was valued at $66,733, of which $52,548 was used for building purposes. The value as reported in 1899 was $29,091, with $24,341 the value of the building stone. This shows an increase of $37,642 in the total and of $28,207 in the building-stone value.

VIRGINIA.

Owing to business changes, but a small quantity of sandstone was quarried in Virginia in 1900.

WASHINGTON.

The production of sandstone in Washington increased from $58,395 in 1899 to $68,133 in 1900, a gain of $9,738.

WEST VIRGINIA.

The output of sandstone for West Virginia in 1900 was $72,438, a gain of $38,578 over 1899, when the output was $33,860. Most of this gain was in stone used for railroad construction.

WISCONSIN.

The sandstone output in Wisconsin decreased from $132,901 in 1899 to $81,571 in 1900, a loss of $51,330. Many of the larger quarries gave decreased production, and less stone was used in railroad construction.

WYOMING.

The production of sandstone in Wyoming decreased from $32,583 in 1899 to $27,671 in 1900. Most of this stone was sold in the rough.

SLATE.

The slate industry showed an increase in value of $277,733, or from $3,962,733 in 1899 to $4,240,466 in 1900. The amount used for roofing increased from 1,100,513 squares, valued at $3,454,817, in 1899 to 1,194,048 squares, valued at $3,596,182, in 1900, being an increase of 93,535 squares, and in value of $141,365. The average value per square decreased 13 cents in 1900, or from $3.14 in 1899 to $3.01 in 1900.

The value of milled stock increased $136,368, or from $507,916 in 1899 to $644,284 in 1900.

The export trade showed a decrease from $1,363,617 in 1899 to $950,543 in 1900, a decline of $413,074, or 30 per cent.

The following table shows the output of slate in the United States, by States, from 1897 to 1900:

Value of slate produced in the United States from 1897 to 1900.

State.	1897.	1898.	1899.	1900.
California	$7,000	$2,700	$6,642	$26,500
Georgia		13,125		9,375
Maine	201,117	199,237	181,766	177,342
Maryland	53,939	82,240	93,595	128,673
Massachusetts		958		
Minnesota	1,500	400		700
New Jersey	775	800	(a)	13,600
New York	53,799	48,694	76,675	62,755
Pennsylvania	2,365,299	2,491,756	2,537,022	2,713,598
Tennessee			(a)	250
Utah			(a)	
Vermont	695,815	732,684	872,673	917,462
Virginia	145,370	150,946	183,110	190,211
Other States			11,250	
Total	3,524,614	3,723,540	3,962,733	4,240,466

a Included in other States.

The following table shows the value of the output of roofing and milled slate in the United States in 1899 and 1900, by States:

Value of roofing and milled slate in the United States in 1899 and 1900, by States.

1899.

State.	Roofing slate.	Value.	Other purposes than roofing, value.	Total value.
	Squares.			
California	928	$6,642		$6,642
Maine	24,676	121,640	$60,126	181,766
Maryland	20,196	90,897	2,698	93,595
New York	10,912	69,525	7,150	76,675
Pennsylvania	711,138	2,202,742	334,280	2,537,022
Vermont	277,463	777,971	94,702	872,673
Virginia	52,550	174,950	8,160	183,110
Georgia, Massachusetts, New Jersey, Tennessee, Utah	2,650	10,450	800	11,250
Total	1,100,513	3,454,817	507,916	3,962,733

Value of roofing and milled slate in the United States in 1899 and 1900, by States—Cont'd.

1900.

State.	Roofing slate.	Value.	Other purposes than roofing, value.	Total value.
	Squares.			
California	3,500	$26,500	....	$26,500
Georgia	2,500	9,375	....	9,375
Maine	21,771	103,949	$73,393	177,342
Maryland	27,158	126,271	2,402	128,673
Minnesota	....	....	700	700
New Jersey	3,600	13,600	....	13,600
New York	7,713	58,360	4,395	62,755
Pennsylvania	788,571	2,277,192	436,406	2,713,598
Tennessee	50	250	....	250
Vermont	282,820	795,474	121,988	917,462
Virginia	56,365	185,211	5,000	190,211
Total	1,194,048	3,596,182	644,284	4,240,466

The following table shows the average value of roofing slate per square since 1890:

Average annual price per square of roofing slate for the entire country.

1890	$3.34	1896	$3.36
1891	3.49	1897	3.09
1892	3.56	1898	3.42
1893	3.55	1899	3.14
1894	3.11	1900	3.01
1895	3.23		

EXPORTS.

The following table shows the ports and customs districts from which and countries to which slate has been exported since 1893:

Value of slate exported from United States, showing ports and customs districts from which and countries to which sent, from 1893 to 1900.

Port and customs district.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Baltimore, Md	....	....	....	$9,860	$101,581	$170,916	$99,083	$110,049
Bangor, Me	....	$445	....	350	....	....	....	577
Boston and Charlestown, Mass.	$1,086	....	$443	609	1,020	385	40,622	65,531
Newport News, Va	....	....	....	....	18,170	65,290	42,220	19,950
New York, N. Y	36,306	19,684	31,092	242,559	557,099	986,638	968,395	592,288
Passamaquoddy, Me	....	....	192	....	120	....	....	....
Philadelphia, Pa	....	....	....	2,300	94,865	136,916	205,779	150,254
Portland and Falmouth, Me	....	....	....	....	270	....	....	....
Brazos de Santiago, Tex	5	....	....	....	....	....	14	....
Corpus Christi, Tex	....	....	105	174	....	1,761	....	....
New Orleans, La	....	587	....	....	....	....	....	....
Paso del Norte, Tex	....	621	....	....	....	....	....	....
Puget Sound, Wash	....	....	....	....	....	22	67	....
San Diego, Cal	....	....	....	....	....	....	7	....

Value of slate exported from United States, showing ports and customs districts from which and countries to which sent, from 1893 to 1900—Continued.

Port and customs district.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Buffalo Creek, N. Y	$13,428	$13,696	$4,748	$5,903	$2,378	$4,141	$6,364	$6,584
Champlain, N. Y	869	1,869	1,961	1,617	613	3,015	937	2,320
Detroit, Mich			65	2,874	2,427	854	129	1,441
Huron, Mich	200							424
North and South Dakota	94	160				137		612
Oswegatchie, N. Y								487
Vermont	24	133	200	139	1,569			26
Total	52,012	37,195	38,806	266,385	780,112	1,370,075	1,363,617	950,543
Belgium							524	
France				12,000				
Germany			25	910	5,850	82,916	65,974	17,921
Netherlands					2,087	25	520	
United Kingdom	1,400	4,800	3,000	197,440	695,980	1,213,377	1,188,962	813,918
Denmark						8,150	25,323	25,437
Norway and Sweden						270	669	859
Bermuda	1,046	336	1,550	2,312	1,395	157	230	202
Dominion of Canada:								
Nova Scotia, New Brunswick, etc	119	445	406	1,278	730		288	798
Quebec, Ontario, etc	14,615	15,858	6,974	10,533	6,977	8,147	7,430	11,894
British Columbia						22	67	
Newfoundland and Labrador	32		13					30
Central American States:								
Guatemala						1,755		
Honduras		587						
Mexico	22	621	488	821	150	1,872	330	
Miquelon, Langley, etc						35		
West Indies:								
British		3,803	4,419	1,159	1,860	2,356	1,400	2,049
Haiti		330				26		332
Santo Domingo			10					
Cuba		2,643	3,258	90		673	16	
Colombia				259	100			285
Guianas:								
British		712	702	440	165	600		
Dutch	3,145		340		1,640	1,325	2,275	650
Peru	405							1,000
Uruguay				417		807	760	829
China						110		
East Indies—British				1,628	810	550		
British Australasia	30,362	7,060	17,363	34,970	60,604	44,642	64,434	71,881
Hawaiian Islands				245	166		77	
British Africa	866		258	1,883	1,598	2,218	4,335	2,458
Portuguese Africa						42	3	
Total	52,012	37,195	38,806	266,385	780,112	1,370,075	1,363,617	950,543

THE SLATE INDUSTRY IN INDIVIDUAL STATES.

ARKANSAS.

No slate of commercial value was reported from Arkansas in 1900, yet several firms have been prospecting and companies have been organized and work will probably be pushed in 1901.

Red slate has been obtained in the quarries at Mena. This is of interest and value, since the only red slate hitherto produced has come from Washington County, N. Y.

CALIFORNIA.

The product in this State showed an increase of $19,858 from $6,642 in 1899 to $26,500 in 1900. This was all used for roofing.

GEORGIA.

Slate has been produced in a small amount in Georgia for many years, but not regularly.

MAINE.

There was a slight decrease in the number and value of squares of slate produced in this State in 1900, the product being 24,676 squares, valued at $121,640, in 1899 and 21,771 squares, valued at $103,949, in 1900. There was also a decrease in the average price per square. The value of milled stock, however, increased from $60,126 in 1899 to $73,393 in 1900, an increase of $13,267. The entire decrease was from $181,766 in 1899 to $177,342 in 1900, a decrease of $4,424. The decrease in production was due to one of the principal quarries having been destroyed or partially destroyed by fire. As a producer of milled stock Maine ranks third, following Pennsylvania and Vermont. The value of milled stock produced in Maine was $73,393, while Pennsylvania and Vermont produced milled stock to the value of $436,406 and $121,988, respectively.

MARYLAND.

The value of the slate produced in Maryland has increased steadily since 1897, when the value was $53,939. The value in 1900 was $128,673, against $93,595 in 1899, an increase of $35,078. The number of quarries remains about the same in the Peach Bottom region, and the average value per square increased slightly in 1900.

MASSACHUSETTS.

Massachusetts produces a small amount of slate every year. It is not used for roofing, and only a very small amount for milled stock, but chiefly for building and foundation work; therefore the amount is not included in the total.

MINNESOTA.

Minnesota reports but a small amount of slate yearly. The entire product is used for milled stock.

NEW JERSEY.

New Jersey, being at the northern end of the slate chain that extends through Pennsylvania, Maryland, and into Virginia, has hitherto been of little importance as a commercial producer, but in 1900 new quarries were started, old ones opened up, and the production was unusually large.

The New Jersey Slate Company resumed operations in the old quarry at Newton, Sussex County, and near Delaware Water Gap, in Warren County, operations were carried on by Mr. J. I. Johnson. Other quarries were operated at Lafayette.

NEW YORK.

The production of slate in New York decreased from $76,675 in 1899 to $62,755 in 1900, or $13,920. The product in 1899, $62,755, however, was an increase of $14,061 over the product of 1898, $48,694. Several old quarries came into the hands of the Mathews Slate Company of Granville, and there are prospects of large production in 1901.

PENNSYLVANIA.

Pennsylvania ranks first in the list of slate-producing States, and has showed a steady increase of products since 1893, when the value of the output was $1,472,275, this being the lowest value obtained in the eleven years for which statistics are given. In 1899 the value was $2,537,022 and in 1900, $2,713,598, an increase of $176,576. The greatest increase was in the value of milled stock, the value being $334,280 in 1899 and $436,406 in 1900, an increase of $102,126. The number of squares increased from 711,138 in 1899 to 788,571 in 1900, or 77,433 squares, while the value increased from $2,202,742 in 1899 to $2,277,192 in 1900, or $74,450. The average value per square in 1899 was $3.097 and in 1900, $2.887, showing a slight decrease.

The principal producing counties are Northampton, Lehigh, York, and Bucks. Operators report home consumption to be better and the export trade slightly less. This is also shown in the table of exports.

TENNESSEE.

Operations in Tennessee have been only spasmodically carried on, resulting in a very small production this year.

VERMONT.

Vermont ranks second in the list of slate-producing States, both in the value of roofing slate and the value of milled stock. The value of the product increased from $872,673 in 1899 to $917,462 in 1900, or $44,789. The amount of slate produced increased from 277,463 squares, valued at $777,971, in 1899, to 282,820 squares, valued at $795,474, in 1900, or an increase of 5,357 squares, and in value $17,503. The average value per square was greater in 1899 than in 1900.

VIRGINIA.

Virginia showed a very slight gain in slate output in 1900 over 1899, the product in 1899 being $183,110 and in 1900 $190,211, or a gain of $7,101. The gain was in the value of roofing slates, the product of which increased from 52,550 squares, valued at $174,950, in 1899, to 56,365 squares, valued at $185,211, in 1900, an increase of 3,815 squares, and in value $10,261. The value of milled stock decreased from $8,160 in 1899 to $5,000 in 1900, or $3,160.

The home trade was reported to be better, with less foreign demand.

The value per square decreased from $3.329 in 1899 to $3.286 in 1900.

MARBLE.

The production of marble in the United States in 1900 exceeded that of 1899 by $255,572, the production in 1900 being $4,267,253 and in 1899 $4,011,681. This increase is chiefly in the marble used for cemetery work, with a marked decrease in the value of stone used for ornamental purposes, which was $92,942 in 1899 and $13,754 in 1900. The value of marble used for outside building decreased from $1,176,208 in 1899 to $1,080,969 in 1900, a loss of $95,239.

Operations have been started in several new States, as Alabama, Arizona, Idaho, Missouri, Montana, and New Mexico.

Although deposits of marble have been long known in these States, they have not been worked commercially to any great extent. The value of the output in California increased from $6,500 in 1899 to $17,500 in 1900. Georgia's marble product decreased from $742,554 in 1899 to $631,241 in 1900. Massachusetts showed a decided increase in marble production, going from $59,416 in 1899 to $130,735 in 1900, an increase of $71,319. This increase was chiefly in the amount used for building. The value of the marble product in New York decreased slightly, and in Pennsylvania there was a slight increase. The production in Tennessee advanced in value, as did that of Vermont and Washington. Marble quarries have also been reported in Alaska, but no commercial value has been given.

The following table gives the production of marble, by States, for the years 1891 to 1900, both inclusive:

Value of marble, by States, from 1891 to 1900.

State.	1891.	1892.	1893.	1894.	1895.
California	$100,000	$115,000	$10,000	$13,420	$22,000
Georgia	275,000	280,000	261,666	724,385	689,229
Idaho			4,500	3,000	2,250
Iowa					13,750
Maryland	100,000	105,000	130,000	175,000	145,000
Massachusetts		100,000			2,000
New York	390,000	380,000	206,926	501,585	207,828
Pennsylvania	45,000	50,000	27,000	50,000	59,787
Tennessee	400,000	350,000	150,000	231,796	362,277
Vermont	2,200,000	2,275,000	1,621,000	1,500,399	1,321,598
Scattering	100,000	50,000			
Total	3,610,000	3,705,000	2,411,092	3,199,585	2,825,719

Value of marble, by States, from 1891 to 1900—Continued.

State.	1896.	1897.	1898.	1899.	1900.
Alabama					$500
Arizona					5,000
Arkansas				$3,410	
California	$4,000	$48,690	$40,200	6,500	17,500
Colorado		99,600		10,776	
Georgia	617,380	598,076	656,808	742,554	631,241
Idaho	5,500	5,000	4,400		1,250
Iowa	39,740				
Maryland	110,000	130,000	120,525	77,000	70,000
Massachusetts	83,904	79,721	38,210	59,416	130,735
Missouri					900
Montana					1,200
New Mexico					4,500
New York	484,160	354,631	342,072	338,816	332,518
Pennsylvania	31,522	62,683	39,373	139,506	151,167
Tennessee	381,373	441,954	316,814	*a* 384,705	424,054
Utah				2,355	
Vermont	1,101,557	2,050,229	2,067,938	2,241,806	2,484,852
Washington			3,600	4,837	11,836
Total	2,859,136	3,870,584	3,629,940	4,011,681	4,267,253

a Contains small amount from North Carolina.

The following table shows the purposes for which the marble of the various productive States was sold by the quarrymen in 1897, 1898, 1899, and 1900:

Value of the marble product, by uses and States, in 1897, 1898, 1899, and 1900.

State.	Rough.	Building.	Ornamental.	Cemetery.	Interior.	Other.	Total.
1897.							
California	$8,280	$2,625	$4,960	$3,015	$27,310	$2,500	$48,690
Colorado					82,000	17,600	99,600
Georgia	198,198	145,875		157,803	71,200	25,000	598,076
Idaho				4,500	500		5,000
Maryland		130,000					130,000
Massachusetts	1,026	58,608	306	2,300	16,481	1,000	79,721
New York	11,066	274,626		61,631	5,308	2,000	354,631
Pennsylvania		56,000		6,683			62,683
Tennessee	147,679	4,000		15,625	259,025	15,625	441,954
Vermont	111,607	402,912	3,744	1,295,912	115,159	120,895	2,050,229
Total	477,856	1,074,646	9,010	1,547,469	576,983	184,620	3,870,584
1898.							
California	10,800	750	17,100	1,050	10,500		40,200
Georgia	271,723	142,000		147,000	84,700	11,385	656,808
Idaho	100			4,000	100	200	4,400
Maryland		116,000	625		3,900		120,525
Massachusetts	1,210	25,000			12,000		38,210
New York	54,696	193,464	27	74,990	3,031	15,864	342,072
Pennsylvania	75	38,700		560		38	39,373
Tennessee	239,483	11,000			66,331		316,814
Vermont	108,553	441,439	6,152	1,386,142	124,152	1,500	2,067,938
Washington	3,600						3,600
Total	690,240	968,353	23,904	1,613,742	304,714	28,987	3,629,940

Value of the marble product, by uses and States, in 1897, 1898, 1899, and 1900—Cont'd.

State.	Rough.	Building.	Ornamental.	Cemetery.	Interior.	Other.	Total.
1899.							
Arkansas	$2,850	$210	$140	$210			$3,410
California	6,200			300			6,500
Colorado	10,766						10,776
Georgia	335,535	97,400		194,600	$92,350	$22,669	742,554
Maryland		75,000	300		1,700		77,000
Massachusetts	565	43,121	2,000	1,100	8,000	4,630	59,416
New York	14,207	185,559	5,708	110,379		22,963	338,816
Pennsylvania	3,531	134,356		840	240	539	139,506
Tennessee	*a* 126,955	10,000		5,000	230,750	12,000	384,705
Utah	2,355						2,355
Vermont	133,411	630,562	84,107	1,337,726	56,000		2,241,806
Washington	4,150		687				4,837
Total	640,535	1,176,208	92,942	1,650,155	389,040	62,801	4,011,681
1900.							
Alabama	500						500
Arizona	5,000						5,000
California	5,000	4,400	5,900	2,200			17,500
Georgia	194,483	87,777		228,409	104,322	16,250	631,241
Idaho	250			1,000			1,250
Maryland		50,000		20,000			70,000
Massachusetts	5,950	107,604		300	10,961	5,920	130,735
Missouri				900			900
Montana				1,200			1,200
New Mexico	1,500	1,500		1,000		500	4,500
New York	51,480	102,904		164,331		13,803	332,518
Pennsylvania	16,056	114,533		10,003	8,000	2,575	151,167
Tennessee	88,284	36,750		70,250	228,770		424,054
Vermont	123,310	574,623	6,000	1,510,980	202,950	66,989	2,484,852
Washington		878	1,854	8,901	89	114	11,836
Total	491,813	1,080,969	13,754	2,019,474	555,092	106,151	4,267,253

a Contains a small amount from North Carolina.

The following table shows the various uses to which the marble quarried in 1897, 1898, 1899, and 1900 was put:

Distribution and value of output in 1897, 1898, 1899, and 1900 among various uses.

	1897.	1898.	1899.	1900.
Sold by producers in rough state	$477,856	$690,240	$640,535	$491,813
Sold for outside building	1,074,646	968,353	1,176,208	1,080,969
Ornamental purposes	9,010	23,904	92,942	13,754
Cemetery work (monuments and tombstones)	1,547,469	1,613,742	1,650,155	2,019,474
Interior decoration in buildings	576,983	304,714	389,040	555,092
Other scattering uses	184,620	28,987	62,801	106,151
Total	3,870,584	3,629,940	4,011,681	4,267,253

LIMESTONE.

As with the other branches of the stone industry, limestone showed an increase in the value of the product. The value of the output in 1899 was $18,757,963, and in 1900 $20,354,019, a gain of $1,596,056.

This increase is in the value of the limestone used for paving and road making, and in the amount used for blast-furnace flux. All the other products decreased in value. For the first time the report for blast-furnace flux includes values obtained from pig-iron producers, who quarried their own stone, as well as from quarrymen only.

The value of lime burned decreased from $6,983,067 in 1899 to $6,798,496 in 1900. Pennsylvania ranks first among the limestone-producing States, being the largest producer of lime and of blast-furnace flux. Indiana ranks second, being the largest producer of building stone. Ohio, Illinois, New York, and Missouri follow in the order named, the value of the product of each State exceeding a million dollars.

The following table shows the production of limestone in the United States in 1899 and 1900, by States and uses:

Value of limestone produced in the United States in 1899 and 1900, by States and uses.

1899.

State or Territory.	Building purposes.	Paving and road making.	Riprap.	Made into lime.	Stone sold to lime burners.	Flux.	Other purposes.	Total.
Alabama	$37,250	$16,021	$150	$118,928	$7,450	$184,837		$364,636
Arizona				960				960
Arkansas	21,230	785	10,850	38,240	800		$60	71,965
California	1,551	9,915		263,406		525	11,898	287,295
Colorado		150		33,675		62,431	200	96,456
Connecticut				161,945		443		162,388
Florida	18,000	17,402		8,600				44,002
Georgia				29,786				29,786
Idaho	25			3,300				3,325
Illinois	1,067,622	561,329	99,976	194,773	9,000	80,810	51,973	2,065,483
Indiana	1,400,854	272,969	8,678	273,901	492	184,570	32,369	2,173,833
Iowa	312,595	158,917	139,064	102,611	1,505		70,884	785,576
Kansas	209,680	75,443	57,023	2,615			34,240	379,001
Kentucky	104,094	44,845	7,510	12,672		6,248	3,492	178,861
Maine				1,001,368	16,396	2,543	8,068	1,028,375
Maryland	8,896	7,292	51	217,522	794	75	595	235,225
Massachusetts	6,100	250		159,997		1,675	125	168,147
Michigan	30,299	62,815	1,111	89,441	157,657	27,512	2,375	371,210
Minnesota	325,856	26,105	75,335	52,851		3,840	12,475	496,462
Missouri	242,469	284,453	47,020	383,543	385	10,231	9,298	977,399
Montana				13,818		99,900		113,718
Nebraska	33,571	24,948	36,962	2,000	2,960	18,000	6,576	125,017
New Jersey	705	1,824		108,056	914	41,526		153,025
New York	574,372	337,775	5,965	522,480	14,206	43,042	47,859	1,545,699
Ohio	250,816	315,890	11,828	802,228	29,841	313,936	69,065	1,793,604
Oklahoma	10,050	40,500						50,550
Oregon				8,000				8,000
Pennsylvania	195,116	230,907	46,187	1,132,760	147,204	1,278,632	57,777	3,088,583
Rhode Island				18,239				18,239
South Carolina *a*				17,650				17,650
South Dakota	450			10,001		35,357		45,808
Tennessee	79,550	14,225	1,250	93,137	2,500	17,130	305	208,097
Texas	3,940	357	858	79,399		15,471		100,025
Utah	3,898	56		1,033		1,394		6,381

a Contains a small amount from North Carolina.

Value of limestone produced in the United States in 1899 and 1900, by States and uses—Continued.

State or Territory.	Building purposes.	Paving and road making.	Riprap.	Made into lime.	Stone sold to lime burners.	Flux.	Other purposes.	Total.
Vermont	....	$13	....	$281,560	....	....	$600	$282,173
Virginia	$12,622	6,788	$4	111,339	$10	$119,477	5,400	255,640
Washington	....	....	....	133,646	....	....	5,693	139,339
West Virginia	1,345	296	10	54,259	558	2,334	....	58,802
Wisconsin	122,202	135,276	45,020	442,586	174	28,860	52,368	826,486
Wyoming	....	....	....	742	....	....	....	742
Total	5,075,158	2,647,546	594,852	6,983,067	392,846	2,580,799	483,695	18,757,963

1900.

State or Territory.	Building purposes.	Paving and road making.	Riprap.	Made into lime.	Stone sold to lime burners.	Flux.	Other purposes.	Total.
Alabama	$83,380	....	$14,697	$139,090	....	$296,241	$200	$533,608
Arizona	165	....	....	....	....	....	....	165
Arkansas	5,994	$665	....	64,038	$200	....	510	71,407
California	1,937	87,128	325	297,810	316	1,080	18,893	407,489
Colorado	....	1,274	....	96,055	75	62,413	770	160,587
Connecticut	....	25	....	145,490	....	2,545	....	148,060
Florida	....	6,988	97,023	24,370	....	....	....	128,381
Georgia	1,200	10,735	....	39,492	2,000	1,024	....	54,451
Idaho	....	9,000	....	25,587	....	....	....	34,587
Illinois	499,739	859,602	96,900	246,575	....	114,849	63,486	1,881,151
Indiana	1,639,985	239,913	11,451	227,343	....	168,692	57,434	2,344,818
Iowa	248,883	153,929	58,493	110,589	580	....	13,936	586,410
Kansas	203,304	113,952	7,586	3,192	1,125	....	10,307	339,466
Kentucky	21,623	115,730	12,500	8,393	....	17,728	2,278	178,252
Maine	....	....	....	629,545	4,218	883	56,666	691,312
Maryland	11,385	14,343	524	281,717	3,726	3,867	1,645	317,207
Massachusetts	8,175	....	....	199,645	....	1,539	....	209,359
Michigan	32,362	105,266	799	94,789	65,000	3,200	124,220	425,636
Minnesota	323,688	27,778	32,912	42,480	400	300	13,996	441,554
Missouri	362,344	235,489	57,023	398,010	....	8,288	18,189	1,079,343
Montana	3,000	2,093	....	19,000	....	117,000	....	141,093
Nebraska	39,556	31,442	10,488	590	7,088	13,125	5,016	107,305
New Jersey	6,955	1,299	1,000	105,902	286	54,564	....	170,006
New York	244,738	484,902	21,668	676,324	40,838	71,408	190,284	1,730,162
Ohio	217,399	466,819	47,530	661,869	14,939	422,407	138,424	1,969,387
Oklahoma	2,672	22,914	....	....	....	....	....	25,586
Oregon	....	....	....	10,525	375	....	....	10,900
Pennsylvania	128,997	684,983	660	910,903	21,799	1,949,859	103,117	3,800,318
Rhode Island	....	....	....	16,715	....	113	....	16,828
South Carolina *a*	....	500	....	36,320	....	1,595	....	38,415
South Dakota	300	....	....	14,380	....	33,082	....	47,762
Tennessee	22,800	26,490	396	128,035	120	60,564	100	238,505
Texas	15,681	9,821	250	79,659	....	18,942	375	124,728
Utah	11,979	....	....	770	....	....	....	12,749
Vermont	193	32	....	187,075	....	....	800	188,100
Virginia	5,070	8,721	....	151,687	....	237,840	....	403,318
Washington	....	240	....	239,022	....	6,643	3,258	249,163
West Virginia	9,391	40	....	36,677	5,851	1,742	....	53,701
Wisconsin	177,386	231,356	110,263	445,193	3,630	15,861	5,996	989,685
Wyoming	425	....	....	2,640	....	....	....	3,065
Total	4,330,706	3,953,469	582,488	6,797,496	172,566	3,687,394	829,900	20,354,019

a Includes North Carolina.

The following table shows the production of limestone in the United States from 1897 to 1900, by States:

Value of limestone from 1897 to 1900, by States.

State.	1897.	1898.	1899.	1900.
Alabama	$221,811	$242,295	$364,636	$533,608
Arizona	11,522	1,782	960	165
Arkansas	44,222	54,373	71,965	71,407
California	308,925	229,729	287,295	407,489
Colorado	79,256	109,310	96,456	160,587
Connecticut	178,410	142,057	162,388	148,060
Florida	18,889	91,330	44,002	128,381
Georgia	32,000	57,803	29,786	54,451
Idaho	15,538	3,080	3,325	34,587
Illinois	1,483,157	1,421,072	2,065,483	1,881,151
Indiana	2,012,608	1,686,572	2,173,833	2,344,818
Iowa	480,572	524,546	785,576	586,410
Kansas	208,889	305,605	379,001	339,466
Kentucky	40,815	83,960	178,861	178,252
Maine	742,877	1,283,468	1,028,375	691,312
Maryland	181,637	433,653	235,225	317,207
Massachusetts	126,508	174,822	168,147	209,359
Michigan	215,177	271,523	371,210	425,636
Minnesota	236,397	345,685	496,462	441,554
Missouri	1,018,202	735,275	977,399	1,079,343
Montana	37,300	63,196	113,718	141,093
Nebraska	42,359	78,493	125,017	107,305
New Jersey	141,646	146,611	153,025	170,006
New York	1,697,780	1,533,936	1,545,699	1,730,162
North Carolina *a*	....	1,605	....	....
Ohio	1,486,550	1,673,160	1,793,604	1,969,387
Oklahoma	....	3,000	50,550	25,586
Oregon	....	7,480	8,000	10,900
Pennsylvania	2,327,870	2,746,256	3,088,583	3,800,318
Rhode Island	11,555	10,215	18,239	16,828
South Carolina	30,000	34,000	17,650	38,415
South Dakota	3,895	26,858	45,808	47,762
Tennessee	113,774	182,402	208,097	238,505
Texas	57,258	70,321	100,025	124,728
Utah	9,250	11,721	6,381	12,749
Vermont	165,657	174,150	282,173	188,100
Virginia	192,972	182,852	255,640	403,318
Washington	126,877	140,239	139,339	249,163
West Virginia	61,546	56,167	58,802	53,701
Wisconsin	641,232	698,454	826,486	989,685
Wyoming	....	....	742	3,065
Total	14,804,933	16,039,056	18,757,963	20,354,019

a Small amounts for 1899 and 1900 are included with South Carolina.

LIMESTONE PRODUCTION IN INDIVIDUAL STATES.

ALABAMA.

The value of the product increased from $364,636 in 1899 to $533,608 in 1900, or $168,972. The only noticeable decrease was in the amount used for paving and road making.

ARKANSAS.

The limestone trade in Arkansas showed no appreciable change from 1899. The product is chiefly lime, which advanced from $38,240 in 1899 to $64,038 in 1900. The total for 1900 was $71,407, and for 1899, $71,965.

CALIFORNIA.

The production of limestone in California advanced from $287,295 in 1899 to $407,489 in 1900, a gain of $120,194. The increase was chiefly in the value of stone used for paving and road making. Limestone is used in this State by the sugar refineries, and most of that noted in the table as used for other purposes went to the refineries.

COLORADO.

Colorado showed a decided increase in value, the product being valued at $96,456 in 1899 and $160,587 in 1900. The chief increase was in the value of lime, which advanced from $33,675 in 1899 to $96,055 in 1900, a gain of $62,380.

CONNECTICUT.

The value decreased slightly for 1900, being $162,388 in 1899 and $148,060 in 1900. The product is chiefly lime.

FLORIDA.

The value of the limestone product increased $84,379 or from $44,002 in 1899 to $128,381 in 1900.

GEORGIA.

The value of the limestone product in Georgia in 1899 was $29,786, in 1900 $54,451, which gives a gain of $24,665.

IDAHO.

The rise noticed in the production of limestone in Idaho is due to the fact that more producers were heard from than in former years. The value given for 1900 is $34,587.

ILLINOIS.

Illinois shows a decrease in limestone production of $184,332 from 1899, the value being $2,065,483 in 1899 and $1,881,151 in 1900. The decrease was in the amount and value of building stone sold, and was partly made up by increase in stone used for paving and road making, which advanced from $561,329 in 1899 to $859,602 in 1900. A large part of this was railroad ballast. The value of the lime made also advanced in a satisfactory manner, being $194,773 in 1899 and $246,575 in 1900. The decrease in value of building stone was due to the large number of strikes that took place in and around Chicago during 1900 in the building trades.

INDIANA.

Indiana showed an increase in the limestone product for 1900, the value of the output being $2,173,833 in 1899 and $2,344,818 in 1900, a gain of $170,985. This gain was almost entirely in the value of building stone, which increased from $1,400,854 in 1899 to $1,639,985 in 1900, or $239,131. The other products showed a slight decrease.

IOWA.

Iowa's limestone production in 1900 declined to $586,410 from $785,576 in 1899. This decrease was mostly in stone used for riprap.

KANSAS.

The limestone production in Kansas in 1900 was $339,466. This is a decline of $39,535 from the production of $379,001 in 1899. The decrease was chiefly in the stone used for riprap.

KENTUCKY.

The limestone product of Kentucky was practically the same as 1899. The value of the product in 1900 was $178,252. In 1899 it was $178,861. The value of the stone used for building purposes decreased and that for railroad ballast, paving, and road making increased.

MAINE.

There was a considerable decrease in the value of the limestone product of Maine in 1900. The value in 1899 was $1,028,375, and in 1900 $691,312. The decrease was due to the business change which took place in this State. Most of the large firms formed a combination known as the Rockland-Rockport Lime Company, of Rockland, Me. Most of the stone in this State is burned into lime.

MARYLAND.

The value of the production in Maryland increased from $235,225 in 1899 to $317,207 in 1900. This increase was shared by all the purposes for which the stone was used.

MASSACHUSETTS.

The limestone production increased from $168,147 in 1899 to $209,359 in 1900. This gain was mostly in the value of the lime made, which was $159,997 in 1899 and $199,645 in 1900, a gain of $39,648.

MICHIGAN.

Michigan showed an increase in limestone production in 1900. The value was $371,210 in 1899 and $425,636 in 1900. A considerable amount of the product in this State is used in sugar refineries and in the manufacture of soda.

MINNESOTA.

There was a decrease of $54,908 in the limestone production in 1900, the output being $496,462 in 1899 and $441,554 in 1900.

MISSOURI.

Missouri increased in value of limestone production from $977,399 in 1899 to $1,079,343 in 1900, or $101,944.

MONTANA.

The production of limestone in Montana increased from $113,718 in 1899 to $141,093 in 1900. The stone is used chiefly for lime and for blast furnace flux.

NEBRASKA.

The limestone production in Nebraska decreased from $125,017 in 1899 to $107,305 in 1900. This decrease was chiefly in the stone used for riprap.

NEW JERSEY.

New Jersey produced limestone to the value of $170,006 in 1900, as compared with $153,025 in 1899.

NEW YORK.

The output of limestone in New York in 1900 was valued at $1,730,162. This shows a gain of $184,463 over the production in 1899, which was $1,545,699. This gain was shared by stone used for all purposes, except for building which decreased in value.

OHIO.

The limestone product of Ohio increased from $1,793,604 in 1899 to $1,969,387 in 1900, or $175,783. The stone used for paving, road making, ballast, riprap, and blast furnace flux increased in value, while the value of the stone used for building purposes decreased, as did also the value of the lime made.

PENNSYLVANIA.

The value of the limestone production in Pennsylvania increased from $3,088,583 in 1899 to $3,800,318 in 1900, or $711,735. This increase is principally in the value of blast furnace flux as obtained from pig-iron manufacturers. The value of the lime burned in Pennsylvania decreased from $1,132,760 in 1899 to $910,903 in 1900, or $221,857. This decrease, however, does not prevent Pennsylvania from keeping first rank as a lime-producing State. The cause of the decrease was due chiefly to the high price of coal. Farmers who depended upon coal for fuel in burning lime were unable to keep their kilns running. Much of the lime burned in this State is used by the farmers on their land and burned for this purpose alone.

TENNESSEE.

The limestone production in Tennessee in 1900 showed a slight increase over 1899, it being $238,505 in 1900, as compared with $208,097 in 1899. The increase was in the amount and value used for blast furnace flux. The value of both building stone and lime decreased.

TEXAS.

The production of limestone in Texas increased from $100,025 in 1899 to $124,728 in 1900. This increase was chiefly in the value of building stone and stone used for paving and road making. The value of the lime remained about the same.

UTAH.

There was an increase from $6,381 in 1899 to $12,749 in 1900 in the value of the limestone production as reported from Utah. This stone was used chiefly for building.

VERMONT.

The limestone production in Vermont decreased from $282,173 in 1899 to $188,100 in 1900. The product was almost entirely lime.

WASHINGTON.

Considerable activity has been shown recently in the lime business in Washington. In 1899 the value of the limestone product was $139,339, and in 1900, $249,163, or a gain of $109,824. The value of the lime burned was $133,646 in 1899 and $239,022 in 1900.

WEST VIRGINIA.

West Virginia decreased in limestone production from $58,802 in 1899 to $53,701 in 1900. The decrease was in the value of lime burned.

WISCONSIN.

The value of the limestone produced in Wisconsin in 1900 was $989,685. The value for 1899 was $826,486, showing an increase of $163,199. The value of stone used for blast furnace flux decreased somewhat. All other products showed an increase.

THE STONE INDUSTRY IN CUBA.

The stone available for building purposes in Cuba includes all varieties mentioned in this report, from granite and trap rock in the interior of the island to marble on the Isle of Pines and Coquina, and denser limestone in the newer formations near the coast.

Quarrying has been carried on for many years in a small way. The most extensive operations are on the outskirts of Habana, where two quarries are operated by the Cuba Quarry Company, about 3 miles from the center of the city. These two quarries are known under the names of San Miguel and Jesus de Monte. The San Miguel quarry has been in operation from sixty to seventy-five years. It has an exposed face about 400 feet long, and from 20 to 75 feet wide. During the past year about 50,000 tons of this sandstone have been turned out for making concrete.

Previous to the Spanish war in Cuba a large steam stone mill with eight gangs of saws was in operation cutting this stone for use in various places on the island, especially for sidewalks, curbstones, etc. The mill was burned during the war.

The Jesus de Monte quarry is in Coquina. In addition to these two quarries the Campo Florido Company is now opening up a quarry of so-called granite 18 miles from Habana, toward Matanzas. It is sufficiently tough for use in repairing the streets of Habana.

Mr. C. E. McDowell, general superintendent of the Cuba Quarry Company, has reported a very superior trap rock, found about 25 miles west of Habana, about 2 miles from the town of Mariel. This has been used to a considerable extent for macadamized roads.

CLAY PRODUCTS.

By Jefferson Middleton.

INTRODUCTION.

In the organization of the Twelfth Census the Geological Survey was invited to cooperate with that bureau in so far as the lines of inquiry coincided, and for this purpose, since this office had been collecting the statistics of the clay-working industries for several years, the writer was assigned the work of the collection of these statistics, as expert special agent for the manufactures division of the Twelfth Census, under the supervision of Mr. S. N. D. North, chief statistician for manufactures. This plan was adopted in the interests of both offices, and it has avoided duplication of work by the two bureaus and prevented asking similar information from producers twice.

The figures given in the following pages show the quantity and value of the clay products of the United States in 1899 and 1900. For the former year the figures collected by the Twelfth Census are used, this office having made no independent canvass of the clay-working industries for that year. These figures show great activity in all the branches of this industry, every one making large increases in 1899 over 1898. This is undoubtedly due in part to the more complete returns received by the Census Office, but the chief reason for this increase is the greater activity along all the lines of the clay-working industries in 1899 over 1898 and in 1900 over 1899. This is shown by the fact that, with the same means of collecting the information (correspondence), the product increased in value from $95,797,370 in 1899 to $96,212,345 in 1900.

During the years under review the centralization of capital in the clay-working industries was accomplished to some extent in the organization of the American Clay-working Company, now the American Sewer Pipe Company, the Illinois Brick Company, and the New England Brick Company, while the projected American Pottery Company, a combination of the leading white ware potteries and the American Brick Company, which proposed to unite all of the brickyards along the Hudson River, failed of organization, at least for the time being.

The tendency noted in these reports some time since, toward the investment of greater capital in the industry and the consequent more intelligent manipulation of the raw material and marketing of the finished product, still exists, due largely to the efforts of the technical associations, both State and national; and while the small hand yard will probably always exist, its usefulness will be confined to small towns and thinly-settled communities. The clay-working industry is unquestionably destined to enjoy a wider field of usefulness, especially in view of the rapid destruction of our forests, which will necessitate the greater use of clay products as structural materials.

The figures given herewith show only a slightly greater product in 1900 than in 1899. This condition, however, is only an apparent and not a real one, as the clay-working industry was undoubtedly more prosperous in 1900 than in 1899. The returns to this office are practically as complete as those to the Census Office. The explanation of the decrease in the value of structural materials, as compared with the census returns, lies in the fact that the census schedule requested, as far as products were concerned, a statement of the product manufactured, while the Geological Survey's investigation considered only the products sold. The prosperity during 1898 and 1899 led to the establishment of many plants in the latter part of 1899, which made a considerable product in that year. This was reported to the Census Office, rightfully enough, but much of it was not sold until the next building season, and thus was reported to the Census Office as product and to the Geological Survey as sales. While the period covered by the Census Office investigation was mainly the calendar year 1899, a plant beginning operation within the census year which ended May 31, 1900, was included in the census returns, thus causing an overlapping. Therefore the census figures may be taken as representing the product for 1899, while the Geological Survey represents equally as accurately the sales for 1900.

ACKNOWLEDGMENTS.

As stated above, the figures for 1899 are those collected by the Census Office, by the writer, for the manufactures division, and this opportunity is taken to thank Mr. S. N. D. North for the use of the figures in advance of their publication by the Census Office, and for the uniform courtesy with which the writer has been treated by the census officials.

The opportunity is again taken to thank the clay workers of the country for their cooperation in the preparation of this report, and especially the secretaries of the large corporations, and Mr. D. V. Purington for his continued interest in the work and his assistance in securing accurate figures of the brick output in Cook County, Ill., as well as the brick exchanges in the several cities for their cooperation.

As in previous years, the State geological surveys of Iowa and Maryland have cooperated in the collection of the figures for their States, and the complete returns for these States are due to the efforts of the officers of the State geological surveys.

PRODUCTION.

In the following tables are given a statement of the total value of the clay products of the United States in 1899 and 1900, by States:

Value of the clay products of the United States in 1899.

State.	Brick and tile.	Pottery.	Total.
Alabama	$868,472	$29,338	$897,810
Arizona	101,954	....	101,954
Arkansas	319,071	20,071	339,142
California	1,554,655	32,863	1,587,518
Colorado	1,055,338	16,050	1,071,388
Connecticut *a*	992,452	81,750	1,074,202
Delaware	168,485	....	168,485
District of Columbia	462,375	18,770	481,145
Florida	136,208	2,600	138,808
Georgia	1,235,727	28,268	1,263,995
Idaho	44,624	3,000	47,624
Illinois	6,496,268	763,557	7,259,825
Indiana	3,888,180	347,174	4,235,354
Indian Territory	35,075	....	35,075
Iowa	2,203,728	30,080	2,233,808
Kansas	811,337	28,430	839,767
Kentucky	1,253,823	104,605	1,358,428
Louisiana	542,089	12,640	554,729
Maine	655,524	7,161	662,685
Maryland	1,317,915	361,726	1,679,641
Massachusetts	1,887,677	294,033	2,181,710
Michigan	1,254,256	29,741	1,283,997
Minnesota	1,012,332	206,365	1,218,697
Mississippi	526,540	20,201	546,741
Missouri	3,587,819	78,797	3,666,616
Montana	313,390	950	314,340
Nebraska	841,825	1,490	843,315
Nevada	17,850	....	17,850
New Hampshire	552,752	17,535	570,287
New Jersey	5,716,707	5,070,566	10,787,273
New Mexico	108,090	....	108,090
New York	7,426,220	650,192	8,076,412
North Carolina	748,539	25,663	774,202
North Dakota	168,124	....	168,124
Ohio	9,504,580	6,996,045	16,500,625
Oklahoma	150,552	....	150,552
Oregon	316,170	11,204	327,374
Pennsylvania	12,935,508	1,167,737	14,103,245
South Carolina	593,798	11,531	605,329
South Dakota	46,500	....	46,500
Tennessee	880,363	68,490	948,853
Texas	1,139,067	82,052	1,221,119
Utah	208,399	8,050	216,449
Vermont	131,525	....	131,525
Virginia	1,084,064	9,720	1,093,784
Washington	577,927	13,350	591,277
West Virginia	866,229	585,310	1,451,539
Wisconsin	1,798,567	13,145	1,811,712
Wyoming	8,450	....	8,450
Total	78,547,120	17,250,250	95,797,370
Per cent of total products	81.99	18.01	100.00

a Including Rhode Island.

Value of the clay products of the United States in 1900.

State.	Brick and tile.	Pottery.	Total.
Alabama	$692,431	$20,296	$712,727
Arizona	112,737	....	112,737
Arkansas	354,732	26,280	381,012
California	1,351,611	24,387	1,375,998
Colorado	1,182,575	*a* 17,944	1,200,519
Connecticut and Rhode Island	1,038,722	61,250	1,099,972
Delaware	156,274	....	156,274
District of Columbia	278,060	10,873	288,933
Florida	140,604	(*b*)	140,604
Georgia	1,168,835	*b* 24,383	1,193,218
Idaho	49,382	(*a*)	49,382
Illinois	6,932,086	776,773	7,708,859
Indiana	3,532,450	*c* 325,900	3,858,350
Indian Territory	30,233	....	30,233
Iowa	2,254,662	36,589	2,291,251
Kansas	1,002,689	14,061	1,016,750
Kentucky	1,349,827	131,497	1,481,324
Louisiana	503,394	4,300	507,694
Maine	724,934	(*d*)	724,934
Maryland	1,275,239	436,617	1,711,856
Massachusetts	1,594,377	*d* 238,724	1,833,101
Michigan	1,147,378	34,317	1,181,695
Minnesota	1,103,302	*e* 293,395	1,396,697
Mississippi	558,916	14,452	573,368
Missouri	3,665,093	71,474	3,736,567
Montana	350,489	(*a*)	350,489
Nebraska	683,958	....	683,958
Nevada	9,580	....	9,580
New Hampshire	485,013	(*f*)	485,013
New Jersey	5,664,772	*f* 5,263,651	10,928,423
New Mexico	41,898	....	41,898
New York	6,495,281	*g* 1,165,325	7,660,606
North Carolina	797,112	18,863	815,975
North Dakota	92,399	....	92,399
Ohio	9,731,305	8,573,323	18,304,628
Oklahoma	164,457	....	164,457
Oregon	264,095	17,290	281,385
Pennsylvania	12,000,875	1,390,873	13,391,748
Rhode Island	(*h*)	....	....
South Carolina	693,703	17,633	711,336
South Dakota	43,440	....	43,440
Tennessee	865,923	49,655	915,578
Texas	1,083,553	87,464	1,171,017
Utah	227,621	6,600	234,221
Vermont	121,041	....	121,041
Virginia	1,302,085	3,110	1,305,195
Washington	616,029	9,430	625,459
West Virginia	1,384,924	631,841	2,016,765
Wisconsin	1,072,179	(*e*)	1,072,179
Wyoming	21,500	....	21,500
Total	76,413,775	19,798,570	96,212,345
Per cent of total	79.42	20.58	100.00

a Value of the pottery products of Idaho and Montana is included with that of Colorado.
b Value of the pottery products of Florida is included with that of Georgia.
c Porcelain electrical supplies for Indiana included in New York.
d Value of the pottery products of Maine is included with that of Massachusetts.
e Value of pottery products of Wisconsin included with that of Minnesota.
f Value of pottery products of New Hampshire is included with that of New Jersey.
g Includes porcelain electrical supplies for Indiana and china for Ohio.
h Included with Connecticut.

From these tables it will be seen that the value of the clay products in 1900 was $96,212,345, as compared with $95,797,370 in 1899, a gain of $414,975, or less than one-half of 1 per cent. While there is apparently this small gain in the total, it is probable that the actual gain is much larger, as explained in the introduction to this chapter since the census figures embrace in "all other products" goods which are made by establishments whose main industry was that of clay working, but which were running saw, cider, or gin mills in connection with their clay-working plants.

The total for 1899 here published will be found to be slightly in excess of that given by the Census Office. This is caused by the fact that the Census Office does not include in its total State institutions, of which were 21 reporting in 1899 with a product valued at $208,637, nor establishments making a product valued at less than $500 for the year, of which there were 519 in 1899 with a product valued at $144,771.

In the following table is given a statement of the total value of the clay products of the United States from 1895 to 1900, by States:

Value of clay products of the United States, 1895 to 1900. (*a*)

State.	1895.	1896.	1897.	1898.	1899.	1900.
Alabama	$301,341	$372,185	$443,378	$456,597	$897,810	$712,727
Arizona	6,855	55,663	54,143	81,509	101,954	112,737
Arkansas	243,959	216,332	184,099	245,766	339,142	381,012
California	1,421,154	680,207	703,410	1,263,734	1,587,518	1,375,998
Colorado	553,383	328,680	406,863	766,767	1,071,388	1,200,519
Connecticut and Rhode Island	1,128,925	1,448,598	1,336,670	952,180	1,074,202	1,099,972
Delaware	58,615	61,003	68,458	160,555	168,485	156,274
District of Columbia	373,304	353,565	288,981	320,320	481,145	288,933
Florida	114,015	122,144	89,435	130,987	138,808	140,604
Georgia	867,355	905,813	962,513	857,258	1,263,995	1,193,218
Idaho	18,890	16,000	15,914	27,365	47,624	49,382
Illinois	7,619,884	5,938,247	5,498,574	6,866,715	7,259,825	7,708,859
Indiana	3,117,520	2,674,325	2,712,309	3,331,997	4,235,354	3,858,350
Indian Territory	(*b*)	(*b*)	14,135	35,633	35,075	30,233
Iowa	1,870,292	1,694,402	1,821,247	2,183,022	2,233,808	2,291,251
Kansas	246,647	260,087	256,518	444,975	839,767	1,016,750
Kentucky	839,198	829,684	806,368	1,000,940	1,358,428	1,481,324
Louisiana	415,718	402,412	370,910	517,059	554,729	507,694
Maine	737,104	994,731	800,739	600,029	662,685	724,934
Maryland	1,066,987	1,450,055	1,305,282	1,542,853	1,679,641	1,711,856
Massachusetts	2,221,590	2,264,974	2,179,396	1,809,070	2,181,710	1,833,101
Michigan	1,129,195	1,005,405	791,870	1,043,362	1,283,997	1,181,695
Minnesota	1,100,135	696,701	882,069	1,132,584	1,218,697	1,396,697
Mississippi	194,750	224,809	275,600	321,783	546,741	573,368
Missouri	2,889,218	2,810,245	2,536,528	3,112,716	3,666,616	3,736,567
Montana	204,193	276,311	231,649	275,026	314,340	350,489
Nebraska	214,541	144,373	351,385	513,565	843,315	683,958
Nevada	....	....	....	....	17,850	9,580
New Hampshire	521,567	598,169	465,172	439,189	570,287	485,013
New Jersey	4,899,120	4,728,003	6,180,847	8,706,357	10,787,273	10,928,423
New Mexico	(*b*)	(*b*)	33,270	41,940	108,090	41,898
New York	5,889,496	6,414,206	5,615,504	6,622,537	8,076,412	7,660,606
North Carolina	400,983	420,899	369,194	429,782	774,202	815,975
North Dakota	48,000	59,625	62,420	72,900	168,124	92,399
Ohio	10,649,382	10,609,571	11,067,684	12,667,627	16,500,625	18,304,628
Oklahoma	*b* 45,307	*b* 38,444	30,217	78,258	150,552	164,457
Oregon	138,543	126,345	115,798	131,864	327,374	281,385
Pennsylvania	8,807,161	9,063,829	7,874,695	9,714,683	14,103,245	13,391,748
South Carolina	276,918	354,275	290,497	259,232	605,329	711,336
South Dakota	10,740	53,004	21,800	30,770	46,500	43,440
Tennessee	522,534	537,325	612,293	520,038	948,853	915,578
Texas	1,030,446	915,753	1,197,039	817,797	1,221,119	1,171,017
Utah	112,586	137,573	135,781	180,992	216,449	234,221
Vermont	132,544	83,274	53,485	59,474	131,525	121,041
Virginia	855,768	883,536	812,046	894,383	1,093,784	1,305,195
Washington	265,445	161,528	190,720	250,988	591,277	625,459
West Virginia	895,777	899,444	1,115,254	1,098,575	1,451,539	2,016,765
Wisconsin	944,196	788,995	724,282	877,306	1,811,712	1,072,179
Wyoming	8,525	9,659	3,550	3,825	8,450	21,500
Total	65,409,806	63,110,408	62,359,991	73,892,884	95,797,370	96,212,345
Operating firms reporting	....	5,293	5,424	5,971	6,962	6,375

a In 1897 and 1898 the figures for California include the pottery products of Oregon and Washington; Colorado, those of Idaho, Montana, Nebraska, and Utah; Maryland, those of the District of Columbia; Georgia, those of Florida; Mississippi, those of Louisiana; New Hampshire, those of Maine; Minnesota, those of Wisconsin; and North Carolina, those of South Carolina. This is done in order that the operations of individual establishments may not be disclosed.

b The figures for Indian Territory and New Mexico in 1895 and 1896 are included with Oklahoma.

The following table gives a comparison of the clay-working industries in 1899 and 1900, showing the increase and decrease of the several varieties of clay products in 1900:

Value of clay products in the United States in 1899 and 1900, with increase or decrease.

Product.	1899.	1900.	Increase in 1900.	Decrease in 1900.
Common brick	$39,887,522	$38,621,514	....	$1,266,008
Front brick	4,767,343	3,864,670	....	902,673
Vitrified paving brick	4,750,424	4,764,124	$13,700	....
Fancy or ornamental brick	476,191	289,698	....	186,493
Enameled brick	329,969	323,630	....	6,339
Fire brick	8,641,882	9,830,517	1,188,635	....
Stove linings	416,235	462,541	46,306	....
Drain tile	3,682,394	2,976,281	....	706,113
Sewer pipe	4,560,334	5,842,562	1,282,228	....
Ornamental terra cotta	2,027,532	2,372,568	345,036	....
Fireproofing	1,665,066	1,820,214	155,148	....
Tile (not drain)	1,276,300	2,349,420	1,073,120	....
Miscellaneous	6,065,928	2,896,036	....	3,169,892
Total brick and tile	78,547,120	76,413,775	4,104,173	6,237,518
Decrease in brick and tile in 1900	....	....	....	2,133,345
Total pottery	17,250,250	19,798,570	2,548,320	....
Total	95,797,370	96,212,345	*a* 414,975	....

a Net increase.

An inspection of this table shows that the building brick in all varieties declined, the common brick making the greatest decline, or from a product valued at $39,887,522 in 1899 to $38,621,514 ($1,266,008, or 3.17 per cent) in 1900. The front brick also declined from $4,767,343 in 1899 to $3,864,670, a decline of $902,673, or 1.89 per cent. The drain-tile product suffered the greatest proportionate decline, however—from $3,682,394 in 1899 to $2,976,281, or 19.18 per cent in 1900. The miscellaneous column, owing to the nature of the census inquiry, would necessarily be larger than the similar column in the Geological Survey compilation, since many concerns combined other branches of industry with the brick and tile business, and these side products were included in the census figures, though not clay products.

The products which show a gain in 1900 over 1899 are vitrified brick, fire brick, stove lining, sewer pipe, architectural fireproofing, tile (not drain), and pottery. The first, vitrified brick, practically only held its own, the gain being but $13,700. This is surprising in view of the apparent growth in popularity of this material for street pavements and for other purposes.

The fire-brick industry continues to grow in importance, and will undoubtedly hold its rank as long as we are the leading iron-producing nation in the world. This product increased from $8,641,882 in 1899 to $9,830,517 in 1900, a gain of $1,188,635, or 13.75 per cent. The stove-lining industry, which is closely allied to the fire-brick interests, increased from $416,235 in 1899 to $462,541, or $46,306 in 1900. The sewer-pipe industry showed the greatest actual gain, increasing from $4,560,334 in 1899 to $5,842,562, a gain of $1,282,228, or 28.12 per cent in 1900.

Fireproofing showed an increase from $1,665,066 to $1,820,214, an increase of $155,148, or 9.32 per cent.

To the increase in the value of the pottery products, however, is due the increase in the total clay products, as the brick and tile products fell off $2,133,345, or 2.72 per cent, while the pottery products increased $2,548,320, or 14.77 per cent.

RANK OF STATES.

The following tables show the rank of States, total value of clay products, and percentage of the total product made by each State in 1899 and 1900:

Rank of States and value of output of clay products in 1899 and 1900.

1899.

Rank.	State.	Number of operating firms reporting.	Value.	Per cent of total product.
1	Ohio	980	$16,500,625	17.22
2	Pennsylvania	550	14,103,245	14.72
3	New Jersey	159	10,787,273	11.26
4	New York	276	8,076,412	8.43
5	Illinois	643	7,259,825	7.58
6	Indiana	639	4,235,354	4.42
7	Missouri	289	3,666,616	3.83
8	Iowa	372	2,233,808	2.33
9	Massachusetts	111	2,181,710	2.28
10	Wisconsin	173	1,811,712	1.89
11	Maryland	66	1,679,641	1.75
12	California	79	1,587,518	1.66
13	West Virginia	55	1,451,539	1.52
14	Kentucky	111	1,358,428	1.42
15	Michigan	196	1,283,997	1.34
16	Georgia	109	1,263,995	1.32
17	Texas	125	1,221,119	1.27
18	Minnesota	116	1,218,697	1.27
19	Virginia	96	1,093,784	1.14
20	Connecticut *a*	45	1,074,202	1.12
21	Colorado	75	1,071,388	1.12
22	Tennessee	125	948,853	.99
23	Alabama	118	897,810	.94
24	Nebraska	113	843,315	.88
25	Kansas	67	839,767	.88
26	North Carolina	287	774,202	.81
27	Maine	75	662,685	.69
28	South Carolina	118	605,329	.63
29	Washington	41	591,277	.62
30	New Hampshire	57	570,287	.60
31	Louisiana	64	554,729	.58
32	Mississippi	99	546,741	.57
33	District of Columbia	17	481,145	.50
34	Arkansas	72	339,142	.35
35	Oregon	62	327,374	.34
36	Montana	28	314,340	.32
37	Utah	201	216,449	.23
38	Delaware	27	168,485	.18
39	North Dakota	15	168,124	.17
40	Oklahoma	38	150,552	.16
41	Florida	21	138,808	.14
42	Vermont	60	131,525	.14
43	New Mexico	11	108,090	.11
44	Arizona	20	101,954	.11
45	Idaho	27	47,624	.05
46	South Dakota	12	46,500	.05
47	Indian Territory	14	35,075	.04
48	Nevada	7	17,850	.02
49	Wyoming	10	8,450	.01
	Total	6,962	95,797,370	100.00

a Including Rhode Island.

Rank of States and value of output of clay products in 1899 and 1900—Continued.

1900.

Rank.	State.	Number of operating firms reporting.	Value.	Per cent of total product.
1	Ohio	871	$18,304,628	19.03
2	Pennsylvania	508	13,391,748	13.92
3	New Jersey	149	10,928,423	11.36
4	Illinois	569	7,708,859	8.01
5	New York	269	7,660,606	7.96
6	Indiana	567	3,858,350	4.01
7	Missouri	267	3,736,567	3.88
8	Iowa	358	2,291,251	2.38
9	West Virginia	53	2,016,765	2.10
10	Massachusetts	101	1,833,101	1.91
11	Maryland	55	1,711,856	1.78
12	Kentucky	118	1,481,324	1.54
13	Minnesota	114	1,396,697	1.45
14	California	72	1,375,998	1.43
15	Virginia	112	1,305,195	1.36
16	Colorado	72	1,200,519	1.25
17	Georgia	99	1,193,218	1.24
18	Michigan	189	1,181,695	1.23
19	Texas	193	1,171,017	1.22
20	Connecticut and Rhode Island	47	1,099,972	1.14
21	Wisconsin	68	1,072,179	1.11
22	Kansas	62	1,016,750	1.06
23	Tennessee	123	915,578	.95
24	North Carolina	256	815,975	.85
25	Maine	71	724,934	.75
26	Alabama	109	712,727	.74
27	South Carolina	102	711,336	.73
28	Nebraska	105	683,958	.71
29	Washington	48	625,459	.65
30	Mississippi	87	573,368	.60
31	Louisiana	59	507,694	.53
32	New Hampshire	50	485,013	.50
33	Arkansas	81	381,012	.40
34	Montana	26	350,489	.36
35	District of Columbia	14	288,933	.30
36	Oregon	64	281,385	.29
37	Utah	61	234,221	.24
38	Oklahoma	33	164,457	.17
39	Delaware	25	156,274	.16
40	Florida	21	140,604	.15
41	Vermont	15	121,041	.13
42	Arizona	24	112,737	.12
43	North Dakota	13	92,399	.10
44	Idaho	25	49,382	.05
45	South Dakota	13	43,440	.05
46	New Mexico	13	41,898	.04
47	Indian Territory	11	30,233	.03
48	Wyoming	8	21,500	.02
49	Nevada	5	9,580	.01
	Total	6,375	96,212,345	100.00

Every State and Territory except Alaska appears in these tables as producers of clay products, Nevada for the first time appearing, though with only a small product. Ohio still must be called the greatest producer of clay goods, with a product valued at $18,304,628, or 19.03 per cent of the total.

In the following table is shown the rank of the several States and Territories in the value of clay products from 1894 to 1900:

Rank of clay-producing States, in value of production, from 1894 to 1900.

State.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Alabama	31	28	26	24	26	23	26
Arizona	46	47	43	41	40	44	42
Arkansas	34	33	34	35	34	34	33
California	16	10	21	21	12	12	14
Colorado	27	22	29	25	25	21	16
Connecticut *a*	20	20	11	10	16	20	20
Delaware	43	41	41	39	39	38	39
District of Columbia	28	27	28	30	30	33	35
Florida	40	39	39	38	38	41	40
Georgia	18	15	15	14	18	15	17
Idaho	44	44	46	46	47	45	44
Illinois	2	3	4	5	4	5	4
Indiana	6	6	7	6	6	6	6
Indian Territory	(*b*)	(*b*)	(*b*)	47	45	47	47
Iowa	8	9	9	9	8	8	8
Kansas	33	32	32	32	27	25	22
Kentucky	19	19	18	17	15	14	12
Louisiana	24	25	25	26	24	31	31
Maine	17	21	13	18	21	27	25
Maryland	11	13	10	11	10	11	11
Massachusetts	9	8	8	8	9	9	10
Michigan	10	11	12	19	14	15	18
Minnesota	15	12	20	15	11	18	13
Mississippi	38	36	33	31	31	32	30
Missouri	7	7	6	7	7	7	7
Montana	37	35	31	33	32	36	34
Nebraska	23	34	36	28	23	24	28
Nevada	....	....	....	....	....	48	49
New Hampshire	26	23	22	23	28	30	32
New Jersey	5	5	5	3	3	3	3
New Mexico	(*b*)	(*b*)	(*b*)	43	44	43	46
New York	4	4	3	4	5	4	5
North Carolina	30	26	24	27	29	26	24
North Dakota	42	42	42	40	42	39	43
Ohio	1	1	1	1	1	1	1
Oklahoma	*b* 41	*b* 43	*b* 45	44	41	41	38
Oregon	36	37	38	37	37	35	36
Pennsylvania	3	2	2	2	2	2	2
Rhode Island	29	29	30	(*c*)	(*c*)	(*c*)	(*c*)
South Carolina	32	30	27	29	35	28	27
South Dakota	45	45	44	45	46	46	45
Tennessee	22	24	23	22	22	22	23
Texas	13	14	14	12	19	17	19
Utah	35	40	37	36	36	37	37
Vermont	39	38	40	42	43	42	41
Virginia	14	18	17	16	17	19	15
Washington	25	31	35	34	33	29	29
West Virginia	21	17	16	13	13	13	9
Wisconsin	12	16	19	20	20	10	21
Wyoming	47	46	47	48	48	49	48

a Including Rhode Island in 1897, 1898, 1899, and 1900.
b In 1894, 1895, and 1896 Indian Territory and New Mexico were included with Oklahoma Territory.
c Included with Connecticut in 1897, 1898, 1899, and 1900.

In the following table is given a statement of the output of clay products in the United States from 1894 to 1900 by varieties of product, together with the total for each year and the number of operating firms reporting:

Clay products of the United States from 1894 to 1900, by varieties.

Year.	Number of operating firms reporting.	Common brick.			Front brick.		
		Quantity.	Value.	Average price per thousand.	Quantity.	Value.	Average price per thousand.
		Thousands.			*Thousands.*		
1894	....	6,152,420	$35,062,538	$5.70	(*b*)	(*b*)	....
1895	....	6,017,965	31,569,126	5.25	339,204	$4,399,367	$12.97
1896	5,293	5,703,279	29,664,043	5.20	270,335	3,390,941	12.54
1897	5,424	5,292,532	26,430,207	4.99	310,918	3,855,033	12.40
1898	5,971	5,867,415	30,980,704	5.28	295,833	3,572,385	12.08
1899	6,962	7,695,305	39,887,522	5.18	438,817	4,767,343	10.86
1900	6,375	7,140,622	38,621,514	5.41	344,516	3,864,670	11.09

Year.	Vitrified paving brick.			Fancy or ornamental brick (value).	Enameled brick (value).	Fire brick (value).	Stove linings (value).	Drain tile (value).
	Quantity.	Value.	Average price per thousand.					
	Thousands.							
1894	457,021	$3,711,073	$8.12	$1,128,608	(*c*)	$4,762,820	(*d*)	$5,803,168
1895	381,591	3,130,472	8.20	652,519	(*c*)	5,279,004	(*d*)	3,450,961
1896	320,407	2,794,585	8.72	763,140	(*c*)	4,944,723	(*d*)	2,613,513
1897	435,851	3,582,037	8.22	685,048	(*c*)	4,094,704	(*d*)	2,623,305
1898	474,419	4,016,822	8.47	358,372	$279,993	6,093,071	(*d*)	3,115,318
1899	580,751	4,750,424	8.18	476,191	329,969	8,641,882	$416,235	3,682,394
1900	546,679	4,764,124	8.71	289,698	323,630	9,830,517	462,541	2,976,281

Year.	Sewer pipe (value).	Ornamental terra cotta (value).	Fireproofing (value).	Tile, not drain (value).	Pottery (value).	Miscellaneous (value). *a*	Total (value).
1894	$5,989,923	$1,476,185	$514,637	$1,688,724	(*e*)	$4,517,709	$64,655,385
1895	4,482,577	2,512,193	741,626	2,572,628	(*e*)	6,619,333	65,409,806
1896	4,588,503	2,359,983	1,706,504	1,618,127	$7,455,627	1,210,719	63,110,408
1897	4,069,534	1,841,422	1,979,259	1,476,638	10,309,209	1,413,595	62,359,991
1898	3,791,057	2,043,325	1,900,642	1,746,024	13,994,428	2,000,743	73,892,884
1899	4,560,334	2,027,532	1,665,066	1,276,300	17,250,250	6,065,928	95,797,370
1900	5,842,562	2,372,568	1,820,214	2,349,420	19,798,570	2,896,036	96,212,345

a Including miscellaneous pottery products in 1894 and 1895.
b Common and pressed brick not separately classified in 1894.
c Enameled brick not separately classified prior to 1898.
d Stove linings not separately classified prior to 1899.
e Pottery not separately classified in 1894 and 1895.

BRICK AND TILE.

PRODUCTION.

The following table gives a statement of the brick and tile and other structural clay products, together with fire brick and sewer pipe, in 1899 and 1900:

Brick and tile products of the United States in 1899.

State.	Common brick.		Average price per thousand.	Front brick.		Average price per thousand.
	Quantity.	Value.		Quantity.	Value.	
	Thousands.			*Thousands.*		
Alabama	109,371	$611,844	$5.59	4,345	$28,360	$6.52
Arizona	15,687	101,834	6.49	....	....	....
Arkansas	43,858	279,997	6.38	884	8,690	9.83
California	129,512	800,210	6.18	3,642	59,918	16.45
Colorado	75,603	422,524	5.59	11,821	136,613	11.55
Connecticut and Rhode Island	150,665	751,239	4.98	(*a*)	(*a*)	....
Delaware	18,433	138,319	7.50	2,212	23,566	10.65
District of Columbia	45,657	358,232	7.85	(*a*)	(*a*)	....
Florida	26,089	132,123	5.06	(*a*)	(*a*)	....
Georgia	201,991	968,310	4.79	8,505	78,175	9.19
Idaho	6,315	44,149	6.99	....	....	....
Illinois	664,684	3,231,332	4.86	26,941	252,244	9.36
Indiana	364,675	1,727,697	4.74	14,317	139,978	9.77
Indian Territory	5,680	35,075	6.18	....	....	....
Iowa	220,384	1,328,050	6.03	17,280	160,890	9.31
Kansas	78,559	408,196	5.20	11,672	106,353	9.11
Kentucky	103,994	546,535	5.26	2,505	20,275	8.09
Louisiana	101,995	515,577	5.05	1,730	14,775	8.54
Maine	72,649	399,110	5.49	5,616	39,615	7.05
Maryland	111,479	682,247	6.12	14,335	157,918	11.01
Massachusetts	230,437	1,256,767	5.45	3,710	79,280	21.36
Michigan	200,144	933,176	4.66	4,290	58,920	13.73
Minnesota	145,333	754,499	5.19	3,955	41,230	10.42
Mississippi	88,585	510,600	5.76	1,195	12,775	10.69
Missouri	253,220	1,345,792	5.31	30,062	281,797	9.37
Montana	28,725	188,339	6.55	(*a*)	(*a*)	....
Nebraska	119,287	781,246	6.55	1,588	23,653	14.89
Nevada	2,085	17,440	8.51	....	....	....
New Hampshire	98,900	505,951	5.12	2,193	21,301	9.71
New Jersey	394,764	1,809,906	4.58	37,825	609,819	16.12
New Mexico	7,712	57,600	7.47	(*a*)	(*a*)	....
New York	1,246,756	5,275,194	4.23	24,796	324,645	13.09
North Carolina	135,147	682,282	5.05	2,075	14,412	6.94
North Dakota	24,210	141,124	5.83	(*a*)	(*a*)	....
Ohio	467,888	2,427,684	5.19	48,829	466,555	9.55
Oklahoma Territory	17,403	113,532	6.52	650	10,500	16.15
Oregon	29,631	191,881	6.48	773	18,460	23.88
Pennsylvania	782,944	4,537,305	5.80	88,784	959,000	10.80
South Carolina	120,061	551,103	4.39	4,037	26,470	6.55
South Dakota	6,510	46,500	7.03	....	....	....
Tennessee	113,278	555,812	4.91	9,705	58,813	6.06
Texas	174,[illegible]72	947,980	5.43	7,316	60,061	8.20
Utah	27,802	159,481	5.74	1,612	18,467	11.45
Vermont	18,450	92,395	5.00	(*a*)	(*a*)	....
Virginia	128,847	765,598	5.94	18,712	242,137	12.94
Washington	55,794	405,678	7.27	1,497	31,790	21.23
West Virginia	49,903	269,656	5.40	2,196	16,218	7.38
Wisconsin	178,722	1,073,101	6.00	6,881	60,213	8.74
Wyoming	915	7,300	7.99	(*a*)	(*a*)	....
Other States *b*	....	....	....	10,331	103,457	10.01
Total	7,695,305	39,887,522	5.18	438,817	4,767,343	10.86
Per cent of total clay products	....	41.63	....	....	4.98	....

a Included in Other States.
b Including all products made by less than three producers in order that the operations of individual establishments may not be disclosed.

Brick and tile products of the United States in 1899—Continued.

State.	Vitrified brick.		Average price per thousand.	Fancy or ornamental brick (value).	Fire brick (value).	Stove linings (value).	Draintile (value).
	Quantity.	Value.					
	Thousands.						
Alabama	11,075	$100,600	$9.08	(*a*)	$114,050	...	(*a*)
Arizona	...	...	...	(*a*)	...	...	...
Arkansas	1,300	12,700	9.77	(*a*)	8,100	...	$9,384
California	(*a*)	(*a*)	10.00	(*a*)	28,798	$1,350	9,298
Colorado	4,760	48,200	10.12	(*a*)	162,633	...	5,397
Connecticut and Rhode Island	(*a*)	(*a*)	10.00	(*a*)	(*a*)	(*a*)	...
Delaware	...	...	...	(*a*)	...	...	(*a*)
District of Columbia	...	...	...	...	...	...	(*a*)
Florida	...	...	6.25	...	...	...	(*a*)
Georgia	(*a*)	(*a*)	...	(*a*)	24,400	(*a*)	(*a*)
Idaho	...	...	7.96	...	...	...	(*a*)
Illinois	88,047	700,524	9.19	$27,868	132,759	...	1,026,192
Indiana	28,120	258,471	...	8,841	72,350	...	839,046
Indian Territory	...	...	7.61	...	...	...	...
Iowa	29,555	225,044	6.81	4,700	(*a*)	...	359,568
Kansas	40,844	278,164	10.20	(*a*)	...	...	6,550
Kentucky	5,919	60,398	...	(*a*)	334,630	...	36,132
Louisiana	...	...	9.21	...	...	...	3,335
Maine	(*a*)	(*a*)	14.00	(*a*)	...	(*a*)	(*a*)
Maryland	50	700	...	6,997	325,812	32,457	3,673
Massachusetts	...	...	12.00	(*a*)	22,792	143,547	(*a*)
Michigan	(*a*)	(*a*)	...	(*a*)	(*a*)	...	140,171
Minnesota	...	...	5.00	(*a*)	...	...	11,400
Mississippi	350	1,750	8.35	...	...	...	1,035
Missouri	22,594	188,787	17.00	49,219	375,023	(*a*)	53,575
Montana	(*a*)	(*a*)	7.15	(*a*)	(*a*)	(*a*)	...
Nebraska	2,110	15,090	...	(*a*)	...	...	...
Nevada	...	...	...	...	...	...	...
New Hampshire	...	...	12.80	...	(*a*)	...	...
New Jersey	(*a*)	(*a*)	...	43,368	633,158	(*a*)	(*a*)
New Mexico	...	...	...	...	(*a*)	...	2,000
New York	32,350	342,845	10.60	(*a*)	227,814	74,507	41,921
North Carolina	(*a*)	(*a*)	5.76	...	3,380	...	(*a*)
North Dakota	...	...	...	...	(*a*)	...	...
Ohio	145,657	1,133,509	7.78	42,037	976,693	(*a*)	977,773
Oklahoma Territory	...	...	...	...	...	...	...
Oregon	...	...	...	(*a*)	(*a*)	...	20,481
Pennsylvania	89,017	702,782	7.89	57,299	4,921,339	106,851	26,719
South Carolina	...	...	...	(*a*)	11,220	...	(*a*)
South Dakota	...	...	...	...	...	...	...
Tennessee	5,780	69,289	11.98	(*a*)	28,049	...	16,695
Texas	(*a*)	(*a*)	9.83	3,147	23,234	...	2,325
Utah	(*a*)	(*a*)	5.71	(*a*)	(*a*)	...	(*a*)
Vermont	...	...	...	(*a*)	...	(*a*)	(*a*)
Virginia	5,000	50,000	10.00	16,117	(*a*)	...	5,160
Washington	937	14,260	15.21	(*a*)	21,173	...	5,346
West Virginia	53,451	415,089	7.77	(*a*)	54,400	...	3,656
Wisconsin	(*a*)	(*a*)	15.00	1,975	...	...	23,334
Wyoming	...	...	...	...	...	...	...
Other States *b*	13,835	132,222	9.56	214,623	140,075	57,523	52,228
Total	580,751	4,750,424	8.18	*c*806,160	8,641,882	416,235	3,682,394
Per cent of total clay products	...	4.96	...	.84	9.02	.44	3.84

a Included in Other States.
b Including all products made by less than three producers in order that the operations of individual establishments may not be disclosed.
c Including enameled brick valued at $329,969, made in the following States: California, Illinois, Maryland, New Jersey, Oregon, and Pennsylvania. New Jersey, with a product valued at $183,113, was the only State in which there were three or more producers of enameled brick.

Brick and tile products of the United States in 1899—Continued.

State.	Sewer pipe (value).	Ornamental terra cotta (value).	Fireproofing (value).	Tile not drain (value).	Miscellaneous *a* (value).	Total value.
Alabama					$12,943	$868,472
Arizona						101,954
Arkansas						319,071
California	$479,537	$76,000	$7,100	$3,400	70,709	1,554,655
Colorado	(*b*)		(*b*)		213,439	1,055,338
Connecticut and Rhode Island			(*b*)		108,183	992,452
Delaware						168,485
District of Columbia	69,495				28,263	462,375
Florida	(*b*)	(*b*)			1,014	136,208
Georgia	100,612	(*b*)	(*b*)		5,825	1,235,727
Idaho					75	44,624
Illinois	229,040	(*b*)	198,360	130,085	117,246	6,496,268
Indiana	161,935	(*b*)	62,575	328,041	266,746	3,888,180
Indian Territory						35,075
Iowa	(*b*)				77,457	2,203,728
Kansas					11,000	811,337
Kentucky	(*b*)		(*b*)	(*b*)	146,412	1,253,823
Louisiana					8,402	542,089
Maine	(*b*)			(*b*)	19,015	655,524
Maryland	(*b*)			(*b*)	34,604	1,317,915
Massachusetts		(*b*)	70,573		126,320	1,887,677
Michigan	50,300		5,900		22,709	1,254,256
Minnesota	(*b*)		(*b*)		11,575	1,012,332
Mississippi					380	526,540
Missouri	436,624	184,495	26,257	(*b*)	629,250	3,587,819
Montana	(*b*)		(*b*)		22,361	313,390
Nebraska					17,693	841,825
Nevada					410	17,850
New Hampshire					10,500	552,752
New Jersey	99,000	660,304	653,144	37,123	949,425	5,716,707
New Mexico					7,000	108,090
New York	51,293	417,350	108,961	91,645	468,456	7,426,220
North Carolina	(*b*)				2,250	748,539
North Dakota						168,124
Ohio	1,680,724		346,090	565,094	880,858	9,504,580
Oklahoma Territory					26,520	150,552
Oregon	(*b*)		(*b*)	(*b*)	29,503	316,170
Pennsylvania	204,400	139,100	110,210	(*b*)	1,035,092	12,935,508
South Carolina					2,690	593,798
South Dakota						46,500
Tennessee	(*b*)				6,623	880,363
Texas	58,753		(*b*)		9,217	1,139,067
Utah	(*b*)				9,620	208,399
Vermont					2,000	131,525
Virginia					4,115	1,084,064
Washington	76,694	(*b*)	(*b*)		10,484	577,927
West Virginia	(*b*)		(*b*)	(*b*)	20,050	866,229
Wisconsin					639,494	1,798,567
Wyoming						8,450
Other States	861,927	550,283	75,896	120,912		(*c*)
Total	4,560,334	2,027,532	1,665,066	1,276,300	6,065,928	78,547,120
Per cent of total clay products	4.76	2.12	1.74	1.33	6.33	81.99

a Including acid-proof brick, adobes, aquaria ornaments, chimney pipe and tops, condensers, conduits for underground wires, cupola blocks, fire kindlers, fire-clay retorts and special shapes, flue pipes and linings, furnace linings and settings, gas logs, glass melting pots and glass-house furnace blocks, grate tile, grave markers, hollow brick, lead pots, muffles, open-hearth runner brick, patent panels, perforated paving brick, porous cups, porous hollow brick, refractory fire-clay furnace linings, scorifiers, sewer brick, sidewalk tile and blocks, statuary, stone pumps, toy marbles, vases, web tile and well brick and tile.

b Included in Other States.

c The total of Other States is distributed among the States to which it belongs, in order that each State may be fully represented in the totals.

Brick and tile products of the United States in 1900.

State.	Common brick.		Average price per thousand.	Front brick.		Average price per thousand.
	Quantity.	Value.		Quantity.	Value.	
	Thousands.			*Thousands.*		
Alabama	89,693	$500,313	$5.58	1,040	$9,560	$9.19
Arizona	15,834	108,822	6.88	(*a*)	(*a*)	14.44
Arkansas	44,360	274,390	6.19	8,254	67,170	8.14
California	119,906	698,583	5.83	1,751	32,584	18.61
Colorado	79,286	471,235	5.94	13,390	143,470	10.71
Connecticut and Rhode Island	164,431	862,334	5.24	(*a*)	(*a*)	15.02
Delaware	19,316	144,860	7.50	708	7,414	10.47
District of Columbia	22,136	168,127	7.60	(*a*)	(*a*)	14.83
Florida	26,270	136,779	5.21	(*a*)	(*a*)	11.89
Georgia	195,463	982,083	5.02	5,591	49,800	8.91
Idaho	6,970	46,992	6.74	(*a*)	(*a*)	8.00
Illinois	685,161	3,981,577	5.84	26,040	240,989	9.25
Indiana	274,383	1,391,873	5.08	19,084	172,752	9.05
Indian Territory	4,550	30,233	6.64			
Iowa	222,744	1,386,641	6.23	8,013	79,682	9.94
Kansas	92,364	482,952	5.23	6,122	57,764	9.44
Kentucky	113,863	608,334	5.34	2,282	21,098	9.25
Louisiana	88,319	463,613	5.25	2,320	19,100	8.23
Maine	63,170	353,731	5.60	3,330	27,050	8.12
Maryland	117,830	724,013	6.14	4,439	60,729	13.68
Massachusetts	198,693	1,123,586	5.65	4,884	87,575	17.93
Michigan	180,892	863,250	4.77	8,421	48,411	5.75
Minnesota	152,497	811,457	5.32	4,520	46,830	10.36
Mississippi	107,185	552,061	5.16	692	5,750	8.31
Missouri	195,930	1,057,497	5.40	22,013	228,070	10.36
Montana	32,977	219,465	6.65	536	8,217	15.33
Nebraska	88,917	553,905	6.23	6,599	95,528	14.48
Nevada	1,135	9,580	8.44			
New Hampshire	80,582	423,713	5.26	3,659	33,175	9.07
New Jersey	331,579	1,449,694	4.37	25,229	426,692	16.91
New Mexico	5,141	38,268	7.44			
New York	1,009,041	4,266,715	4.23	19,204	249,078	12.97
North Carolina	148,177	737,577	4.98	441	4,025	9.13
North Dakota	13,742	87,399	6.36	(*a*)	(*a*)	14.71
Ohio	411,532	2,232,090	5.42	40,923	433,086	10.58
Oklahoma	20,980	132,782	6.33	565	5,900	10.44
Oregon	24,686	168,369	6.82	195	2,690	13.79
Pennsylvania	744,663	4,484,590	6.02	54,068	596,559	11.03
South Carolina	140,618	665,998	4.73	1,482	10,784	7.28
South Dakota	5,192	41,324	7.96	(*a*)	(*a*)	17.71
Tennessee	108,759	609,994	5.61	7,645	59,493	7.78
Texas	170,124	964,743	5.67	3,827	35,605	9.30
Utah	29,766	174,579	5.86	3,734	31,039	8.31
Vermont	19,614	102,699	5.24	(*a*)	(*a*)	15.00
Virginia	153,409	934,185	6.09	15,617	275,847	17.66
Washington	55,671	404,687	7.27	1,480	31,840	21.51
West Virginia	103,760	708,861	6.83	1,610	16,797	10.43
Wisconsin	156,586	963,461	6.15	10,832	84,601	7.81
Wyoming	2,725	21,500	7.89			
Other States *b*				3,976	57,916	14.57
Total	7,140,622	38,621,514	5.41	344,516	3,864,670	11.22
Per cent of total clay products		40.14			4.02	

a Included in Other States.

b Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

Brick and tile products of the United States in 1900—Continued.

State.	Vitrified brick.		Average price per thousand.	Fancy or ornamental brick (value).	Fire brick. (value).	Stove linings. (value).	Drain tile. (value).
	Quantity.	Value.					
	Thousands.						
Alabama	3,275	$30 250	$9.24	(a)	$148,665	....	(a)
Arizona	....	....	....	....	....	....	....
Arkansas	602	5,616	9.33	....	5,150	....	$1,306
California	....	....	....	(a)	48,461	$2,100	8,141
Colorado	2,213	22,130	10.00	(a)	207,475	....	5,600
Connecticut and Rhode Island	(a)	(a)	12.00	(a)	(a)	....	(a)
Delaware	....	....	....	....	....	....	(a)
District of Columbia	(a)	(a)	6.00	(a)	....	....	(a)
Florida	....	....	....	....	(a)	....	(a)
Georgia	(a)	(a)	10.00	(a)	35,502	(a)	(a)
Idaho	....	....	....	....	....	....	(a)
Illinois	87,724	720,089	8.21	$15,705	175,259	....	734,249
Indiana	30,326	331,276	10.92	7,310	40,976	(a)	674,602
Indian Territory	....	....	....	....	....	....	....
Iowa	17,338	151,386	8.73	1,750	2,145	(a)	377,586
Kansas	53,690	417,924	7.78	(a)	(a)	....	6,950
Kentucky	(a)	(a)	12.00	(a)	393,220	(a)	26,727
Louisiana	....	....	....	....	....	(a)	2,659
Maine	(a)	(a)	16.75	(a)	(a)	....	5,564
Maryland	74	595	8.04	9,886	321,666	36,049	2,363
Massachusetts	....	....	....	(a)	69,400	144,044	....
Michigan	(a)	(a)	12.42	(a)	(a)	....	114,747
Minnesota	(a)	(a)	6.00	(a)	(a)	....	2,745
Mississippi	....	....	....	....	(a)	....	455
Missouri	28,019	252,783	9.02	42,096	510,166	(a)	57,900
Montana	....	....	....	1,100	117,566	....	....
Nebraska	3,580	28,055	7.83	(a)	(a)	....	....
Nevada	....	....	....	....	....	....	....
New Hampshire	(a)	(a)	5.43	....	(a)	....	....
New Jersey	(a)	(a)	12.43	4,112	1,072,535	(a)	55,655
New Mexico	(a)	(a)	10.00	(a)	(a)	....	....
New York	29,943	347,671	11.61	(a)	360,933	93,188	89,019
North Carolina	(a)	(a)	8.00	(a)	714	(a)	7,186
North Dakota	....	....	....	....	(a)	....	....
Ohio	146,693	1,118,106	7.62	45,855	1,340,775	(a)	715,874
Oklahoma	(a)	(a)	11.20	(a)	....	....	(a)
Oregon	(a)	(a)	12.00	(a)	1,334	....	15,972
Pennsylvania	57,827	481,670	8.33	57,279	4,587,991	90,348	8,420
South Carolina	....	....	....	....	14,321	....	(a)
South Dakota	(a)	(a)	10.00	....	....	....	....
Tennessee	6,991	87,760	12.55	(a)	32,573	....	18,900
Texas	(a)	(a)	8.96	1,109	14,144	....	2,164
Utah	(a)	(a)	10.00	(a)	3,250	....	(a)
Vermont	....	....	....	....	....	....	(a)
Virginia	3,692	44,067	11.94	17,921	26,573	....	3,285
Washington	1,242	18,950	15.26	(a)	22,988	(a)	(a)
West Virginia	53,492	474,880	8.88	....	149,257	(a)	1,346
Wisconsin	....	....	....	2,272	(a)	....	14,995
Wyoming	....	....	....	....	....	....	....
Other States *b*	19,958	230,916	....	83,303	127,478	96,812	21,871
Total	546,679	4,764,124	8.71	*c*613,328	9,830,517	462,541	2,976,281
Per cent of total clay products	....	4.95	....	.64	10.22	.48	3.09

a Included in Other States.

b Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

c Including enameled brick valued at $323,630, made in the following States: California, Colorado, Illinois, Maryland, Missouri, New Jersey, North Carolina, Ohio, and Pennsylvania. New Jersey, with a product valued at $139,875, was the only State in which there were three or more producers of enameled brick.

Brick and tile products of the United States in 1900—Continued.

State.	Sewer pipe (value).	Ornamental terra cotta (value).	Fireproofing (value).	Tile (not drain) (value).	Miscellaneous (*a*) (value).	Total value.
Alabama					$2,825	$692,431
Arizona					15	112,737
Arkansas				$100	1,000	354,732
California	$357,867	$74,800	$15,500	(*b*)	100,675	1,351,611
Colorado	(*b*)		(*b*)	(*b*)	202,484	1,182,575
Connecticut and Rhode Island	(*b*)		(*b*)	(*b*)	13,988	1,038,722
Delaware						156,274
District of Columbia	69,374				35,929	278,060
Florida	(*b*)				250	140,604
Georgia	(*b*)	66,000	(*b*)			1,168,835
Idaho					190	49,382
Illinois	271,035	(*b*)	76,347	229,729	25,237	6,932,086
Indiana	279,719	(*b*)	116,581	343,985	112,576	3,532,450
Indian Territory						30,233
Iowa	52,462		25,900	5,450	171,485	2,254,662
Kansas					34,600	1,002,689
Kentucky	(*b*)	(*b*)	(*b*)	(*b*)		1,349,827
Louisiana		(*b*)			14,822	503,394
Maine	(*b*)			(*b*)		724,934
Maryland	(*b*)	(*b*)		(*b*)	26,193	1,275,239
Massachusetts		(*b*)	(*b*)	(*b*)	11,791	1,594,377
Michigan	57,916	(*b*)	2,350	(*b*)	406	1,147,378
Minnesota	(*b*)		(*b*)	(*b*)	4,160	1,103,302
Mississippi						558,916
Missouri	624,932	158,051	19,529	(*b*)	551,645	3,665,093
Montana	3,300		841			350,489
Nebraska				(*b*)		683,958
Nevada						9,580
New Hampshire			(*b*)			485,013
New Jersey	154,481	647,884	873,706	508,392	286,424	5,664,772
New Mexico						41,898
New York	94,293	676,408	93,994	105,519	107,136	6,495,281
North Carolina	(*b*)				5,000	797,112
North Dakota						92,399
Ohio	2,243,386	2,857	351,884	690,257	491,735	9,731,305
Oklahoma					20,000	164,457
Oregon	(*b*)		(*b*)		75	264,095
Pennsylvania	522,650	180,100	95,957	191,878	643,252	12,000,875
South Carolina					300	693,703
South Dakota						43,440
Tennessee	(*b*)		(*b*)	(*b*)		865,923
Texas	(*b*)			(*b*)	5,940	1,083,553
Utah	(*b*)	(*b*)	(*b*)		1,250	227,621
Vermont					18,000	121,041
Virginia	(*b*)				200	1,302,085
Washington	119,807	(*b*)	(*b*)		800	616,029
West Virginia	(*b*)			(*b*)	3,853	1,384,924
Wisconsin				(*b*)	1,800	1,072,179
Wyoming						21,500
Other States *c*	991,340	566,468	147,625	274,110		(*d*)
Total	5,842,562	2,372,568	1,820,214	2,349,420	2,896,036	76,413,775
Per cent of total clay products	6.07	2.47	1.89	2.44	3.01	79.42

a Including acid-proof brick, adobes, aquaria ornaments, burnt-clay ballast, chimney pipe and tops, condensers, conduits for underground wires, cupola blocks, curbing brick, crucibles, fire cement and mortar, fire kindlers, fire clay retorts and special shapes, flue pipes and linings, foundation brick, frost-proof hollow cellar brick, furnace linings and settings, gas logs, glass melting pots and glass-house furnace blocks, grate tile, grave markers, hollow brick, lead pots, muffles, open-hearth runner brick, patent panels, perforated paving brick, porous cups, porous hollow brick, refractory fire-clay furnace linings, scorifiers, sewer brick, sidewalk tile and blocks, statuary, stone pumps, toy marbles, vases, web tile, well brick and tile.

b Included in Other States.

c Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

d The total of other States is distributed among the States to which it belongs, in order that they may be fully represented in the totals.

RANK OF STATES.

The following tables show the rank of States in the output of brick and tile products, as distinguished from pottery products, and the percentage of the total made by each State in 1899 and 1900, and will be of interest to those engaged exclusively in this line of industry:

Rank of States and value of output of brick and tile products in 1899 and 1900.

1899.

Rank.	State.	Value.	Per cent of total product.
1	Pennsylvania	$12,935,508	16.47
2	Ohio	9,504,580	12.10
3	New York	7,426,220	9.45
4	Illinois	6,496,268	8.27
5	New Jersey	5,716,707	7.28
6	Indiana	3,888,180	4.95
7	Missouri	3,587,819	4.57
8	Iowa	2,203,728	2.81
9	Massachusetts	1,887,677	2.40
10	Wisconsin	1,798,567	2.29
11	California	1,554,655	1.98
12	Maryland	1,317,915	1.68
13	Michigan	1,254,256	1.60
14	Kentucky	1,253,823	1.60
15	Georgia	1,235,727	1.57
16	Texas	1,139,067	1.45
17	Virginia	1,084,064	1.38
18	Colorado	1,055,338	1.34
19	Minnesota	1,012,332	1.29
20	Connecticut and Rhode Island	992,452	1.26
21	Tennessee	880,363	1.12
22	Alabama	868,472	1.11
23	West Virginia	866,229	1.10
24	Nebraska	841,825	1.07
25	Kansas	811,337	1.03
26	North Carolina	748,539	.95
27	Maine	655,524	.83
28	South Carolina	593,798	.76
29	Washington	577,927	.74
30	New Hampshire	552,752	.70
31	Louisiana	542,089	.69
32	Mississippi	526,540	.67
33	District of Columbia	462,375	.59
34	Arkansas	319,071	.41
35	Oregon	316,170	.40
36	Montana	313,390	.40
37	Utah	208,399	.27
38	Delaware	168,485	.21
39	North Dakota	168,124	.21
40	Oklahoma	150,552	.19
41	Florida	136,208	.17
42	Vermont	131,525	.17
43	New Mexico	108,090	.14
44	Arizona	101,954	.13
45	South Dakota	46,500	.06
46	Idaho	44,624	.06
47	Indian Territory	35,075	.05
48	Nevada	17,850	.02
49	Wyoming	8,450	.01
	Total	78,547,120	100.00

Rank of States and value of output of brick and tile products in 1899 and 1900—Continued.

1900.

Rank.	State.	Value.	Per cent of total product.
1	Pennsylvania	$12,000,875	15.71
2	Ohio	9,731,305	12.74
3	Illinois	6,932,086	9.07
4	New York	6,495,281	8.50
5	New Jersey	5,664,772	7.41
6	Missouri	3,665,093	4.80
7	Indiana	3,532,450	4.62
8	Iowa	2,254,662	2.95
9	Massachusetts	1,594,377	2.09
10	West Virginia	1,384,924	1.81
11	California	1,351,611	1.77
12	Kentucky	1,349,827	1.77
13	Virginia	1,302,085	1.70
14	Maryland	1,275,239	1.67
15	Colorado	1,182,575	1.55
16	Georgia	1,168,835	1.53
17	Michigan	1,147,378	1.50
18	Minnesota	1,103,302	1.44
19	Texas	1,083,553	1.42
20	Wisconsin	1,072,179	1.40
21	Connecticut and Rhode Island	1,038,722	1.36
22	Kansas	1,002,689	1.31
23	Tennessee	865,923	1.13
24	North Carolina	797,112	1.04
25	Maine	724,934	.95
26	South Carolina	693,703	.91
27	Alabama	692,431	.91
28	Nebraska	683,958	.90
29	Washington	616,029	.81
30	Mississippi	558,916	.73
31	Louisiana	503,394	.66
32	New Hampshire	485,013	.63
33	Arkansas	354,732	.46
34	Montana	350,489	.46
35	District of Columbia	278,060	.36
36	Oregon	264,095	.35
37	Utah	227,621	.30
38	Oklahoma	164,457	.22
39	Delaware	156,274	.20
40	Florida	140,604	.18
41	Vermont	121,041	.16
42	Arizona	112,737	.15
43	North Dakota	92,399	.12
44	Idaho	49,382	.06
45	South Dakota	43,440	.06
46	New Mexico	41,898	.05
47	Indian Territory	30,233	.04
48	Wyoming	21,500	.03
49	Nevada	9,580	.01
	Total	76,413,775	100.00

PRICES.

The following table shows the average value per thousand of the several kinds of brick in the United States in 1900 by States:

COMMON BRICK.

Nevada	$8.44	Illinois	$5.84
South Dakota	7.96	California	5.83
Wyoming	7.89	Texas	5.67
District of Columbia	7.60	Massachusetts	5.65
Delaware	7.50	Tennessee	5.61
New Mexico	7.44	Maine	5.60
Washington	7.27	Alabama	5.58
Arizona	6.88	Ohio	5.42
West Wirginia	6.83	Missouri	5.40
Oregon	6.82	Kentucky	5.34
Idaho	6.74	Minnesota	5.32
Montana	6.65	New Hampshire	5.26
Indian Territory	6.64	Louisiana	5.25
North Dakota	6.36	Vermont	5.24
Oklahoma	6.33	Kansas	5.23
Nebraska	6.23	Florida	5.21
Iowa	6.23	Mississippi	5.16
Arkansas	6.19	Connecticut	5.10
Wisconsin	6.15	Indiana	5.08
Maryland	6.14	Georgia	5.02
Virginia	6.09	North Carolina	4.98
Pennsylvania	6.02	Michigan	4.77
Rhode Island	6.00	South Carolina	4.73
Colorado	5.94	New Jersey	4.37
Utah	5.86	New York	4.23

FRONT BRICK.

Washington	$21.51	West Virginia	$10.43
Connecticut	20.00	Minnesota	10.36
California	18.61	Missouri	10.36
Massachusetts	17.93	Iowa	9.94
South Dakota	17.71	Kansas	9.44
Virginia	17.66	Texas	9.30
New Jersey	16.91	Illinois	9.25
Montana	15.33	Kentucky	9.25
Rhode Island	15.00	Alabama	9.19
Vermont	15.00	North Carolina	9.13
District of Columbia	14.83	New Hampshire	9.07
North Dakota	14.71	Indiana	9.05
Nebraska	14.48	Georgia	8.91
Arizona	14.44	Utah	8.31
Oregon	13.79	Mississippi	8.31
Maryland	13.68	Louisiana	8.23
New York	12.97	Arkansas	8.14
Florida	11.89	Maine	8.12
Pennsylvania	11.03	Idaho	8.00
Colorado	10.71	Wisconsin	7.81
Ohio	10.58	Tennessee	7.78
Delaware	10.47	South Carolina	7.28
Oklahoma	10.44	Michigan	5.75

VITRIFIED BRICK.

Maine	$16.75	Arkansas	$9.33
Washington	15.26	Alabama	9.24
Tennessee	12.55	Missouri	9.02
New Jersey	12.43	Texas	8.96
Michigan	12.42	West Virginia	8.88
Kentucky	12.00	Iowa	8.73
Oregon	12.00	Pennsylvania	8.33
Rhode Island	12.00	Illinois	8.21
Virginia	11.94	Maryland	8.04
New York	11.61	North Carolina	8.00
Oklahoma	11.20	Nebraska	7.83
Indiana	10.92	Kansas	7.78
Colorado	10.00	Ohio	7.62
Georgia	10.00	District of Columbia	6.00
New Mexico	10.00	Minnesota	6.00
South Dakota	10.00	New Hampshire	5.43
Utah	10.00		

POTTERY.

INTRODUCTION.

The plan of cooperation between the Census Office and the Geological Survey mentioned in the introduction to this report covered the statistics of the pottery industry as well as the brick and tile industry, and this portion of the report covers the same period, 1899 and 1900.

The condition of the pottery industry during these years, as shown by the returns to the Census Office and the Geological Survey, should be very gratifying to those engaged in that industry. While there has been only an insignificant increase in the number of potteries making the higher grades of ware, the production has more than kept pace with the increase in population; and the imports, while having increased in the last two years, have not kept pace with the production, thus showing that the home products are coming into greater use and the imported ware is slowly losing ground.

For the year 1900 the figures were collected by this office by direct correspondence, and the results have been unusually satisfactory, direct returns having been received from every establishment in the country manufacturing white ware except two, and careful estimates have been made for these two, so that the figures here given are practically as complete as those collected by the Census Office. The potters contributing to this result are hereby thanked for their intelligent cooperation, without which, of course, it would have been impossible to publish this information.

For 1900, at the suggestion of some of the potters, our card of inquiry asked a separation of the plain and decorated ware sold during the year, and while the collection of the information was satisfactorily accomplished, it was found upon tabulation that to publish State totals for the various classes of ware would be to disclose the business of individual establishments; therefore, while the total value of the plain and decorated ware is given for each variety, it has been impossible to give State totals by varieties of ware, except for seven States.

PRODUCTION.

The following tables show that the pottery industry is in an exceedingly flourishing condition. The value of the pottery products of the United States, as reported to this office in 1898 and 1900, and to the Census Office in 1899, was $14,589,251 in 1898, $17,250,250 in 1899, and $19,798,570 in 1900. This is a gain of $2,660,999 in 1899 over 1898, or 18.24 per cent, and of $2,548,320 in 1900 over 1899, or 14.77 per cent. The greatest contributor to this total is the white table and toilet ware classed as C. C. white granite and semiporcelain and semivitreous porcelain ware made in such large quantities at East Liverpool, Ohio, and Trenton, N. J. The value of these grades of ware was $7,461,635 in 1898, or 51.14 per cent; $7,914,776 in 1899, or 45.88 per cent; and $10,323,963 in 1900, or 52.14 per cent. While the manufacture of red earthenware is most widely distributed, it forms only a small proportion of the product. There has been a steady decline in the value of the yellow and Rockingham ware made since 1898, when it was $392,812; in 1899 it was $305,746, and in 1900 it was $215,279.

The decorated product is confined almost exclusively to the white ware; that is, out of a decorated product valued at $6,405,800, only $824,295 worth, or 12.87 per cent, was other than white ware.

Of the decorated white ware the largest contributor was the white granite, which was valued at $2,649,349, followed by semivitreous porcelain ware, valued at $1,770,714, while the decorated china was valued at $481,471.

Our china product shows a slight decrease, from $1,255,978 in 1899 to $1,222,357 in 1900. This product is made in but three States—New Jersey, New York, and Ohio.

In the following tables will be found a statement of the pottery products of the United States by varieties of products, by States, in 1898, 1899, and 1900:

Value of pottery products of the United States in 1900, by States.

PLAIN.

State.	Red earthenware.	Stoneware.	Yellow or Rockingham ware.	C. C. ware.	White granite and semi-porcelain ware.	Semivitreous porcelain ware.
Alabama	$1,365	$18,481	...	(a)	...	...
Arkansas	2,460	23,820	...	...	...	...
California	13,800	8,587	...	...	...	...
Colorado	(a)	(a)	...	...	...	...
Connecticut	17,250	(a)	...	...	...	...
District of Columbia	10,873	...	...	...	...	...
Florida	(a)	(a)	...	...	...	...
Georgia	6,098	13,945	(a)	(a)	...	...
Idaho	(a)	...	(a)	...	...	...
Illinois	57,068	578,405	...	(a)	(a)	...
Indiana	4,337	44,207	...	...	(a)	...
Iowa	5,500	25,739	...	...	...	...
Kansas	...	14,061	...	...	...	...
Kentucky	21,202	110,295	...	...	...	...
Louisiana	2,400	(a)	...	...	...	...
Maine	(a)	...	...	...	...	...
Maryland	8,080	...	(a)	(a)	...	...
Massachusetts	101,364	22,198	(a)	(a)	...	...
Michigan	34,317	...	...	...	...	...
Minnesota	(a)	(a)	...	...	...	...
Mississippi	161	13,955	...	...	...	...
Missouri	10,865	58,509	...	(a)	...	...
Montana	(a)	...	...	...	...	...
New Hampshire	...	...	...	...	...	(b)
New Jersey	28,600	46,650	(a)	$345,249	$494,282	c$96,447
New York	25,207	37,008	...	(a)	...	...
North Carolina	1,937	16,498	...	...	...	...
Ohio	75,720	646,445	$142,207	707,047	1,715,157	942,478
Oregon	2,383	(a)	...	...	...	...
Pennsylvania	86,582	255,457	(a)	(a)	465,000	...
South Carolina	5,688	11,945	...	...	...	...
Tennessee	(a)	48,325	...	...	...	...
Texas	3,242	84,222	...	...	...	...
Utah	6,600	...	...	...	...	...
Virginia	425	(a)	...	...	...	...
Washington	810	8,620	...	...	...	...
West Virginia	...	9,827	...	(a)	(a)	...
Wisconsin	13,000	...	...	...	...	...
Other States d	13,524	300,702	73,072	299,178	226,078	...
Total plain	560,858	2,397,901	215,279	1,351,474	2,900,517	1,038,925

DECORATED.

State.	Red earthenware.	Stoneware.	Yellow or Rockingham ware.	C. C. ware.	White granite and semi-porcelain ware.	Semivitreous porcelain ware.
Maryland	(a)	...	...	(a)	(a)	(a)
Massachusetts	$53,340	...	...	...	...	...
New Jersey	...	...	...	$199,000	$645,338	$292,479
New York	...	...	...	...	...	...
Ohio	178,650	(a)	(e)	349,179	1,052,680	1,308,735
Pennsylvania	2,100	...	...	...	365,000	...
West Virginia	...	...	...	(a)	(a)	...
Other States d	37,499	$49,436	...	64,805	586,331	169,500
Total decorated	271,589	49,436	(e)	612,984	2,649,349	1,770,714
Grand total	832,447	2,447,337	$215,279	1,964,458	5,549,866	2,809,639
Per cent of total clay products	.87	2.54	.22	2.04	5.77	2.92
Per cent of pottery products	4.21	12.36	1.09	9.92	28.03	14.19

a Included in Other States

b Included in New Jersey.

c Includes semivitreous porcelain ware for New Hampshire.

d Includes all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

e Included in Ohio miscellaneous.

Value of pottery products of the United States in 1900, by States—Continued.

PLAIN.

State.	China.	Bone china, delft, and Belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous. *a*	Total.
Alabama						$20,046
Arkansas						26,280
California			(*b*)			24,387
Colorado						15,200
Connecticut					(*b*)	36,250
District of Columbia						10,873
Florida			(*b*)			(*c*)
Georgia					(*b*)	21,033
Idaho						(*c*)
Illinois					$4,800	708,273
Indiana			(*b*)	(*d*)		*d* 278,374
Iowa					(*b*)	36,489
Kansas						14,061
Kentucky						131,497
Louisiana						2,900
Maine						(*c*)
Maryland			(*b*)			141,082
Massachusetts					(*b*)	171,162
Michigan						34,317
Minnesota						(*c*)
Mississippi						14,116
Missouri			(*b*)			71,474
Montana						(*c*)
New Hampshire						(*e*)
New Jersey	$345,112	$38,800	$1,807,953	$285,466	325,389	*f* 3,820,948
New York	*g* 395,774		(*b*)	*h* 382,832	37,453	931,597
North Carolina						18,435
Ohio	(*i*)		(*b*)	247,135	549,994	*i* 5,131,183
Oregon						17,290
Pennsylvania					103,179	1,023,773
South Carolina						17,633
Tennessee						48,855
Texas						87,464
Utah						6,600
Virginia					(*b*)	2,910
Washington						9,430
West Virginia			(*b*)			222,949
Wisconsin					(*b*)	14,000
Other States *j*			373,544		30,385	*k* 281,889
Total plain	740,886	38,800	2,181,497	915,433	1,051,200	13,392,770

DECORATED.

State.	China.	Bone china, delft, and Belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous. *a*	Total.
Maryland						$295,535
Massachusetts					$14,072	67,412
New Jersey	(*a*)	(*a*)	(*a*)			1,431,703
New York	(*a*)				(*a*)	233,728
Ohio	(*a*)				412,060	3,442,140
Pennsylvania						367,100
West Virginia		(*a*)	(*a*)			408,892
Other States *j*	$481,471	$31,432	$35,555		77,138	*l* 159,290
Total decorated	481,471	31,432	35,555		503,270	6,405,800
Grand total	1,222,357	70,232	2,217,052	$915,433	1,554,470	19,798,570
Per cent of total clay products	1.27	.07	2.31	.95	1.62	20.58
Per cent of pottery products	6.17	.36	11.30	4.62	7.85	100.00

a Including acid-proof tanks, art and chemical pottery, bath tubs, caster wheels, electrical supplies, faience, glass pots, insulators, jardinieres, lavatories, pins, stilts, and spurs for potters' use; porcelain door, picture, and shutter knobs; filter tubes, shuttle eyes, and thread guides; pump wheels, sinks, smoking pipes, statues, wash tubs and boards, and white earthenware.

b Included in Other States.

c Included in *k* ($281,889).

d Porcelain electrical supplies for Indiana included in New York.

e Included in New Jersey.

f Includes semivitreous porcelain ware for New Hampshire.

g Includes china for Ohio.

h Includes porcelain electrical supplies for Indiana.

i China for Ohio included in New York.

j Includes all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

k Includes State totals for Florida, Idaho, Maine, Minnesota, and Montana, in order that the operations of individual establishments may not be disclosed.

l Includes State totals for Alabama, Connecticut, Florida, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, New Hampshire, North Carolina, Tennessee, Virginia, and Wisconsin, in order that the operations of individual establishments may not be disclosed.

Value of the pottery products of the United States in 1899, by States.

State.	Red earthenware.	Stoneware.	Yellow or Rockingham ware.	C. C. ware.	White granite and semi-porcelain ware.	Semivitreous porcelain ware.
Alabama	$2,090	$27,248				
Arkansas	(*a*)	19,840				
California	24,814	(*a*)	(*a*)			
Colorado	(*a*)	(*a*)		(*a*)		
Connecticut	50,850	(*a*)				
District of Columbia	18,770					
Georgia	3,315	24,953				
Illinois	52,600	572,327	(*a*)	(*a*)	(*a*)	(*a*)
Indiana	4,818	49,788	(*a*)		(*a*)	(*a*)
Iowa	7,632	22,448				
Kansas	(*a*)	28,130				
Kentucky	10,290	94,315				
Louisiana	10,000					
Maine	(*a*)	(*a*)				
Maryland	9,225	(*a*)	(*a*)	(*a*)		(*a*)
Massachusetts	163,431	35,435		(*a*)		
Michigan	29,641			(*a*)		
Minnesota	17,600	(*a*)				
Mississippi	340	19,480				
Missouri	6,379	63,790	(*a*)			
Montana	(*a*)					
New Jersey	24,000	35,500	(*a*)	$751,444	$442,354	$372,350
New York	34,555	33,344				
North Carolina	(*a*)	25,403				
Ohio	164,893	583,277	$159,553	789,044	1,143,990	2,676,412
Oregon	2,501	(*a*)				
Pennsylvania	101,251	175,905	(*a*)	(*a*)	201,057	(*a*)
South Carolina	1,144	10,337				
Tennessee	(*a*)	67,490				
Texas	5,860	68,192				
Utah	7,850	(*a*)				
Virginia	1,220	(*a*)				
Washington		13,350				
West Virginia		16,464		(*a*)	(*a*)	(*a*)
Wisconsin	13,145					
Other States *b*	6,891	234,642	146,193	449,620	176,292	912,213
Total	775,105	2,221,658	305,746	1,990,108	1,963,693	3,960,975
Per cent of total clay products	.81	2.32	.32	2.08	2.05	4.13
Per cent of pottery products	4.49	12.88	1.77	11.54	11.38	22.96

a Included in Other States.

b Includes all products made by less than three producers, in order that the operations of individual establishments may not be disclosed.

Value of the pottery products of the United States in 1899, by States—Continued.

State.	China.	Bone china, delft, and belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous. *a*	Total value.
Alabama						$29,338
Arkansas						20,071
California			(*b*)		$550	32,863
Colorado					1,650	16,050
Connecticut					28,500	81,750
District of Columbia						18,770
Georgia						28,268
Illinois					2,000	763,557
Indiana			(*b*)		2,000	347,174
Iowa						30,080
Kansas						28,430
Kentucky						104,605
Louisiana					2,640	12,640
Maine						7,161
Maryland					20,000	361,726
Massachusetts					30,167	294,033
Michigan						29,741
Minnesota						206,365
Mississippi					381	20,201
Missouri			(*b*)			78,797
Montana						950
New Jersey	$494,870	$42,000	$1,850,225	$154,807	877,516	5,070,566
New York	336,680	(*a*)		125,234	103,007	650,192
North Carolina						25,663
Ohio	424,428		(*b*)	190,314	741,634	6,996,045
Oregon					36	11,204
Pennsylvania			(*b*)	(*c*)	*d* 234,486	1,167,737
South Carolina					50	11,531
Tennessee						68,490
Texas					8,000	82,052
Utah						8,050
Virginia					8,240	9,720
Washington						13,350
West Virginia		(*b*)	(*b*)			585,310
Wisconsin						13,145
Other States *e*		21,355	314,660			*f* 24,625
Total	1,255,978	63,355	2,164,885	470,355	2,078,392	17,250,250
Per cent of total clay products	1.31	.07	2.26	.49	2.17	18.01
Per cent of pottery products	7.28	.37	12.55	2.73	12.05	100.00

a Including art and chemical pottery, bath and laundry tubs, caster wheels, faience, filter tubes, jardinieres and pedestals, pins, stilts, and spurs for potters use, porcelain door knobs, porcelain hardware trimmings, porcelain lining for ball grinding mills, shuttle eyes and thread guides, smoking pipes, statuary, toy marbles, umbrella handles, and white earthenware.

b Included in Other States.

c Included in Pennsylvania miscellaneous.

d Includes porcelain electrical supplies for Pennsylvania.

e Includes all products made by less than three producers, in order that the operations of individual establishments may not be disclosed.

f Includes State totals for Florida, Idaho, Nebraska, and New Hampshire, in order that the operations of individual establishments may not be disclosed.

Value of pottery products of the United States in 1898, by States.

State.	Operating firms reporting.	Red earthenware.	Stoneware.	Yellow and Rockingham ware.	C. C. ware.	White granite and semiporcelain ware.	Semivitreous porcelain ware.
Alabama	8	$1,750	$11,900				
Arkansas	4		16,900				
California	7	17,247					
Connecticut	5	16,100					
Georgia	6	3,300	13,500				
Illinois	23	5,725	431,812				
Indiana	18	6,210	36,532				
Iowa	15	6,100	24,825				
Kansas	4		3,700				
Kentucky	10	13,165	76,521				
Maryland	8	8,854					
Massachusetts	15	160,078	22,746				
Michigan	3	17,900					
Minnesota	5						
Missouri	9	3,880	49,378				
New Jersey	44	13,900	9,200		$733,958	$483,917	$439,356
New York	24	29,723	76,620				
North Carolina	28	1,311	12,815				
Ohio	110	167,396	529,691	$187,649	663,530	2,224,264	1,337,495
Pennsylvania	39	132,967	245,243				
Tennessee	16	1,500	37,814				
Texas	18	4,750	50,592				
Virginia	8	2,126	4,274				
West Virginia	5						
Other States *a*	*b* 21	*c* 27,864	*d* 361,782	*e* 205,163	*f* 452,964	*g* 868,508	*h* 257,643
Total	453	641,846	2,015,845	392,812	1,850,452	3,576,689	2,034,494
Per cent of total clay products		.82	2.82	.55	2.58	5.00	2.84

a Includes all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

b Includes Colorado, District of Columbia, Florida, Idaho, Louisiana, Maine, Nebraska, New Hampshire, Oregon, South Carolina, Utah, Washington, and Wisconsin.

c Includes Arkansas, District of Columbia, Florida, Idaho, Kansas, Louisiana, Maine, Mississippi, Montana, Nebraska, Oregon, South Carolina, Utah, Washington, West Virginia, and Wisconsin.

d Includes California, Colorado, Connecticut, Florida, Idaho, Maryland, Minnesota, Mississippi, Nebraska, Oregon, South Carolina, Washington, and West Virginia.

e Includes Georgia, Idaho, Illinois, Maryland, Minnesota, New Jersey, New York, Pennsylvania, and South Carolina.

f Includes Illinois, Maryland, Massachusetts, New York, Pennsylvania, and West Virginia.

g Includes Illinois, Indiana, Maryland, Pennsylvania, and West Virginia.

h Includes New Hampshire, Pennsylvania, and West Virginia.

Value of pottery products of the United States in 1898, by States—Continued.

State.	Chinaware.	Bone china, delft and belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous. *a*	Total.
Alabama						$13,650
Arkansas						17,100
California						36,347
Colorado						17,350
Connecticut					$55,000	72,600
Georgia						22,350
Illinois						637,537
Indiana					1,000	266,742
Iowa					3,400	34,425
Kansas						4,111
Kentucky						89,686
Maryland						303,518
Massachusetts					9,441	242,265
Michigan						17,900
Minnesota					100	322,864
Mississippi					600	14,100
Missouri						58,258
New Hampshire						31,200
New Jersey	$424,060	$52,500	$1,477,192	$182,000	206,159	4,030,442
New York			38,213	90,785	32,187	621,821
North Carolina						18,146
Ohio	218,000			178,919	623,515	6,137,459
Pennsylvania					29,277	952,453
Tennessee						39,314
Texas						55,342
Virginia					7,626	14,026
West Virginia						518,218
Other States *b*	248,193		*c* 198,946			
Total	890,253	52,500	1,714,351	451,704	968,305	14,589,251
Per cent of total clay products	.90	.07	2.39	.63	.89	19.49

a Including art, chemical, and "Grueby" pottery, battery cups, bath and laundry tubs, sinks, ceramic mosaics, doorknobs, decorated cuspidors and jardinieres, filter tubs, toy marbles, pins, stilts, and spurs for potters' use, oval ware roasters, shuttle eyes and thread guides, smoking pipes, umbrella stands and pedestals.

b Includes all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

c Includes California, Indiana, Iowa, Missouri, Ohio, Pennsylvania, and West Virginia.

In the following table is given a statement of the value of the pottery products, by States, and of the value of the plain and decorated ware made in each State:

Value of the pottery products of the United States in 1900.

State.	Plain.	Decorated.	Total.
Alabama	$20,046	$250	$20,296
Arkansas	26,280	....	26,280
California	24,387	....	24,387
Colorado	*a* 17,944	....	17,944
Connecticut	36,250	25,000	61.250
District of Columbia	10,873	....	10,873
Florida	(*b*)	....	....
Georgia	*b* 24,233	150	24,383
Idaho	(*a*)	....	....
Illinois	708,273	68,500	776,773
Indiana	278,374	47,526	325,900
Iowa	36,489	100	36,589
Kansas	14,061	....	14,061
Kentucky	131,497	....	131,497
Louisiana	2,900	1,400	4,300
Maine	(*c*)	....	....
Maryland	141,082	295,535	436,617
Massachusetts	*c* 171,312	67,412	238,724
Michigan	34,317	....	34,317
Minnesota	*f* 289,795	3,600	293,395
Mississippi	14,116	336	14,452
Missouri	71,474	....	71,474
Montana	(*a*)	....	....
New Hampshire	(*d*)	....	....
New Jersey	*d* 3,820,948	1,442,703	5,263,651
New York	931,597	233,728	1,165,325
North Carolina	18,435	428	18,863
Ohio	5,131,183	3,442,140	8,573,323
Oregon	17,290	....	17,290
Pennsylvania	1,023,773	367,100	1,390,873
South Carolina	17,633	....	17,633
Tennessee	48,855	800	49,655
Texas	87,464	....	87,464
Utah	6,600	....	6,600
Virginia	2,910	200	3,110
Washington	9,430	....	9,430
West Virginia	222,949	408,892	631,841
Wisconsin	(*e*)	....	....
Total	13,392,770	6,405,800	19,798,570
Per cent of total	67.65	32.35	100.00

a Value of the pottery products of Idaho and Montana is included with that of Colorado.
b Value of the pottery products of Florida is included with that of Georgia.
c Value of the pottery products of Maine is included with that of Massachusetts.
d Value of the pottery products of New Hampshire is included with that of New Jersey.
e Value of the pottery products of Wisconsin is included with that of Minnesota.

It will be seen from this table that while quite a number of States make decorated ware, in only a few does this product reach any considerable value, and these are the large white-ware producing States. As will be seen, the plain product was valued at $13,392,770, or 67.65 per cent of the total, while the decorated was valued at $6,405,800, or 32.35 per cent.

RANK OF STATES.

The following tables show the rank of States in the production of pottery, together with the value of the product of each State and the percentage of the total product made by each State in 1899 and 1900:

Rank of States and value of output of pottery products in 1899 and 1900.

1899.

Rank.	State.	Number of firms reporting.	Value.	Per cent of total product.
1	Ohio	118	$6,996,045	40.56
2	New Jersey	46	5,070,566	29.39
3	Pennsylvania	50	1,167,737	6.77
4	Illinois	28	763,557	4.43
5	New York	25	650,192	3.77
6	West Virginia	6	585,310	3.39
7	Maryland	9	361,726	2.10
8	Indiana	21	347,174	2.01
9	Massachusetts	18	294,033	1.70
10	Minnesota	4	206,365	1.20
11	Kentucky	10	104,605	.61
12	Texas	27	82,052	.47
13	Connecticut	4	81,750	.47
14	Missouri	21	78,797	.46
15	Tennessee	19	68,490	.40
16	California	13	32,863	.19
17	Iowa	12	30,080	.17
18	Michigan	4	29,741	.17
19	Alabama	30	29,338	.17
20	Kansas	4	28,430	.16
21	Georgia	30	28,268	.16
22	North Carolina	47	25,663	.15
23	Mississippi	11	20,201	.12
24	Arkansas	8	20,071	.12
25	District of Columbia	3	18,770	.11
26	Colorado	4	16,050	.09
27	Washington	6	13,350	.08
28	Wisconsin	3	13,145	.08
29	Louisiana	3	12,640	.07
30	South Carolina	15	11,531	.07
31	Oregon	3	11,204	.06
32	Virginia	6	9,720	.06
33	Utah	4	8,050	.05
	Florida, Idaho, Maine, Montana, Nebraska, and New Hampshire	7	32,736	.19
	Total	619	17,250,250	100.00

Rank of States and value of output of pottery products in 1899 and 1900—Continued.

1900.

Rank.	State.	Number of firms reporting.	Value.	Per cent of total product.
1	Ohio	113	$8,573,323	43.30
2	New Jersey *a*	43	5,263,651	26.59
3	Pennsylvania	47	1,390,873	7.03
4	New York *b*	25	1,165,325	5.89
5	Illinois	29	776,773	3.92
6	West Virginia	6	631,841	3.19
7	Maryland	8	436,617	2.21
8	Indiana	15	325,900	1.65
9	Minnesota *c*	3	293,395	1.48
10	Massachusetts *d*	18	238,724	1.21
11	Kentucky	10	131,497	.66
12	Texas	24	87,464	.44
13	Missouri	18	71,474	.36
14	Connecticut	5	61,250	.31
15	Tennessee	19	49,655	.25
16	Iowa	7	36,589	.18
17	Michigan	17	34,317	.17
18	Arkansas	7	26,280	.13
19	California	10	24,387	.12
20	Georgia *e*	25	24,383	.12
21	Alabama	27	20,296	.10
22	North Carolina	39	18,863	.10
23	Colorado *f*	3	17,944	.09
24	South Carolina	13	17,633	.09
25	Oregon	3	17,290	.09
26	Mississippi	7	14,452	.07
27	Kansas	3	14,061	.07
28	District of Columbia	3	10,873	.06
29	Washington	5	9,430	.05
30	Utah	4	6,600	.03
31	Louisiana	3	4,300	.02
32	Virginia	6	3,110	.02
	Total	561	19,798,570	100.00

a Includes New Hampshire.
b Includes electrical supplies made in Indiana and china made in Ohio.
c Includes Wisconsin.
d Includes Maine.
e Includes Florida.
f Includes Idaho and Montana.

Ohio continues to be the leading pottery-producing State in the Union, making all the varieties enumerated except bone china, etc. The values of its product in 1899 was $6,996,045, or 40.56 per cent of the total, and in 1900 its product was valued at $8,573,323, or 43.30 per cent of the total. The number of firms reporting in this State for 1899 was 118, while for 1900 119 reported, 6 of which were idle. New Jersey is again second, with a product valued in 1900 at $5,263,651, or 26.59 per cent of the total, as compared with $5,070,566 in 1899, or 29.39 per cent of the total. The number of firms reporting in this State for 1900 was 45, of which 2 were idle. In 1899 46 reported. New Jersey is the largest producer of sanitary ware, and was the first to introduce the solid porcelain bath tub, a branch of the trade which is growing rapidly. Ohio and New Jersey in each of the last three years produced 70 per cent of the total pottery products of the country.

Pennsylvania was third in each year, and Illinois fourth in 1899, while in 1900 New York was fourth and Illinois fifth, and West Virginia was sixth in both years.

The following table shows the number of potteries reporting during 1898, 1899, and 1900, together with those operating and those idle:

Number of operating and idle potteries in the United States reporting in 1898, 1899, and 1900.

State.	1898.			1899.	1900.		
	Operating.	Idle.	Total.	Operating.	Operating.	Idle.	Total.
Alabama	8	3	11	30	27	3	30
Arkansas	4	2	6	8	7	0	7
California	5	3	8	13	10	3	13
Colorado				4	3	0	3
Connecticut	5	0	5	4	5	0	5
District of Columbia				3	3	0	3
Florida				1	1	0	1
Georgia	6	2	8	30	25	1	26
Idaho				1	2	0	2
Illinois	23	4	27	28	29	0	29
Indiana	18	4	22	21	15	2	17
Iowa	15	0	15	12	7	0	7
Kansas	4	1	5	4	3	1	4
Kentucky	10	2	12	10	10	0	10
Louisiana				3	3	1	4
Maine				2	1	1	2
Maryland	8	1	9	9	8	1	9
Massachusetts	15	2	17	18	18	1	19
Michigan	3	0	3	4	4	0	4
Minnesota	3	1	4	4	3	0	3
Mississippi				11	7	0	7
Missouri	9	3	12	21	18	2	20
Montana				1	1	0	1
Nebraska				1	0	1	1
New Hampshire				1	1	0	1
New Jersey	44	3	47	46	43	2	45
New York	22	2	24	25	25	2	27
North Carolina	28	0	28	47	39	4	43
Ohio	108	9	117	118	113	6	119
Oregon				3	3	0	3
Pennsylvania	39	2	41	50	47	3	50
South Carolina	4	1	5	15	13	1	14
Tennessee	16	1	17	19	19	1	20
Texas	18	0	18	27	24	1	25
Utah				4	4	1	5
Virginia	8	3	11	6	6	3	9
Washington				6	5	3	8
West Virginia	5	1	6	6	6	2	8
Wisconsin				3	3	0	3
Other States *a*	19	3	22				
Total	447	53	500	619	561	46	607

a Including in 1898 Colorado, District of Columbia, Florida, Idaho, Louisiana, Maine, Mississippi. Montana, Nebraska, New Hampshire, Oregon, Utah, and Wisconsin.

CONSUMPTION.

As will be seen from the table showing the imports of clay wares, given on another page, the imports of pottery increased from $6,962,610 in 1898 to $7,906,940 in 1899 and $8,742,095 in 1900. In 1895 the imports of pottery were valued at $10,234,322, which is the maximum. There has been a gradual increase in the percentage of the domestic product as compared with the total consumption, as follows: In 1898 the product was 67.69 per cent of the consumption; in 1899 it was 68.37 per cent, and in 1900 it was 69.37 per cent. This should be very gratifying to American potters.

TRENTON, N. J., AND EAST LIVERPOOL, OHIO.

In the following table will be found a statement showing the value of the pottery products of the great pottery centers Trenton, N. J., and East Liverpool, Ohio:

Value of pottery products of Trenton, N. J., and East Liverpool, Ohio, in 1900.

Product.	Trenton (value).	East Liverpool (value).	Total (value).
Yellow or Rockingham ware		$90,261	$90,261
C. C. ware	$526,249	757,434	1,283,683
White granite ware	1,139,620	2,036,686	3,176,306
Semivitreous porcelain ware	375,926	1,211,104	1,587,030
China	577,593	(a)	577,593
Bone china, delft, and belleek ware	65,800		65,800
Sanitary ware	1,594,447		1,594,447
Porcelain electrical supplies	285,466	(a)	285,466
Miscellaneous b	310,889	c 507,629	818,518
Total	4,875,990	4,603,114	9,479,104

a Included in miscellaneous.

b Including stilts, pins, and spurs for potters' use; porcelain door, shutter, and picture knobs; druggists' bath and wash tubs, kitchen sinks, lavatories, etc.

c Also includes red earthenware, china and porcelain electrical supplies.

From this table it will be seen that these two centers are practically equal as far as value of product is concerned, the value of that made at Trenton being $4,875,990 and that at East Liverpool $4,603,114. The total value of the products of these two cities was $9,479,104, or 47.88 per cent of the total value of the pottery products of the country. The number of firms reporting were 28 in Trenton and 29 in East Liverpool. While these figures do not represent the actual number of plants, since some firms at each place operate more than one plant, they are accurate enough for comparison.

CLAY.

The following tables show the production and value of the clay mined in the United States in 1899 and 1900 by those who do not manufacture it into wares themselves, but sell it.

For 1900 the clay sold in a raw state and that prepared in any manner by the miner were separated. The total value of the clay sold reported to this office in 1900 was $1,840,377, as compared with $1,645,328 in 1899.

Production and value of raw clay in the United States in 1899, by States.

[Quantity in tons of 2,000 pounds.]

State.	Kaolin or china.		Ball.		Fire.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama	(a)	(a)			14,881	$9,784
Arizona					(a)	(a)
California	(a)	(a)			3,902	4,660
Colorado	(a)	(a)	(a)	(a)	8,578	8,259
Connecticut b	(a)	(a)			(a)	(a)
Delaware	24,900	$71,479			(a)	(a)
Florida	(a)	(a)				
Illinois			(a)	(a)	17,338	16,908
Indiana					2,269	2,030
Iowa			(a)	(a)	(a)	(a)
Kentucky			(a)	(a)	(a)	(a)
Maryland	(a)	(a)	(a)	(a)	2,138	1,705
Michigan	2,275	5,650				
Missouri	1,675	8,419	(a)	(a)	90,599	347,493
New Jersey	5,566	11,801	7,178	$38,105	178,048	264,286
New York	(a)	(a)	(a)	(a)	1,603	3,008
North Carolina	9,945	76,760	76	33	(a)	(a)
Ohio			940	700	56,163	40,169
Pennsylvania	19,307	111,644			78,151	102,089
South Carolina	19,954	93,699			300	1,200
Tennessee					1,148	710
West Virginia					(a)	(a)
Wisconsin	(a)	(a)				
Other States c	13,485	91,830	14,568	70,531	23,878	24,618
Total	97,107	471,282	22,762	109,369	478,996	826,919

a Included in Other States.

b Including Montana, Oregon, Texas, Vermont, and Virginia.

c Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

Production and value of raw clay in the United States in 1899, by States—Continued.

[Quantity in tons of 2,000 pounds.]

State.	Pipe.		Terra-cotta clay.		Miscellaneous. *b*		Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
Alabama			(*a*)	(*a*)			$10,679
Arizona							2,000
California	5,410	$5,420					10,105
Colorado	(*a*)	(*a*)					20,735
Connecticut *c*	(*a*)	(*a*)			(*a*)	(*a*)	2,641
Delaware							71,742
Florida							50,000
Illinois	6,530	5,256	31,414	$29,869	16,866	$9,971	100,049
Indiana	(*a*)	(*a*)			712	665	3,383
Iowa							4,682
Kentucky							21,632
Maryland	(*a*)	(*a*)	(*a*)	(*a*)	2,500	1,025	3,955
Michigan							5,650
Missouri			2,351	4,368	2,700	1,620	375,400
New Jersey	32,568	19,357	52,439	61,352	23,100	45,973	440,874
New York	(*a*)	(*a*)	(*a*)	(*a*)	1,156	3,854	10,140
North Carolina	(*a*)	(*a*)					76,846
Ohio	(*a*)	(*a*)	2,573	2,508	14,559	8,694	52,271
Pennsylvania	(*a*)	(*a*)			1,022	6,335	235,068
South Carolina							94,899
Tennessee					100	100	810
West Virginia							13,967
Wisconsin							37,800
Other States *d*	45,445	27,669	2,884	3,647	85	75	(*e*)
Total	89,953	57,702	91,661	101,744	62,800	78,312	1,645,328

a Included in Other States.

b Including shale, earthenware clay, stoneware clay, paper clay, slip clay, and clay for plaster and boiler covering.

c Including Montana, Oregon, Texas, Vermont, and Virginia.

d Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

e The total of other States is distributed among the States to which it belongs, in order that they may be fully represented in the totals.

Production and value of clay in the United States in 1900, by States.

[Quantity in tons of 2,000 pounds.]

State.	Kaolin.				Ball.			
	Raw.		Prepared.		Raw.		Prepared.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama	(*a*)	(*a*)						
Arizona *b*	494	$907	10,280	$63,600				
California								
Colorado	(*a*)	(*a*)						
Delaware			12,357	102,005				
Georgia	(*a*)	(*a*)	(*a*)	(*a*)				
Illinois								
Indiana								
Iowa								
Kentucky					7,754	$26,039		
Maryland								
Massachusetts								
Michigan	728	1,275						
Missouri	2,545	6,640	(*a*)	(*a*)	(*a*)	(*a*)		
Montana								
New Jersey	2,986	2,456			(*a*)	(*a*)	(*a*)	(*a*)
New York	(*a*)	(*a*)					(*a*)	(*a*)
North Carolina	(*a*)	(*a*)	3,224	28,729				
Ohio								
Pennsylvania	(*a*)	(*a*)	5,834	44,507				
South Carolina	(*a*)	(*a*)						
Tennessee	(*a*)	(*a*)			(*a*)	(*a*)		
Texas	(*a*)	(*a*)						
West Virginia								
Wisconsin			(*a*)	(*a*)				
Other States *c*	15,801	96,942	5,865	50,225	6,222	27,811	7,405	$38,133
Total	22,554	108,220	37,560	289,066	13,976	53,850	7,405	38,133

a Included in Other States.

b Including Connecticut, Florida, Maine, Mississippi, New Hampshire, New Mexico, North Dakota, Oregon, Utah, Vermont, Virginia, and Washington.

c Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

Production and value of clay in the United States in 1900, by States.

[Quantity in tons of 2,000 pounds.]

State.	Fire.				Stoneware.			
	Raw.		Prepared.		Raw.		Prepared.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama	20,294	$11,205	(a)	(a)	(a)	(a)		
Arizona b	1,362	4,872			650	$635		
California	4,932	5,698	(a)	(a)				
Colorado	21,178	22,930	(a)	(a)	(a)	(a)		
Delaware								
Georgia					(a)	(a)		
Illinois	18,605	16,069	(a)	(a)	26,416	21,643	(a)	(a)
Indiana	23,272	18,165			2,000	1,850		
Iowa	1,140	840	(a)	(a)				
Kentucky	(a)	(a)	(a)	(a)	(a)	(a)		
Maryland	(a)	(a)			(a)	(a)		
Massachusetts	(a)	(a)						
Michigan								
Missouri	93,560	78,154	13,583	$113,940	1,735	1,490	(a)	(a)
Montana	(a)	(a)	(a)	(a)				
New Jersey	210,635	272,707	(a)	(a)	16,621	29,189		
New York	(a)	(a)			(a)	(a)	(a)	(a)
North Carolina	(a)	(a)	(a)	(a)	292	127		
Ohio	90,782	71,726	29,374	27,952	36,523	25,200	(a)	(a)
Pennsylvania	86,622	121,885	42,044	57,557	1,957	640	(a)	(a)
South Carolina	(a)	(a)						
Tennessee	1,991	2,697			908	808		
Texas	(a)	(a)			367	435		
West Virginia	124,000	46,700	37,051	29,858				
Wisconsin			(a)	(a)				
Other States c	16,030	12,279	9,104	32,759	1,346	1,826	4,714	$10,862
Total	714,403	685,927	131,156	262,066	88,815	83,843	4,714	10,862

a Included in Other States.

b Including Connecticut, Florida, Maine, Mississippi, New Hampshire, New Mexico, North Dakota, Oregon, Utah, Vermont, Virginia, and Washington.

c Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

Production and value of clay in the United States in 1900, by States—Continued.

[Quantity in tons of 2,000 pounds.]

State.	Pipe.				Terra cotta.	
	Raw.		Prepared.		Raw.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama						
Arizona *a*					75	$19
California	(*b*)	(*b*)			(*b*)	(*b*)
Colorado	(*b*)	(*b*)				
Delaware						
Georgia					(*b*)	(*b*)
Illinois	12,050	$8,257			4,154	3,688
Indiana						
Iowa						
Kentucky						
Maryland	(*b*)	(*b*)				
Massachusetts						
Michigan						
Missouri	(*b*)	(*b*)				
Montana						
New Jersey	8,705	6,812			38,123	43,687
New York						
North Carolina						
Ohio	(*b*)	(*b*)			(*b*)	(*b*)
Pennsylvania	(*b*)	(*b*)				
South Carolina						
Tennessee					(*b*)	(*b*)
Texas						
West Virginia						
Wisconsin						
Other States *c*	21,652	20,535	125	$530	2,725	3,375
Total	42,407	35,604	125	530	45,077	50,769

a Including Connecticut, Florida, Maine, Mississippi, New Hampshire, New Mexico, North Dakota, Oregon, Utah, Vermont, Virginia, and Washington.

b Included in Other States.

c Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

Production and value of clay in the United States in 1900, by States—Continued.

[Quantity in tons of 2,000 pounds.]

State.	Miscellaneous. *a*				Total.	
	Raw.		Prepared.			
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama					21,454	$12,865
Arizona *b*	1,145	$1,105			14,006	71,138
California	40	10			12,879	16,313
Colorado	12,096	8,482			49,652	47,884
Delaware					12,357	102,005
Georgia	510	410			6,885	32,645
Illinois			2	$45	63,062	52,872
Indiana	2,300	1,130			27,572	21,145
Iowa					1,180	980
Kentucky	1,000	900			18,974	32,874
Maryland					2,502	2,378
Massachusetts	1,070	1,130	25	500	1,395	2,380
Michigan					728	1,275
Missouri	5,464	25,276	4,399	3,519	124,666	247,204
Montana	2,867	3,655			6,399	17,491
New Jersey	25,704	41,562	6,088	16,924	321,219	467,881
New York	*c* 2,720	*c* 8,360			4,990	13,410
North Carolina	40	20			10,166	89,536
Ohio	22,091	12,445			181,845	143,547
Pennsylvania	364	647	1,534	11,563	140,734	240,857
South Carolina	*d* 19,960	*d* 79,200			20,510	79,900
Tennessee	3,000	3,750	9	9	11,424	25,421
Texas	60	60			805	1,025
West Virginia	100	70			161,151	76,628
Wisconsin	880	735			5,105	40,723
Other States *e*					(*f*)	(*f*)
Total	101,411	188,947	12,057	32,560	1,221,660	1,840,377

a Including brick clay, clay for boiler covering, flint clay, glass-house pot clay, modeling clay, paper clay, plastic clay, and slip clay.

b Including Connecticut, Florida, Maine, Mississippi, New Hampshire, New Mexico, North Dakota, Oregon, Utah, Vermont, Virginia, and Washington.

c Includes 2,700 tons of Albany slip clay, valued at $8,300.

d Paper clay.

e Including all products made by less than three producers in one State, in order that the operations of individual establishments may not be disclosed.

f The total of Other States is distributed among the States to which it belongs, in order that they may be fully represented in the totals.

Production of clay in the United States in 1900, by kinds.

	Raw.		Prepared.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Kaolin	22,554	$108,220	37,560	$287,066	60,114	$397,286
Ball	13,976	53,850	7,405	38,133	11,381	91,983
Fire	714,403	685,927	131,156	262,066	845,559	947,993
Stoneware	88,815	83,843	4,714	10,862	93,529	94,705
Pipe	42,407	35,604	125	530	42,532	36,134
Terra cotta	45,077	50,769			45,077	50,769
Miscellaneous	101,411	188,947	12,057	32,560	113,468	221,507
Total	1,028,643	1,207,160	193,017	633,217	1,221,660	1,840,377

Of the total for 1900, 1,028,643 tons, or 84.20 per cent of the total, were sold in a raw state, only 193,017 tons, or 15.80 per cent, being prepared before sold.

As in previous years, New Jersey is the leading clay-producing State, selling in 1900 clay valued at $467,881, or 25.4 per cent of the total product; in 1899 this State produced clay valued at $440,874, or 26.8 per cent of the total. Missouri was again second with a product valued at $247,204, or 13.4 per cent, as compared with $375,400 in 1899, or 22.8 per cent of the product. Pennsylvania was again third with a product valued at $240,857, or 13.01 per cent, while in 1899 its product was valued at $235,068, or 14.3 per cent of the total. Ohio was fourth and Delaware was fifth.

IMPORTS.

In the following tables will be found a statement of the clay and manufactured goods imported into the United States in recent years:

Classified imports of clay from 1885 to 1900.

Calendar year.	Kaolin or china clay.		All other clays.						Total.	
			Unwrought.		Wrought.		Common blue.			
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*		*Long tons.*		*Long tons.*	
1885	10,626	$83,722	9,736	$76,899	3,554	$29,839			23,916	$190,460
1886	16,590	123,093	13,740	113,875	1,654	20,730			31,984	257,698
1887	23,486	141,360	17,645	139,405	2,187	22,287			43,318	303,052
1888	18,150	102,050	20,604	152,694	6,832	53,245			45,586	307,989
1889	19,843	113,538	19,237	145,983	8,142	64,971			47,222	324,492
1890	29,923	270,141	21,049	155,486	2,978	29,143			53,950	454,770
1891	39,901	294,458	16,094	118,689	6,297	56,482			62,292	469,629
1892	49,468	375,175	20,132	155,047	4,551	64,818	5,172	$59,971	79,323	655,011
1893	49,713	374,460	14,949	113,029	6,090	67,280	4,304	51,889	75,056	606,658
1894	62,715	465,501	13,146	98,776	4,768	60,786	2,528	28,886	83,157	653,949
1895	75,447	531,714	18,419	125,417	5,160	60,775	3,869	40,578	102,895	758,484
1896	76,718	536,081	13,319	88,029	4,514	56,701	4,983	54,695	99,534	735,506
1897	71,938	493,431	9,405	56,264	7,839	52,232	4,562	50,954	93,744	652,881
1898	85,586	573,595	16,130	98,434	1,412	24,959	5,312	58,280	108,440	755,268
1899	92,521	615,717	19,614	118,679	1,716	31,948	9,223	106,618	123,074	872,962
1900	111,959	698,720	21,626	126,203	3,195	45,431	7,327	92,013	144,107	962,367

Value of earthenware, China, brick, and tile imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	Brown earthen and common stoneware.	China and porcelain, not decorated.	China and decorated porcelain.	Other earthen, stone, or crockery ware, glazed, etc.	Brick, fire brick, and tile.	Total.
June 30—						
1867	$48,618	$418,493	$439,824	$4,280,924		$5,187,859
1868	47,208	309,960	403,555	3,244,958		4,005 712
1869	34,260	400,894	555,425	3,468,970		4,459,549
1870	47,457	420,442	530,805	3,461,524		4,460,228
1871	96,695	391,374	571,032	3,573,254		4,632,355
1872	127,346	470,749	814,134	3,896,664		5,308,893
1873	115,253	479,617	867,206	4,289,868		5,751,944
1874	70,544	397,730	676,656	3,686,794		4,831,724
1875	68,501	436,883	654,965	3,280,867		4,441,216
1876	36,744	409,539	718,156	2,948,517		4,112,956
1877	30,403	326,956	668,514	2,746,186		3,772,059
1878	18,714	389,133	657,485	3,031,393		3,996,725
1879	19,868	296,591	813,850	2,914,567		4,044,876
1880	31,504	234,371	1,188,847	3,945,666		5,500,388
1881	27,586	321,259	1,621,112	4,413,369		6,383,326
1882	36,023	316,811	2,075,708	4,438,237		6,866,779
1883	43,864	368,943	2,587,545	5,685,709		6,686,061
1884	50,172	982,499	2,664,231	(*a*)	$666,595	4,363,497
1885	44,701	823,334	2,834,718		963,422	4,666,175
December 31—						
1886	37,820	865,446	3,350,145		951,293	5,204,704
1887	43,079	967,694	3,888,509		1,008,360	5,907,642
1888	55,558	1,054,854	4,207.598		886,314	6,204,324
1889	48,824	1,148,026	4,580,321		788,391	6,565,562
1890	56,730	974,627	3,562,851		563,568	5,157,776
1891	99,983	1,921,643	6,288,088		353,736	8,663,450
1892	63,003	2,022,814	6,555,172		380,520	9,021,509
1893	57,017	1,732,481	6,248,255		338,143	8,375,896
1894	47,114	1,550,950	5,392,648		189,631	7,180,343
1895	61,424	2,117,425	8,055,473		211,473	10,445,795
1896	41,585	1,511,542	7,729,942		247,455	9,530,524
1897	*b* 32,227	1,406,019	7,057,261		146,668	8,642,175
1898	*b* 54,672	1,002,729	5,905,209		117,324	7,079,934
1899	*b* 40,164	1,125,892	6,740,884		134,691	8,041,631
1900	*b* 65,214	1,059,125	7,617,756		169,951	8,912,046

a Not separately classified after 1883.

b Including Rockingham ware.

EXPORTS.

It will undoubtedly surprise many persons to learn that this country exports clay goods, especially pottery. The following table, however, will show that we not only export these wares, but our exports are increasing, the value of the stoneware exported being considerable.

Exports of clay wares from the United States from 1895 to 1900.

Year.	Brick.				Pottery.			Grand total (value).
	Building.		Fire (value).	Total value.	Earthen and stoneware (value).	China (value).	Total value.	
	Quantity.	Value.						
	Thousands.							
1895	4,757	$34,732	$88,729	$123,461	$114,425	$24,872	$139,297	$262,758
1896	5,258	32,759	102,636	135,395	144,641	24,702	169,343	304,738
1897	4,606	30,383	110,626	141,009	177,320	30,283	207,603	348,612
1898	4,708	32,317	146,632	178,949	212,769	39,052	251,821	430,770
1899	9,872	77,783	214,375	292,158	467,925	43,807	511,732	803,890
1900	12,526	128,800	594,237	723,037	489,942	68,852	558,794	1,281,831

CEMENT.

PORTLAND CEMENT.

By Spencer B. Newberry.

PRODUCTION.

There were 8,482,020 barrels of Portland cement manufactured in the United States in the year 1900; an increase of 2,829,754 barrels, or 50.1 per cent over the product of 1899.

The following table shows the production of Portland cement in 1899 and 1900 by States:

Production of Portland cement in the United States in 1899 and 1900.

State.	1899.			1900.		
	Number of works.	Product.	Value, not including packages.	Number of works.	Product.	Value, not including packages.
		Barrels.			*Barrels.*	
Arkansas	1	50,000	$87,500	1	40,000	$70,000
California	1	60,000	120,000	1	44,565	89,130
Colorado				1	35,708	71,416
Illinois	2	53,000	79,500	3	240,442	300,552
Indiana				1	30,000	37,500
Kansas				1	80,000	100,000
Michigan	4	342,566	513,849	6	664,750	830,940
New Jersey	2	892,167	1,338,250	2	1,169,212	1,169,212
New Mexico	1	1,500	4,500			
New York	7	472,386	708,579	8	465,832	582,290
North Dakota	1	1,700	5,100	1	400	1,200
Ohio	6	480,982	721,473	6	534,215	667,769
Pennsylvania	9	3,217,965	4,290,620	14	4,984,417	4,984,417
South Dakota	1	35,000	70,000	1	38,000	76,000
Texas				2	26,000	52,000
Utah	1	45,000	135,000	1	70,000	175,000
Virginia				1	58,479	73,099
Total	36	5,652,266	8,074,371	50	8,482,020	9,280,525

The above table shows that by far the greatest total increase in product, as in former years, was in the States of Pennsylvania and New Jersey, the chief seat of the industry in this country. Illinois and Michigan are, however, coming to the front as extensive producers, and will probably show a still greater increase in 1901. Colorado, Indiana, and Texas, in which States Portland cement has been made on a small scale in past years, have established the industry on a substantial basis. Kansas and Virginia appear for the first time as producers. In other States the changes have been unimportant.

The relative growth of the industry in the most important producing sections during the last ten years is shown in the following table:

Development of the Portland-cement industry in the United States since 1890.

Section.	1890.			1894.		
	Number of works.	Product.	Per cent.	Number of works.	Product.	Per cent.
		Barrels.			*Barrels.*	
New York	4	65,000	19.4	4	117,275	14.7
Lehigh and Northampton counties, Pa., and Warren County, N. J	5	201,000	60.0	7	485,329	60.8
Ohio	2	22,000	6.5	4	80,653	10.1
All other sections	5	47,500	14.1	9	115,500	14.4
Total	16	335,500	100.0	24	798,757	100.0

Section.	1899.			1900.		
	Number of works.	Product.	Per cent.	Number of works.	Product.	Per cent.
		Barrels.			*Barrels.*	
New York	7	472,386	8.4	8	465,832	5.5
Lehigh and Northampton counties, Pa., and Warren County, N. J	11	4,110,132	72.7	15	6,153,629	72.6
Ohio	6	480,982	8.5	6	534,215	6.3
Michigan	4	342,566	6.1	6	664,750	7.8
All other sections	8	246,200	4.3	15	663,594	7.8
Total	36	5,652,266	100.0	50	8,482,020	100.0

The product of New York has declined from that of the previous year; and New York's proportion of the total has steadily fallen since 1890. This is probably due to the fact that the factories in that State are equipped with intermittent or continuous vertical kilns, and are not able to compete effectively in the matter of price with more modern works using rotaries. One of the oldest factories in the State is, in fact, to be remodeled and equipped with rotary kilns, and a new rotary plant is under construction in one of the western counties.

Ohio shows some increase, but fails to maintain her relative place. This is due to lack of large deposits of favorable material.

Michigan shows a remarkable growth, and will show a still greater increase in output in 1901. There are at present nine factories in operation in the State, and five more under construction, while an almost countless number are projected. Marl is abundant everywhere, and nearly every lake and marsh in the State is underlain by it.

The "other sections" appearing in the table include Indiana, Illinois, Kansas, Virginia, Texas, and the West. These show rapid growth, and will require subdivision in the next report. Indiana should be grouped with Michigan, as the material is the same, and the factories so far established are near the boundary between the States.

IMPORTS.

The imports of Portland cement into the United States in 1900 were 2,386,683 barrels, an increase of 278,295 barrels over the quantity imported in 1899. This increase took place chiefly during the first half of the year, and resulted from the extraordinary demand for cement which then prevailed. It is certainly remarkable that in spite of the immense growth of domestic manufacture the imports should have remained practically constant for the past eleven years. There is good reason to believe, however, that this condition will not longer continue. The marked fall in the price of American Portland cement toward the close of 1900, and the continuance of low prices in the present year, have checked imports in a marked degree, and it is evident that the amount of foreign cement brought into the market in 1901 will be much less than in 1900. High-grade Portland cement is at present manufactured in this country much more cheaply than anywhere in Europe, and is sold nearly a dollar per barrel cheaper than imported brands of no better quality. Further, the leading American manufacturers are in position to warrant their products to give tests superior to the best imported, and for their own reputation are always ready to guarantee delivery in good condition and to be responsible for the success and durability of important work in which their cements are used. These safeguards to the consumer are wholly lacking in the case of imported cements, while abundant ground for complaint against many foreign brands is found in damage by water, breakage of packages, etc.

The following table shows the imports, by countries, from 1897 to 1900:

Imports of cement into the United States in 1897, 1898, 1899, and 1900, by countries.

Country.	1897.	1898.	1899.	1900.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*
United Kingdom	344,336	241,198	199,633	267,921
Belgium	529,686	651,204	624,149	826,289
France	19,319	17,294	15,649	32,710
Germany	1,109,280	1,032,429	1,193,822	1,155,550
Other European countries	46,916	51,582	68,348	75,827
British North America	4,907	4,635	4,398	4,517
Other countries	36,480	15,476	2,389	23,869
Total	2,090,924	2,013,818	2,108,388	2,386,683

RELATION OF DOMESTIC PRODUCTION TO IMPORTATION.

The following table shows the relation of production to imports in 1891, 1896, 1899, and 1900. It will be noted that the proportion of domestic cement consumed to that of foreign manufacture has increased from 13.2 per cent in 1891 to 79.1 per cent in 1901.

Comparison of the domestic production of Portland cement with the imports.

	1891.	1896.	1899.	1900.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*
Production in the United States	454,813	1,543,023	5,652,266	8,482,020
Imports	2,988,313	2,989,597	2,108,388	2,386,683
Total	3,443,126	4,532,620	7,760,654	10,868,703
Exports	....	85,486	110,272	139,939
Total consumption	3,443,126	4,447,134	7,650,382	10,728,764
Percentage of total consumption produced in the United States	13.2	34.7	73.9	79.1

It will be noted that the domestic product in 1900 exceeded the sum of product and imports in 1899. This shows that production is pursuing demand with ever increasing speed.

The production and annual percentage of increase in the last eleven years have been as follows:

Production of Portland cement, with increases each year, since 1890.

Year.	Product.	Increase.	Percentage of increase.	Year.	Product.	Increase.	Percentage of increase.
	Barrels.	*Barrels.*			*Barrels.*	*Barrels.*	
1890	335,500	....	....	1896	1,543,023	552,699	55.8
1891	454,813	119,313	35.6	1897	2,677,775	1,134,752	73.5
1892	547,440	92,627	20.4	1898	3,692,284	1,014,509	37.9
1893	590,652	43,212	7.9	1899	5,652,266	1,959,982	53.1
1894	798,757	208,105	35.3	1900	8,482,020	2,829,754	50.1
1895	990,324	191,567	24.0				

The average rate of increase from year to year has been over 40 per cent, while the increase from 1899 to 1900 was over 50 per cent.

THE PORTLAND CEMENT INDUSTRY IN THE VARIOUS STATES.

California.—The Usona Portland Cement Company is building large works at Benicia.

Georgia.—The Chickamauga Cement Company is building a factory for the manufacture of Portland cement at Rossville, Ga., and near Chattanooga, Tenn. The material to be used is a natural cement rock, nearly free from magnesia, said to approximate to the composition of a correct cement mixture.

Illinois.—Three factories are now in operation near Lasalle. At South Chicago the Illinois Steel Company is making a true Portland cement by grinding granulated slag with the necessary proportion of limestone and burning the mixture in rotary kilns.

Indiana.—The factories at Stroh and at Syracuse are completed and in operation. The latter will at once be enlarged to 1,800 barrels per day.

Kansas.—The factory at Iola was started at the close of 1900. Natural gas is used as fuel, and the materials are limestone and shale.

Michigan.—The writer is informed by the Michigan Alkali Company, of Wyandotte, that the materials used for Portland cement manufacture from caustic-soda waste are not as stated in the report for last year. The composition of the materials at present used is as follows:

Composition of Portland cement materials used at Wyandotte, Mich.

Constituent.	Lime waste.	Clay.
	Per cent.	*Per cent.*
Silica	0.60	46.40
Alumina and iron oxide	3.04	16.30
Carbonate of lime	95.24	25.36
Carbonate of magnesia	1.00	4.30
Alkalies	.20	.75
Combined moisture		7.00
Total	100.08	100.11

Factories under construction during the year at Jonesville, Newaygo, Alpena, and Woodstock are completed and in operation. That at Newaygo has command of 2,000 horsepower of water power from the Muskegon River, and presents many interesting features.

Factories are under construction at Baldwin, Grass Lake, Fenton, Holly, and White Pigeon. Other enterprises are projected in nearly every county in the State.

New York.—A very complete and interesting description of Portland cement plants in New York State, by Mr. E. C. Eckel, appeared in Engineering News, May 16, 1901. From this the following notes are in part taken.

The Catskill Cement Company's works at Smiths Landing were put into operation in July, 1900. Helderberg limestone and clay of the following composition are used:

Composition of Portland cement materials at Smiths Landing, N. Y.

Constituent.	Limestone.	Clay.
	Per cent.	*Per cent.*
Silica	1.54	61.92
Alumina	.39	16.58
Iron oxide	1.04	7.84
Lime	53.87	2.01
Magnesia	.52	1.58
Alkalies		3.64

Rotary kilns are used at these works.

The Alsen Portland Cement Company, of Germany, is building works at West Camp-on-Hudson, and will begin manufacture in the present year. Limestone and clay will be used, and the burning will be done in rotary kilns.

The Iroquois Portland Cement Company is building works at Caledonia, in the western part of the State. Marl and clay are the materials to be used. These are to be ground and mixed dry, and burned in rotaries.

The Cayuga Portland Cement Company is building works near Ithaca. The material will be obtained from an outcrop of the Tully limestone and underlying shales. These works will probably be in operation before the close of the present year.

Ohio.—A new factory is under construction at Wellston, near that of the Alma Company.

Pennsylvania.—The Dexter Company's works, near Nazareth, began manufacturing near the close of 1900. The material used is a cement rock quarried close to the factory, and is remarkable for the fact that it shows the average composition of a correct mixture and requires no addition of limestone.

The works of the Reading Portland Cement Company, at Evansville, produce a cement of interesting composition, being made from highly siliceous material. This, in the judgment of the writer, is an advantage, both for convenience of manufacture and permanence and soundness of product. Published tests of this cement appear to confirm this view, and are very satisfactory. The composition of the cement, as given by the manufacturers and confirmed by the writer, is as follows:

Composition of Portland cement from Evansville, Pa.

	Per cent.		Per cent.
Silica	24.48	Lime	64.33
Alumina	4.51	Magnesia	2.59
Iron oxide	2.68	Sulphuric acid	1.41

West Virginia.—The Buckhorn Portland Cement Company is building large works at Rowlesburg, on the Cheat River. The materal to be used is limestone of the sub-Carboniferous period, a face of which, more than 60 feet in thickness, is exposed at the top of the hill, several hundred feet above the factory. The stone shows the average composition of a correct mixture, and no other material will be required.

MATERIALS.

The following table shows the comparative product from limestone and marl in 1899 and 1900:

Portland cement made from limestone and marl in 1899 and 1900.

	1899.		1900.	
	Number.	Product.	Number.	Product.
		Barrels.		*Barrels.*
Factories using limestone	24	4,697,722	35	7,154,318
Factories using marl	12	954,544	15	1,327,702
Total	36	5,652,266	50	8,482,020

THE CEMENT INDUSTRY IN EUROPE.

The total European product of Portland cement is estimated to be about 8,000,000 tons (of 1,000 kilograms), equivalent to 44,000,000 barrels. Of this amount Germany produces about 15,000,000 barrels. This production is considerably in excess of the demand, and during the past year, especially in England and Germany, the industry has been in a very depressed condition, as shown by the great decline in the price of securities of the leading manufacturing companies. Tulloch & Co. (February, 1901) speak of the price of cement in England as very low, \$1.20 to \$1.35 per barrel. These prices are, however, considerably higher than those at which many American manufactures are at present selling with considerable profit. All the important works on the Thames and Medway, and some inland companies, have lately combined under the name of the "Associated Portland Cement Manufacturers, Limited," and it is hoped that this consolidation will make it possible to advance the price to \$1.60 per barrel, also that the introduction of the American type of rotary kilns will produce a marked saving in cost of manufacture.

In Germany a "cement syndicate" has been organized, including all important factories in the northwestern and central sections of the country, and proposes to diminish overproduction by a reduction of 40 per cent in the output of the mills.

OPPORTUNITY FOR EXPORT.

At the request of the writer, the State Department asked the United States consuls in Canada, Mexico, Central America, and the West Indies to furnish information in regard to the possible market for American cement in their respective countries. This information has lately appeared in the form of Advance Sheets of Consular Reports, No. 1052, June 3, 1901,[1] and will be found of great interest to American manufacturers.

Apparently there is good demand for Portland cement in Canada at prices high enough to allow export from this country in spite of the Canadian duty of 50 cents per barrel. There are, however, four factories in process of erection in Ontario, and these will go far toward supplying the demand of the province. The duty on cement from England is one-third less than from other countries, and yet large quantities of Belgian cement are imported. So long as this is the case the superiority and lower cost of production of the best American Portland cement should make it easily possible for our manufacturers to compete in the Canadian market.

Mexico, Central America, Martinique, and the Guianas appear also to present favorable conditions for export of cement from the United States.

SLAG CEMENT.

Slag cement, a mechanical mixture of granulated blast-furnace slag and slaked lime, was made in 1900 at five factories, situated in New Jersey, Maryland, Ohio, Illinois, and Alabama, respectively. The total product was 365,611 barrels, valued at $274,208.

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[1] Apply to the Consular Bureau, Department of State, Washington, D. C.

AMERICAN ROCK CEMENT.

By Uriah Cummings.

PRODUCTION.

The production of natural rock cement in the United States during the year 1900 amounted to 8,383,519 barrels. This is practically the average for the last five years.

The following table gives the amount and value of the natural rock cement produced in the United States during 1899 and 1900. The values are based on the price per barrel in bulk at the various factories.

The cost of package is always added to the bulk price of the cement. Approximately 85 per cent of the cement is now sold in cloth or paper sacks.

Product of rock cement for 1899 and 1900.

State.	1899.			1900.		
	Number of works.	Quantity.	Value.	Number of works.	Quantity.	Value.
		Barrels.			*Barrels.*	
Georgia	1	13,000	$9,750	1	28,000	$21,000
Illinois	3	537,094	187,983	3	369,276	129,446
Indiana and Kentucky	19	2,922,453	1,022,858	19	2,750,000	687,500
Kansas	2	150,000	60,000	2	146,000	58,400
Maryland	4	362,000	144,800	4	335,070	134,028
Minnesota	2	113,986	56,793	2	109,403	54,701
Nebraska				1	500	400
New York	29	4,689,167	2,813,500	29	3,409,085	2,045,451
Ohio	3	34,557	17,279	3	35,029	17,514
Pennsylvania	5	511,404	255,702	5	687,838	343,919
Tennessee	1	10,000	8,000	1	10,000	8,000
Texas	1	12,000	20,400	1	17,000	28,900
Virginia	3	63,500	38,100	3	25,313	15,187
West Virginia	1	52,727	21,090	1		
Wisconsin	1	396,291	158,516	1	461,005	184,402
Total	75	9,868,179	4,814,771	76	8,383,519	3,728,848

CONSUMPTION.

Total consumption of all kinds of cement in the United States to January 1, 1901.

	Barrels.
Natural rock cement	186,973,127
Imported Portland	35,732,514
Domestic Portland	27,329,373
Total	250,035,014

Percentage of each kind.

Natural rock cement	74.78
Imported Portland	14.29
Domestic Portland	10.93
Total	100.00

PRICES.

The prices for natural rock cement during 1900 were somewhat lower than for the year 1899.

The depression was probably due to the fact that the prices for domestic Portland during the past year were the lowest ever known in the history of the industry.

There is a vast field for improvement in the natural cements of this country, and the manufacturers of this kind of cement are earnestly urged to institute a series of experiments with their raw material and faithfully record the results.

There is practically no limit to the opportunities for research in the line of testing different layers of rock under varying degrees of heat, and after calcination to mix them together in the grinding. If it is argued that such a process would prove more costly than the old way, it may be answered that the quality may become so improved as to permit of better prices.

Another avenue for improvement may be found in the mode of calcination. It is not at all certain that the prevailing continuous kiln will produce the highest testing cement. The try kiln, which is intermittent, very often produces samples that test much higher than can be obtained from the continuous kiln.

The manufacturers of natural cement who lead in the effort to improve their product will generally be found among those best and most favorably known in the trade.

NEW DEVELOPMENTS.

The remarkable deposit of cement rock which was unearthed at Rossville, Ga., near Chattanooga, Tenn., and which was quite fully described in our report for 1899, has been developed by the construction of a first-class cement plant, and the product is finding a ready market.

SLAG CEMENT IN ALABAMA.

By Edwin C. Eckel.

Two slag-cement plants are now in operation in the vicinity of Birmingham, Ala., and were visited by the writer in July, 1901. The blast furnaces near this city produce large quantities of basic slags, and the utilization of this waste product as material for cement will probably prove profitable. The simplicity and cheapness of the processes employed in the manufacture of this class of cements, together with the low cost of the raw materials, enable them to be produced at a very low figure, probably considerably less than that for the so-called "natural" cements. Many basic slags of this region are, it should be said, rendered unfit for use as cement material owing to the employment of dolomite as flux in some of the furnaces, and the consequent high magnesia content of the slag.

The plant of the Birmingham Cement Company is situated at Ensley, Ala. The slag used is obtained from the furnaces of the Tennessee Coal and Iron Company, located at Ensley, Bessemer, and Sheffield, Ala. After granulation at the furnaces it is shipped to the cement plant and dried in Ruggles-Coles driers. The limestone is burned to quicklime at the quarries, shipped by rail to the cement mill, and there slaked. The two materials are then mixed in the proper proportions, the mixing and first reduction taking place in West ball mills, four of which are in use. The final reduction is carried on in a West tube mill. The product marketed as "Southern Cross Portland" is packed in bags of 95 pounds net, or in barrels of 380 pounds net, the former being the most common form of packing.

An analysis made in the laboratory of the company of samples from an actual shipment of this brand showed:

Analysis of slag cement from Ensley, Ala.

	Per cent.
SiO_2	28.78
CaO	51.71
MgO	1.39
Al and Fe oxides	11.70
Sulphur	1.31

Tests for tensile strength have shown the following results:

Tests of tensile strength of slag cement from Ensley, Ala.

	7 days.	28 days.
	Pounds.	*Pounds.*
Neat	438	595
1 cement, 3 sand	135	220

The plant of the Southern Cement Company is situated in North Birmingham, and in general methods resembles closely that just described. A Kent mill, however, is used in place of the West ball mill operated at Ensley. Two brands of cement are marketed—"Alabama Portland" and "Magnolia Hydraulic." The former is said to average about—CaO, 55 per cent; SiO_2, 27 per cent; Al and Fe oxides, 12 per cent. The "Magnolia" brand is quicker setting and carries about 10 per cent less lime, most of the increase going to the silica.

PRECIOUS STONES.

By George F. Kunz.

INTRODUCTION.

The principal features of the precious-stone industry in the United States for the year 1900 may be summarized as follows: The continued mining of the fine blue sapphires in Fergus County, Mont.; the development of the fancy-colored sapphires in Granite County, Mont.; the systematic working of the beryl deposits in Mitchell County, Mont.; the increased output of the turquoise from Nevada and from Grant and Santa Fe counties, N. Mex.; the great sale of the turquoise cut with the rock under the name of "turquoise matrix" from all localities; the cutting and selling of the western North Carolina emerald with its gangue under the name of "emerald matrix;" the mining of the purple-pink garnets in Macon County, N. C.; the discovery of colored tourmalines at a new locality in California; the further advance in the price of diamonds; the continued popularity and demand for pearls, emeralds, and rubies; the importation of nearly $4,000,000 worth of rough diamonds, that were all cut in this country; the stability of the diamond-cutting industry in the United States, even with the limited output of the South African mines; the continued importation and sale of the Queensland and New South Wales opals, and their cutting from the rough in the United States; and the presentation by J. Pierpont Morgan to the American Museum of Natural History of the great Tiffany collection of gems and precious stones shown at the Paris Exposition of 1900 and the Clarence S. Bement collection of minerals, many specimens of the latter collection being gem minerals of great beauty in their natural state.

DIAMOND.

UNITED STATES.

In the United States diamonds are found in three distinct regions, as follows: (1) In Wisconsin, Michigan, Indiana, and Ohio, in the vicinity of the Green Bay lobe of the continental glacier; (2) in Georgia, North Carolina, South Carolina, Tennessee, and Kentucky; and (3) in California, adjacent to the watersheds of the San Joaquin and Sacramento rivers, where they were first found in the United States.

Diamonds have been reported from at least six or more localities in Georgia, but these are doubtful occurrences. All these occurrences have been described in previous reports of this Bureau.

The whole subject of diamond occurrences in the United States has been reviewed and brought up to date by the author, in a paper which will appear as a Bulletin of the United States Geological Survey. The discoveries reported during the last year are as follows:

An interesting occurrence of a diamond in Indiana, discovered within the last year, is recorded, with full details. The stone was an octahedron of $4\frac{3}{4}$ carats, with a yellow tinge, and had a black spot not quite central. It has since been cut into two stones, probably in the hope of eliminating the flaw, but without success, as both are affected by it. Their color is a peculiar greenish yellow, and their weights are $1\frac{1}{8}$ and eleven-sixteenth carats, respectively.

This diamond was found in panning for stream gold, in material derived from glacial drift. In these respects its occurrence resembles most nearly that of the diamonds from Plum Creek, Pearce County, Wis. The glacial deposits of Brown and Morgan counties, Ind., contain a little gold, which is occasionally sought for in the stream beds, where some concentration has occurred. Late in the autumn of 1900 a farm hand of Mr. R. L. Royse, of Indianapolis, while panning in this way on a small tributary of Gold Creek, in Morgan County, about 9 miles northeast of Martinsville, found this diamond. He sold it to his employer, Mr. Royse, for $25, from whom it was afterwards purchased by Mr. C. E. Nordyke, of Indianapolis. The latter gentleman had it cut in Cincinnati by the Herman Keck Company, and retains the two stones above described.

Prof. W. S. Blatchley, State geologist of Indiana, says that two or three other small diamonds have been reported from the same neighborhood. The glacial material there was brought, according to Professor Blatchley, by the first ice invasion. This is another point of resemblance to the Plum Creek, Wis., occurrence, and of difference from those of the Kettle moraine localities. The relations and probable connections of these two sets of occurrences are discussed by Prof. William H. Hobbs, in his paper, elsewhere referred to, on The Diamond Field of the Great Lakes.

The recent discovery of two diamonds in Tennessee is apparently well authenticated. Mr. H. W. Curtis, a jeweler of Knoxville, purchased one early in 1899 and another in February, 1900, both from the neighborhood of Knoxville. The first weighed 3 carats, but no further particulars regarding it have been obtained. The second weighed $1\frac{1}{16}$ carats, and is described as white and flawless. It was found on the bank of Flat Creek at Luttrell, Union County, by an old gentleman; he noticed it as a peculiar bright pebble lying on the ground and picked it up. It was brought to Mr. Curtis, who recognized and purchased it.

A diamond of $4\frac{1}{4}$ carats has been found in Alabama, in Shelby County, about 30 miles south of Birmingham. It was found by a little girl in earth used to fill up some low spots in a garden; some of this earth was close to the house, where water dripped on it from the roof, and here, after a rain, which had washed it clean, the child noticed the diamond and picked it up. It is estimated that the stone, which was pronounced an excellent one, would cut into a gem of $1\frac{1}{2}$ carats, or perhaps a little more. It was sent to New York and examined, but remains in the possession of the finder.

SOUTH AFRICA.

The annual report of the De Beers consolidated mines for the year ending June 30, 1900, issued by the great corporation, of which Hon. Cecil J. Rhodes is life governor and the eminent American engineer, Mr. Gardner F. Williams, is life manager, is a very voluminous document. It contains much unusual matter, connected with the African war, the siege of Kimberley, and the resulting interference with the operations of the company. Mining was suspended soon after the outbreak of hostilities, and the town was invested for five months, during which time all the energies and resources of the place were taxed for its protection. The mines of the company were an important factor in the defense of the town, as fortifications were constructed of and upon the extensive heaps of "tailings" of blue ground and débris; and on occasions of special peril some of the mining galleries were utilized as bombproof refuges for women, children, and the sick. Operations were resumed in March; but up to the end of the fiscal year of the company, in June, they were carried on only on a limited scale, in consequence of the difficulty in obtaining coal and laborers. Subsequently, however, as announced at the shareholders' meeting, on December 28, the work was again getting into a more normal condition.

In consequence of these great interruptions, which involved direct expenses and stopped the yield of diamonds for nearly half the year, the company decided to pay no dividend for the year ending June 30, 1900. They have declared one, however, for the six months ending December 28, and hope in a short time to pay a bonus to the shareholders, to compensate in part for the loss of the usual dividend in the previous year.

Compared with the preceding year the actual diamond output was reduced by more than one-half; but as the prices were higher the value of the product was just about one-half. The figures are given in the table which follows.

Production of the De Beers and Kimberley and Premier mines from 1898 to 1900.

DE BEERS AND KIMBERLEY MINES.

Year ending June 30—	Loads of blue—		Carats of diamonds found.	Amount realized thereon.	Loads of blue remaining on floors.
	Hoisted.	Washed.			
1898	3,332,688	3,259,692	2,603,250	£3,451,214	2,377,913
1899	3,504,899	3,311,773	2,345,466	3,471,060	2,937,784
1900	1,673,664	1,522,108	1,000,964	1,794,222	2,722,595

PREMIER MINE.

Year ending June 30—	Hoisted.	Washed.	Carats of diamonds found.	Amount realized thereon.	Loads of blue remaining on floors.
1898	1,146,984	691,722	189,356$\frac{1}{4}$	£196,659	727,039
1899	2,032,771	1,662,778	496,762$\frac{1}{4}$	567,360	1,097,032
1900	980,210	736,929	220,762$\frac{1}{2}$	276,191	1,340,313

GUIANA.

Diamonds appear to be quite widely distributed over the globe, and new localities are coming to view year by year. The latest development is that announced from British Guiana, as reported to the Department of State by the American consul at Demerara, Mr. George H. Moulton. The existence of diamonds in Guiana has been known for some years, and quite a number of small stones were found as far back as 1890. Three years later the colonial commissioner of mines alluded, in his report, to their known occurrence in gold placers, and predicted the discovery of "dry mines."

Diamond mining is now carried on about 250 miles south of the town of Bartica, which is situated at the confluence of the Essequibo and Mazaruni rivers. The spot is about 4 miles from the latter stream, and is reached by a narrow trail through a tropical jungle, through which everything must be carried by men. The journey from Bartica is long and hazardous. In March, 1900, 282 stones were brought out and sent to London, where they were valued at $12 per carat. Later, 400 more were brought down—obtained by 9 men in 18 days, working with crude methods. They are octahedral crystals, ranging from very small size up to a carat and a half.

From all reports a larger increase is predicted for the coming year, both in the number of stones produced and the extent of the deposits.

In Dutch Guiana also diamonds have been found for years past in the tailings of gold washings. They have been for the most part small, and have attracted little attention, the gold being the main object; though one fine stone is reported to have been found by a Mr. Fennelly about ten years ago, who sent it to the United States and had it cut. Mr. J. H. Abbott, of Revere, Mass., who resided for a long time at Paramaribo, and was extensively engaged in gold mining in Dutch Guiana, has described the frequent occurrence of small diamonds in the "tailings," and believes that there may be rich possibilities of larger stones in the clay of the river bottoms below. No attention has been given to diamond mining, and the clay is unexplored. Old worked-out gold claims, he thinks, that can be bought for a trifle, may yet prove of value as diamond beds. A serious difficulty, however, is the unhealthfulness of the climate in these interior districts. White men can live well enough along the coast, but the interior is extremely malarious. Mr. Abbott describes the gold and diamond region as consisting of two belts, each about 25 miles wide, reaching from the coast inland across the three Guianas. The French section, nearest the coast, was operated first, then the Dutch, and then the British. It is in working this latter district for gold that the diamond discoveries above noted have been made in British Guiana.

BRAZIL.

An extensive drought in the diamond region of Brazil has rendered accessible stream beds not usually available by the rather crude methods there employed. As a result, an increased production of diamonds is reported, even to the extent of a threefold amount; though this estimate is hardly probable. Accurate data are not obtainable, however, as the duty of 16 per cent on the value for exported gems and a municipal tax of 1 per cent lead to a great amount of concealment and smuggling. It is stated that small rubies, suitable for watch jewels, are abundant in the diamond district, but that the low prices now prevailing do not render their collection profitable. It is perhaps a question whether these "rubies" may not more probably be pyrope garnets, as in South Africa.

INDIA.

M. G. Ramond has published[1] an abstract of the latest and best information concerning the geology of British India, summing up the extended work of Prof. R. D. Oldham in his Manual of the Geology of India. While this article is strictly geological and does not deal with the production of precious stones, the subject of diamond occurrence is briefly alluded to as follows:

> It is in the ancient Paleozoic region of the peninsula that the only formations belong in which, up to the present time, the diamond has been found in India. The only mines exploited have been among the Upper Vindhyan group, * * * at the base of the subdivision known as the Rewa slates, in the Karnoul and Cuddapah group, near Banganapali, and in the valley Mahánadi, near Sambalpur. But nowhere does the diamond exist in place; it is the alluviums and conglomerates that yield it. In India, therefore, it is always of detrital origin.

[1] Annuaire Géologique Universelle, Vol. X, 1893, pp. 595–654; Paris, 1895.

NEW SOUTH WALES.

A valuable résumé of the diamond developments in New South Wales (repeatedly referred to in former reports of this Bureau) appeared in the annual report of the department of mines and agriculture of that colony for 1898. Diamonds were first discovered in 1851, on the Turon River and at Reedy Creek, near Bathurst. By 1860 they had been noted in four other districts of the colony, and subsequently at a number of points, widely separated, as also in adjoining sections of Victoria and South Australia. The first important discovery was in 1867, at the Cudgegong River (Mudgee), and from 3,000 to 4,000 stones were obtained in that year. In 1872 the Bingera district came into prominence and attracted a host of diamond seekers; but the stones proved small and not very marketable, and interest fell off for some years. The Bingera district, however, has been reopened since 1883, though with more or less interruption from lack of water, but it is now the second in importance of the New South Wales diamond fields. The chief one is in the Tingha division, at Boggy Camp, near Big River, Auburn Vale. The first discovery here was about 1884. This, too, is at times interrupted like the preceding.

RUSSIA.

The occurrence of diamonds in the Ural region of Russia was referred to in a previous report.[1] A small pamphlet prepared for the Paris Exposition of 1900, on the mines of Lysva district, gives some later notes.[2] The general facts as to diamond occurrence in the valley of the Adolpho-log, a tributary of the Paludenka River, and the character of the gravels in which they are found, are much as stated in the report of this Survey for 1898. The total number obtained, however, is given as now exceeding 200. The stones are colorless, pure, and transparent, but for the most part small, the largest weighing 3 carets.

L. Jaczewsky[3] discusses the finding of a second diamond in the gold washings of Baladin, on the Melnitschnaja, a tributary of the Jenissei. The second diamond was found in the Rudkowshy mine, on the Totschilnij-Kljutsch, 25 kilometers above where the Melnitschnaja flows into the Pit. The diamond is colorless and transparent, partly showing a cross twinning. It weighed thirteen-hundredths of a gram = one-half caret, with numerous partly developed, rounded trexatohedral.

P. Jeremejeff also describes this same diamond as being found in the gold washings of the northern Taiga, in the Jenisseien Government.[4]

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[1] Twentieth Ann. Rept. U. S. Geol. Survey, Part VI (cont'd), p. 565.

[2] Mines et Usines Metallurgiques du District de Lysva (Oural), Domain du Compte P. P. Schouvaloff.

[3] Trans. Russian Imp. Min. Soc., Pt. 2, No. 36, 1899, pp. 42–43.

[4] Trans. Russian Imp. Min. Soc. Pt. 2, No. 36, 1899, p. 34.

DIAMOND DRILL.

An important work by Mr. G. A. Denny, the mining engineer, which appeared in England during the past year, discusses the use of diamond drills exhaustively and exclusively.[1] The work is designed as "a practical handbook of the use of modern core drills in prospecting and exploiting," and goes into all the aspects of the subject—geological, mechanical, engineering, etc.—with tables and estimates as to the cost of machinery and of working.

In regard to the carbons employed, Mr. Denny enters briefly into the advantages of certain varieties of carbon, giving the first place, by general consent of operators, to the black carbonados of Brazil, "which combine with exceeding hardness the amorphous structure * * * rarely attained in the ordinary white stone." Any variety of diamond free from flaws and not too highly crystalline may be used; but flaws are frequent in all diamonds but the carbonados, and render the stones liable to break under the pressure to which they are subjected in the "crown" of the drill.

The carbons are set in the end of an iron ring, or "crown," which of course wears rapidly in hard rock, notwithstanding the protection afforded by the carbons. Frequent resetting of the stones is therefore required. In the Transvaal mines beds of hornstone are frequent, and diabases that are even harder, as much as 8, and the wear is so great that resetting becomes necessary about every 10 feet, while in ordinary sandstones and quartzites a drill crown will last through two or three times that distance. In all these matters much depends on the skill of the drill operator, who must be able to judge as to the hardness of the rock, and graduate the rate of speed and the force applied accordingly.

INCREASED VALUE OF CARBON AND BORT.

A marked advance in the price of the diamond carbon used in boring and mining operations is reported during the past year, and is due to several concurrent causes. M. Jacques Baszanger, at the congress of boring engineers held in Frankfort, dealt with this subject, and gave three reasons for the rise in value. These were (1) the fact that the Brazilian carbonado product is controlled and practically "cornered" by a single firm—which condition has led to (2) an effort to replace its use by that of "boort," or bort, the African product, while (3) the Transvaal war had interrupted the operations of the De Beers Company for several months. The consequence has been that the limited amounts of bort obtainable in the market have been sought for with great competition.

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[1] Diamond drilling for gold and other minerals, by G. A. Denny, with illustrative diagrams; pp. x, 158, London, 1900.

A striking illustration of the fact just referred to and of its far-reaching results is furnished by the recent statement that prospecting operations in British Columbia have been impeded and almost suspended in consequence of the cost of bort, which has risen from \$16 to \$70 a carat. The expense of diamond drilling has thus been advanced from \$1.50 to \$4 per foot, with a very serious effect upon explorations by this process.

CORUNDUM GEMS.

SAPPHIRE.

MONTANA.

Reports from the Fergus County sapphire mines at Yogo indicate active and successful working. The gems occur in a vertical "lead," or "vein," of clay, inclosed between walls of rock—i. e., in a decomposed igneous dike. This material is taken out and washed, and the stones then sorted. The company that is operating the mines has worked down some 50 or 60 feet, but exploration has been made for 200 feet, with the same occurrence of sapphires. Different portions along the dike vary widely in their yield of gems. In September last five "blocks" were reported as worked. One of these yielded 10,000 carats, the other four only 8,000, one of them furnishing but 74.

It is stated that quantities of corundum besides the gem variety are obtained, and that large amounts of it are lying on the dumps, of no present value until railroad transportation is available. The most important gem yet found here was a very deep blue fine stone of over 3½ carats.

CORUNDUM.

NORTH CAROLINA.

New associations.—In studying the genesis of the ruby and the sapphire in recent years it has been found that corundum, long regarded as a somewhat rare species and principally confined to basic igneous rocks, really occurs quite freely in varied associations in syenites, gneisses, and schists. Its abundant occurrence in connection with nepheline-syenites in Canada has been described in the reports of this Survey.[1]

RUBY.

MONTANA.

The Granite County deposits, at Rock Creek, were worked during part of the summer, and an attempt was made to trace some of the gems to their original source in the rock. As to the success of this search no positive results have yet been reported. A large number

[1] Twentieth Ann. Rept. U. S. Geol. Survey, Part VI (cont'd), pp. 570–572; Twenty-first Ann. Rept. U. S. Geol. Survey, Part VI (cont'd), pp. 437–441.

of gems were obtained from the beds and were cut at Helena. The proportion of red ones—rubies—was greater than heretofore, but none were found possessing the deep color of true oriental ruby. They were of light shades of red, beautiful, and extremely brilliant, but not so dark as desired. At least sixty occurrences of rubies were located on several miles of gulches.

At no known locality, however, has there ever been found so great a variety of rich colors in corundum gems as here. At the Paris Exposition of 1900, there was shown a brooch of over 200 of these stones, ranging from $1\frac{1}{4}$ to 3 carats each, every one of a different tint or shade. Although the deep-red ruby and the "velvet blue" or "cornflower" sapphire were lacking, yet the richness and variety of the other kinds were unequaled; pale rubies, pink, salmon, passing into yellow, pure yellow, yellow brown and deep brown, pale blues and greens, blue-green, etc. Often a single stone would show two or three distinct shades of one color. Many of the colors have never been observed at any other locality. All were of unusual brilliancy, and improve greatly in artificial light. The butterflies and other rich jewels made from these stones possess almost the beauty of natural insects

BURMA.

The Burma Ruby Mines, Limited, the company that was organized after the British occupation of Burma, and from which such fabulous results were anticipated but not realized, has finally succeeded in overcoming the obstacles which for years impeded its endeavors, and has actually begun to pay dividends. This result has been reached by several steps, aided by increased experience and improved methods of working. Three years ago the capital was reduced £120,000 by "writing off" 8s. per share on 300,000 shares. The rent paid to the Government has also been largely reduced; first, by the Government consenting to cancel an accumulated debt of unpaid rental, amounting to 4 lakhs of rupees, or £25,000, and then by a reduction of rent from nearly £20,000 to £12,500, subject to an increase in the Government's share of the net profits from 20 to 30 per cent. The result of these changes was that in 1899 there was for the first time a balance instead of a deficiency, and in 1900 a dividend of $12\frac{1}{2}$ per cent, amounting to £18,687 10s., was announced, leaving a balance of about half that sum to be carried over to the next year's account.

The Burma company is now producing fully one-half of the annual yield of rubies in the world. The original value of the gems as mined is more than doubled by the time that they reach the individual purchaser. The cost of cutting stones so hard as rubies is greater than that of any other gem except the diamond, and adds about 40 per cent to their value, as many are small; while in the course of their passage through various hands, their cost is further enhanced until it is estimated as about two and a half times the value as taken out of the "byon."

The following figures, taken from the company's annual statements, will give an idea of the progress made in the past seven years. They show strikingly the steady reduction in cost of working the "byon" per load, the fluctuations in the royalty received from native workers, and the advance in the balance on ruby production:

Operations at the Burma ruby mines.

Year.	Loads of byon washed.	Gross cost per load.		Rent to government.	Royalty from natives.	Balance on ruby trading account.
		s.	d.			
1893-94	20,089	29	2.75	£12,708	£20,585	£4,535
1894-95	61,080	8	10	11,276	21,395	16,744
1895-96	148,740	3	9.75	11,250	28,277	27,204
1896-97	266,739	3	1	18,437	22,534	43,529
1897-98	823,703	1	2.75	20,815	9,976	52,146
1898-99	652,456		12.86	16,674	14,233	51,469
1899-1900	818,135		10.39	14,769	18,468	84,114

EMERALD.

NORTH CAROLINA.

The emerald and hiddenite mine at Stony Point, Alexander County, N. C., formerly much noted, has been involved in litigation for several years past, and during this time nothing has been done there, or at least no discoveries have been reported or published. Few gem emeralds have been found here; but remarkable crystals, very finely formed and richly colored, and as much as 10 inches long, translucent to semiopaque, were taken out when the mine was first worked about twenty years ago.

Emerald matrix.—A novel and attractive stone has recently been brought forward under the name of "emerald matrix." The emerald deposit at Big Crabtree Mountain, Mitchell County, N. C., described for the first time in this report[1] has been lately worked by a New York company, and, although no transparent gems have yet been obtained, a beautiful ornamental stone has been developed. The crystals vary from one-eighth of an inch to 1¼ inches in diameter, and are rarely over 1 inch in length. They are not transparent, but have rather a fine emerald color, penetrating narrow veins of quartz and feldspar in an irregular manner. This green and white mixture is very pleasing; and as the feldspar has a hardness of 6.5, the quartz of 7, and the emerald of about 8, the whole can be cut and polished together. Pieces are cut en cabochon, showing sections of one or more emerald crystals on the top and sides of the polished stone. The name of "emerald matrix" is given to this ornamental gem material.

[1] Sixteenth Ann. Rep. U. S. Geol. Survey, Part IV, p. 600.

COLOMBIA.

The emerald mines of Colombia, at Muzo and Coscuez, near Bogota, are again to pass under a new management. In 1894 a seven years' lease was granted by the Government to M. Macini, formerly French chargé d'affaires in Colombia, who subsequently transferred it to a British company for $400,000 in cash and an annual payment of $30,000. New proposals are now to be made, the lease being about to expire.

RUSSIA.

P. Zemjatchensky, in a paper on the emerald and beryl of the Uralian Emerald Mines, states,[1] first, that 85 versts northeast of Ekaterinburg, on the headwaters of the Starka, Tokowaja, and other right-fork streams, emerald mines were opened in 1832 in the Pyschma Bolschoi Reft region, two years after the first emerald had been found by a peasant. The developments lasted until 1837. They had decreased in their output until 1852, when the Imperial Cabinet decided that the flow of the river was affected, which, together with the high cost of obtaining the emeralds and consequent unprofitableness of mining, led to the closing of the mine.

Miklachewsky, who in 1861 or 1862 examined the mines, stated that from 1831 to 1862 emerald and beryl weighing 2,332.49 kilograms (5,131 pounds), and phenacite 82.16 kilograms (180¾ pounds), and chrysoberyl 39.95 kilograms (87.9 pounds) had been mined. Later several lessees worked the mine with more or less vigor and more or less financial success, resulting in the entire closing of the mine in 1892. In the two and one-half years of workings they found 360 kilograms (790 pounds) of emerald and beryl and 41 kilograms (90.2 pounds) of alexandrite. Recently the mines have been rented by the New Emerald Mines Company, who have resumed operations.

BERYL.

Beryls of great size, like those of Acworth, N. H., and smaller crystals of gem quality, have been reported in the vicinity of Blandford, Mass. The large crystals were found in a quarry on the land of Mr. E. Boise, where ledges of white quartz were being worked for use in the manufacture of glass and sandpaper. The crystals were very abundant, and many had the diameter of a keg or small barrel, though of rough texture. One of the finest, of uniform light green, with lateral planes nearly perfect, and about 5 feet in length and about 2 feet in diameter, has been secured for the museum of Lehigh University, South Bethlehem, Pa.

The finer crystals, of smaller size, but yielding gem material, have

[1] Travaux Société impériale des naturalistes de St. Pétersbourg, Vol. XXIX, part 5, pp. 1-19, 1900.

been found in bowlders and stone fences. One crystal, 5 inches long and 3 inches in diameter, is said to have yielded its discoverer $150 in New York. Most of the crystals obtained are smaller than those mentioned, however. The source of these beryls is as yet unknown, but there is evidently a valuable locality in the neighborhood, doubtless to the north, whence these specimen pieces have been carried by glacial agency. Associated with the colored tourmaline described further on, at Mesa Grande, San Diego County, Cal., was a remarkable mass of transparent, rose-colored beryl, measuring 65 by 50 millimeters. It is evidently an etched fragment of a very large crystal, the etched faces, with marking and erosions, being visible all over it. Viewed by transmitted light it varies from a delicate rose color to a rich pink, almost that of a Brazilian topaz.

TOPAZ.

A recent article on the mode of occurrence of topaz near Ouro Preto, Brazil, by Prof. Orville A. Derby,[1] gives the results of a study of the associated earths and rocks at the locality where this topaz is found. The crystals occur in a dark-colored earth, which, from its mineralogical character and its geological relations, appears to represent the remains of an igneous dike in which the topaz was an original mineral. What the exact nature of the rock composing this dike was can not be ascertained, on account of its condition of extreme alteration.

GARNET.

OUVAROVITE.

Very interesting is the discovery of the occurrence of richly colored ouvarovite near Carrville, Trinity County, Cal. The mineral occurs in small dodecahedral crystals, from 1 to 3 mm. in diameter, of the richest deep green, coating seams or cavities in chromic iron. These were mistaken for emeralds and announced as such, causing considerable excitement for a time, but their form and association are conclusive as to their being chrome garnet. So far the crystals are small, but as an addition to the gem stones of the United States and as mineralogical specimens they are of great interest.

Mr. George L. Carr, of Carrville, one of the first discoverers, reports that all those found were at the surface, and that no development has yet been made. Further exploration will be awaited with interest.

The suggestion arises that perhaps the mineral described in 1865 by Goldsmith,[2] under the name of trautweinite, from Monterey County, Cal., may be an impure variety of ouvarovite.

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[1] Am. Jour. Sci., January, 1901, 4th series, Vol. XI, pp. 25-34.

[2] Proc. Acad. Nat. Sci. Phila., 1865, pp. 9, 348-365.

TOURMALINE.

In 1898, while prospecting in Mesa Grande Mountain, San Diego County, Cal., for lepidolite, a large ledge was observed that appeared to be a mass of this mineral. This locality is at an altitude of 5,000 feet, in the Mesa Grande Mountain, a region in which no geological work had up to that time been done. The first few blasts showed that lepidolite was present in quantity, and also in larger and more brilliant scales than in the well-known locality at Palo, Cal. Both in the lepidolite and in the associated quartz there are magnificent crystals of tourmaline, and, as at Palo, the rubellite variety predominates. The new locality differs, however, in having the tourmaline in distinct, isolated crystals. Many of these are translucent, or even transparent, and occur as large, separate crystals, with perfect prisms and terminations. They differ in both these respects from the Palo crystals, which are nearly opaque and grouped in radiations almost blending into the matrix 1, which latter is lepidolite, with rarely ever any quartzite. The rubellite seems the predominating variety at Mesa Grande Mountain; but there is also a large proportion of parti-colored crystals—i. e., those made up of three, four, or five distinct sections, as at Haddam Neck, Conn., and Paris, Me.; others present the Brazilian type, in which several different colored tourmalines appear, as though included one within the other. In the Brazilian forms, however, the interior of the crystal is generally red, inclosed in white, and the exterior green. This concentric arrangement is reversed in the crystals from Mesa Grande Mountain, which are generally green in the interior, or yellow green, inclosed in white, with the exterior red. The habit of the crystals is also very interesting, in that many of them, when doubly terminated, end in a flat, basal form of pyramid, and are not hemimorphic, as tourmalines generally are. This, however, is not a constant feature, as one magnificent crystal, nearly 40 millimeters in diameter, is terminated with three low, rhombohedral (?) planes, which, from the peculiar markings upon them, suggest that this crystal may be a trilling. In this instance the termination is green, resting immediately upon white, then green. The largest section of a crystal is a fine pink, translucent rubellite (42 millimeters in diameter and 45 millimeters in height; not flawless). Another is a brilliant, pink crystal, with a basal termination, 56 millimeters in height and 25 millimeters in diameter.

The gangue of Mesa Grande tourmaline is generally white, opaque quartzite, the crystals penetrating it in all directions. When the crystals occur in lepidolite they are generally opaque, but more distinct than those at Palo, and always much larger. All the material at the Palo locality was taken from the surface, showing the result of more or less water acting on pegmatite rock, resembling in this respect the locality at Paris Hill, Oxford County, Me. Owing to the great variety of crystals at Mesa Grande, and their size, perfection, and beauty, this locality may prove to be one of the most important yet found in the United States. Remarkable specimens of tourmaline inclusions in quartz, from Jefferson County, Mont., are described further on under the head of quartz inclusions.

The results of the mining at Paris Hill, Oxford County, Me., and at Haddam Neck, Conn., were not as extensive as those of previous years.

QUARTZ.

QUARTZ INCLUSIONS.

A very remarkable occurrence of tourmaline inclusions in quartz is described by Mr. A. P. Pohndorf, of Butte, Mont. About 22 miles southeast of that city, and 16 miles from Silver Star, Jefferson County, on the ridge between Little and Big Pipestone creeks, occurs a ledge—perhaps a dike—of very coarse pegmatite on the edge of the Butte granite area. The rock is much broken up at the point described, and hence its exact relations can not be determined without further development; thus far it has only been excavated about 25 feet.

In this coarse pegmatite are found crystals of orthoclase feldspar, perfect in form, from 8 to 14 inches in diameter; mica in small scales, sometimes filling cavities; black tourmaline, and very remarkable forms of quartz—colorless, smoky, and amethystine—the two former filled with tourmaline inclusions, but the latter free from them. Mr. Pohndorf describes smoky crystals up to 3 feet in length and 8 inches in diameter, more or less filled with acicular tourmaline. Many of the crystals, also, would be nearly colorless were it not for the tourmaline needles inclosed, which make the mass appear black. The amethysts sometimes occur in groups by themselves, at other times upon the smoky quartz arranged in parallel positions, and again as clear purple terminations to smoky crystals, of which the prisms are filled with tourmaline. In one instance Mr. Pohndorf obtained a double-terminated crystal of this kind—a black prism with clear amethystine pyramids. It is very singular that the tourmaline inclusions, so marked in other varieties, are not to be found in the amethyst, even when part of the same composite is crystal.

The tourmalines, which vary from delicate needless up to slender crystals as much as 5½ millimeters in diameter, penetrate the quartz in every direction; but they sometimes present a zonal arrangement, such that the quartz crystals, when cut transversely, show beautifully marked "phantoms" inclosed or defined by the tourmalines. Crystals 4 inches or more in diameter, cut across in this way into polished sections, are very beautiful, and equal to anything of the kind ever obtained.

Some of his finest specimens Mr. Pohndorf got from small pockets filled with scales of mica. These small mica flakes in many cases adhere to the sides of the quartz crystals, forming more or less of a coating, and occasionally they are inclosed in the quartz. The species of this mica has not yet been determined.

Other interesting inclusions are reported by Mr. H. F. Wheaton, of Riverside County, Cal., from the San Bernardino Range, in the county of the same name, in the desert. Those noted are perfect transparent quartz crystals penetrated with beautiful rutile crystals, and associated with orthoclase feldspar and tabular hematite, an alliance recalling Habachthal and Tavetsch in the Tyrol; also colorless quartz crystals with chlorite "phantoms," including "minute grouped masses of a green color," thought to be chrysocolla or epidote.

AMETHYST.

Amethystine quartz has been found by Mr. A. P. Pohndorf, of Butte, Mont., in a very singular association with smoky quartz full of acicular tourmaline. The amethyst is free from the tourmaline, although sometimes forming clear purple terminations to crystals that are so filled with it as to appear black. The particulars of this curious association, near Silver Star, Jefferson County, Mont., are given under the heading "Quartz inclusions."

QUARTZ INCLUSIONS SAGENITIC.

Many of the crystals of quartz found with the amethyst in Silver Creek, Jefferson County, Mont., are almost entirely permeated with tourmaline; others strangely so. Many of these crystals when cut in transverse sections show beautifully marked phantoms, inclosed in delicate prismatic needles of tourmaline, penetrating the quartz in every direction, making this occurrence one of the most remarkable yet found.

MOSS AGATE (MOSS JASPER).

Chalcedony with dendritic markings, in masses from 15 to 18 inches across, and jaspery agate, with mosslike markings of a dark-brown color, are among the minerals collected by Mr. H. F. Johnson in the San Bernardino Mountains, in the county of that name, in the desert region of California, and reported by Mr. Wheaton, of Farm Springs, in the adjacent county of Riverside, Cal.

THE ARIZONA PETRIFIED FOREST.

The celebrated "Petrified Forest" near Holbrook, Ariz., has been recently brought within easier access for tourists by the establishment of the new railroad station named Adamana, whence the forest can be reached by a drive of 6 miles, although the most remarkable portions of it lie several miles farther southward. Most tourists visit only this nearer part, and the other sections are less known. A recently published account goes quite particularly into the features of the whole area.

At the first deposit, so called, several sections of land are strewn with the fallen and broken trunks, washed out by the erosion of the fine, grayish, sandy material in which they were embedded. Here is the noted Chalcedony Bridge, where one of the finest logs, nearly 4 feet in diameter at its base, spans a deep gully, with its ends resting on the banks and still partly covered up. Much of the wood in this part of the park is broken up and scattered over the ground in small fragments.

The second deposit, lying a few miles to the southeast, covers several hundred acres and presents certain differences in the material. Here many large trunks are found that are simply broken across into cylindrical sections 5 or 6 feet in length. The trunks are not so shattered as in the first deposit. This better state of preservation seems probably due to a more recent washing out of the trunks, with a consequently shorter exposure to atmospheric action.

The third deposit, Chalcedony Park proper, is the largest of all, and lies chiefly in a wide canyon 5 or 6 miles across. Here the silicified logs occur by thousands, still half buried in the soft, sandy deposits, with smaller fragments strewn on every side. Some are long, almost entire trunks; others are broken into cross sections. Very few limbs or branches remain, though many of the logs retain the bark distinctly. Great beauty and variety of color are to be seen in the cross sections of the trees and in the scattered pieces.

Fragments of the same character are found strewn over a wide extent of country, east and west, among the canyons and bad lands of this part of Arizona, and it appears as though the petrified trunks must exist over, or rather under, a large area, but are only exposed where the inclosing material has been removed by erosion.

The establishment of a nearer station, with easier access to these unique localities, will render more important than ever some form of Government protection for these natural treasures of beauty and interest. Such action was urged upon Congress as much as six years ago by the legislature of Arizona,[1] and the bill for the preservation of prehistoric monuments and objects of scientific interest will come none too soon in the case of the Arizona petrified forest.

A very full and careful account of the character and condition of this remarkable locality has been given by Prof. Lester F. Ward, of the National Museum, in a report to the Director of the United States Geological Survey. Dr. Ward visited the region in November, 1900,

[1] Sixteenth Ann. Rept. U. S. Geol. Survey, Part IV, pp. 601-602

and examined it with care, under directions from the General Land Office and the Smithsonian Institution, with a view to some such action as that advocated by the Arizona legislature. He strongly recommends the withdrawal of the area occupied by the petrified forest from private entry and its reservation as a national park.

The relations of the three deposits previously described are made more clear in Dr. Ward's report. The entire region is essentially a worn-down and eroded plain, which had an original altitude of some 5,700 feet above sea level, but of which the upper 700 feet have been cut down and carved out into valleys and gorges separated by ridges, mesas, and buttes. The plain consisted of sandstones and clays of varied and picturesque colors, nearly horizontal, the former constituting the harder capping of the mesas. The age of the beds is regarded as Triassic, and this fact renders the fossil trunks of peculiar interest, as being far more ancient than the petrified forests of California, Wyoming, and the Yellowstone Park, which are largely Tertiary. Nowhere are any of the fossil trunks in their place of growth. Most of them are strewn along the eroded valleys and have been washed out of the sandstone several hundred feet above in the course of its erosion. At a few points they are to be seen in place in the sandstone, but only on reaching a elevation of some 700 feet above the valleys. One of these is on the western border of the largest, or southern, division. The bed is here a coarse, gray, pebbly sandstone, cross-bedded and containing numerous logs and branches, clearly in situ. The same bed, about 20 feet thick, was found at various points at nearly the same elevation, but not always so rich in logs. Another point where the trunks are in place is at the extreme northern end of the area, half a mile northeast of the upper forest, or first deposit of the former account. The bed here has about the same elevation, but is only 400 feet above the forest, the drainage being southward. The sandstone forms the cap of a small solitary mesa, and in it, on its northeastern edge, is the gully spanned by the Chalcedony Bridge, which has, therefore, the especial interest of being in place.

The fact that the trunks are not where they originally grew is evident from several considerations: (1) The character of the bed containing them—a coarse, fragmental deposit; (2) their positions—irregular and prostrate, nowhere erect, and (3) the dismemberment of the trees, with no branches or roots connected with the trunks, though branches are scattered about among the rest of the washed-out deposits.

The original source of the wood, the beds in which the trees grew, must be sought higher up, and perhaps at some distance, in strata which were eroded to form the sandstones into which the trunks were borne, and which was probably covered up by Mesozoic seas and not raised until the great post-Cretaceous elevations began that have lifted this entire region a mile above the present sea level.

The present drainage, as above stated, is southward. About midway of the area lies the arroyo which, says Dr. Ward, "has been mistaken for the famous Lithodendron Creek, so named by Lieutenant Whipple in 1853." It pursues a southward course, winding irregularly among the buttes, and expanding widely toward its southern end, forms there the broad valley of the third deposit above described. It is plain that the sandstone was not uniformly filled with logs. There were centers of accumulation, as Dr. Ward calls them. Fossil wood is abundant all about, but the special deposits that have attracted so much interest are local. The first deposit is found at the northern end, in a valley opening out on the plain reaching to the Rio Puerco, and the second deposit occupies the slope of the eastern border of the area.

The report concludes with several recommendations as to what may wisely be done by the Government. These are made after conference with leading men in Arizona, both in political and business positions. The amount of material is immense, but this fact alone, as experience shows, affords no guaranty against ultimate serious despoilment. Thus far the specimens taken by tourists, and even the logs removed for use as an ornamental stone by the Drake Company, of St. Paul, Minn., have made no impression, but a more serious inroad was threatened by the organization of a company to grind the agatized wood into a substitute for emery. This project fell through, in consequence of the corundum discoveries in Canada, which led to a lower-priced production of emery, and it would not prove of much greater value than plain quartzite. But, sooner or later, in one form or another, the supply will be reduced and the finest specimens removed, unless some kind of protection is given. Dr. Ward recommends prompt withdrawal of the land from entry, careful scientific survey and mapping to ascertain the precise extent and distribution of the fossil forests, or log-deposits, and, based on this last, the creation of a public reservation, under suitable restrictions. Particularly, and immediately, steps are urged for the protection of the chalcedony natural bridge, which shows fissures that may cause it to fall if not ere long supported.

The Drake Company, above referred to, made a fine exhibit of this elegant material at the Paris Exposition of 1900. The large size of the slabs and masses and their unusual richness of coloring unite to produce an ornamental stone of remarkable beauty. The works of the Drake Company are located at Sioux Falls, S. Dak., where the great cutting and polishing machinery is operated by water power, and the polishing of large pieces of hard material is as successfully accomplished as at any establishment in the world.

OPAL.

NEW SOUTH WALES.

The opal production in the White Cliffs district of New South Wales has gone on with good results. The yield for the year was valued at the large amount of $650,000, an increase of about 40 per cent on the output of 1898. The total estimated value of the opal production of the colony to the close of 1899 is given as £376,598, or about $1,875,000, from which it will be seen that the production of the last year exceeds one-third of the whole amount. The popularity of the New South Wales opal continues, and more stones are sold in one year than were sold in an entire century previous to the discovery of the Australian mines. Many are remarkably beautiful, and the price is only one-third to one-tenth of those from the Hungarian mines.

TURQUOISE.

In the annual report to the Secretary of the Interior on the progress and development of the Territory of New Mexico for the year ending June 30, 1900, made by the governor, Hon. Miguel A. Otero, are contained numerous references to the wealth of New Mexico in precious stones, particularly turquoise. The statement is made that this Territory has become already the chief source of the supply of turquoise to the world, and that its color and quality are unsurpassed. The great mine long spoken of as at Los Cerrillos is really a few miles north of that point, and the locality is named Turquesa. Here is the principal source, now known as the Tiffany mine. The output since 1890 is estimated, according to official reports, at a total value of $2,000,000, but the former owner claims that this is much below the reality, and that since 1893 the annual output has approached $1,500,000. This, on the other hand, may be overestimated.

NEPHRITE.

SIBERIA.

The occurrence of nephrite in Siberia has only attracted attention within a comparatively recent period. Its existence at some localities in northern Asia was, indeed, quite certain, from the fact of its being so long known and so highly prized in China; but it was not discovered in place until 1850, when the noted Siberian explorer and prospector, Mr. J. P. Alibert, while seeking for the graphite mines that have since become so celebrated, had the good fortune to discover a locality of fine nephrite in the bed of the stream known as the Onot in eastern Siberia.

JADE.

BRITISH COLUMBIA.

Mr. Harlan I. Smith has described[1] a series of observations conducted by the Jesup North Pacific Exploring Expedition, upon prehistoric village and burial sites at and near Lytton, in British Columbia, at the junction of the Fraser and Thompson rivers. Mr. Smith collected much interesting material, and notes among other stone implements, the occasional occurrence of a light-green, translucent mineral, apparently nephrite, wrought into thin, delicate celts. These range from 4 inches in length, 1½ inches in width, and only one-quarter inch in thickness, down to 1 inch in length, with the other dimensions proportionate. The grooves made in cutting them are visible in some examples, while in others they have been polished out. Those collected show all the stages of manufacture from bowlders on the river bank that had been grooved by grinding or rubbing with thin slabs of siliceous sandstone, to selvage pieces thus produced and then broken off, and celts still showing the break line, and finally those completely polished. Sandstone pieces or saws were obtained that fitted the grooves in the green stone. The whole account—bowlders, sandstone, and all the steps—recalls with singular minuteness the New Zealand jade occurrence and use. No analyses of the mineral are given, so that it is not certain what the nephrite may prove to be here. The bowlders, of course, indicate its occurrence in place somewhere higher up in the course of the river. Mr. Smith says that the coast Indians are accustomed to use the celts, mounted as adzes, to smooth and finish boards that have been split out with wedges. Many wedges, made of the antlers of elk, were among the implements associated with these specimens, and it is fairly presumable that the celts were used in the manner described.

THOMSONITE (MESOLITE).

The local gem stone from Grand Marais, Minn., usually designated thomsonite, is not really that species, but the closely allied mineral, mesolite, according to Prof. N. H. Winchell.[2]

Analyses of Grand Marais mineral.

SiO_2.	Al_2O_3.	CaO.	Na_2O.	K_2O.	Fe_2O_3.	H_2O.
Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
40.45	29.50	10.75	4.76	0.36	0.23	13.93
46.02	26.72	9.40	3.76	.39	.81	12.80
40.45	29.37	10.43	4.28	.42	.88	13.23

[1] Mem. Am. Mus. Nat. Hist., Vol. II, part 3, May, 1899.
[2] Twentieth Ann. Rept. U. S. Geol. Surv., Pt. VI (cont'd), 1899, pp. 591-592.

SODALITE.

The Canadian section at the Paris Exposition of 1900 had specimens of a fine blue massive sodalite from Dungannon Township, Hastings County, Ontario. The color is very rich, closely resembling lapis lazuli, and the deposit could be easily opened and developed if any demand should arise for the mineral as an ornamental stone. It is beautifully adapted for mosaic, inlaying, etc., and was exhibited in the hope of bringing it into notice for such purposes.

CHIASTOLITE MACLE.

This mineral, a variety of andalusite, sold generally under the name of cross-stone (German Kreuzstein), has been found in Madera County, Cal., of fine quality and remarkable size. Fragments of crystals belonging to Mr. W. W. Jefferis are over 3 inches long and measure $1\frac{3}{4}$ by $1\frac{1}{4}$ inches in diameter on the ends, the section being a rhombic prism. When polished these show the peculiar cross pattern that has given its name to the mineral, in rich black upon a white or fine salmon-colored ground, and sometimes with a black square or lozenge at the center from which the arms of the cross extend.

OBSIDIAN.

An interesting account has been given recently of the great obsidian mines in the State of Hidalgo, Mexico, by Prof. W. H. Holmes, of the United States National Museum.[1] These are among the most remarkable and important of the prehistoric mines that are found in various parts of North America, and furnished a large part of the obsidian that is so widely distributed throughout the whole Southwest. In Mexico and Central America implements and fragments abound everywhere, indicating extensive traffic, and at points like Tenochtitlan (the modern City of Mexico) and San Juan Teotihuacan the refuse deposits are black with thousands of pieces.

PYRITE.

The use of iron pyrites in jewelry is not frequent, but it has recently come to be somewhat in vogue in a peculiar form. Old specimens are occasionally seen in which pyrite has been cut and polished as a faceted stone, very brilliant in luster, but, of course, perfectly opaque. The new form in which this mineral is used in jewelry is that of a coating of small bright crystals, nearly uniform in size, forming a sparkling surface of even height. These coatings occur upon the sides of cavities or crevices in anthracite coal, more especially on the slate, and are used for jewelry and ornamental work to some extent just as

[1] Amer. Anthropologist, Vol. II, No. 3 (July-Sept., 1900), pp. 405-416.

they occur, the only cutting being that involved in smoothing the back and making the pieces of suitable size and shape for mounting. One firm, which claims to control the entire output of the pyrites which occurs in this form, made an exhibit of it at the Paris Exposition of 1900, with the object of making it known as a novelty to European jewelers.

Pyrite has recently been obtained in a rather novel form, which yields beautiful specimens for cabinets. The mineral appears in flattened lenticular disks, composed of radiating crystals, often accurately circular in outline and brilliant in luster, between the layers of coal shale or "slate," from Marzon Creek, Illinois.

Radiated spherical nodules of pyrite are familiar, and these are in fact only the same thing; but this highly flattened form is a novelty. The specimens measure 1 or 2 inches in diameter, and are known as "pyrite sans." They are especially handsome when seen on the black ground of the shale.

THE TIFFANY-MORGAN COLLECTION.

In the American section of the Paris Exposition of 1900 was the Tiffany collection of precious and ornamental stones of the United States, and in the Diversified Industries section the Tiffany collection of foreign gems. In both collections were the finest obtainable examples of the most perfect natural crystals, the choicest broken fragments, and rolled pebbles, as well as the largest and finest obtainable gems. These were all purchased to be combined with the collection of gems that constituted the central figure of the Paris Exposition of 1889, and were presented to the American Museum of Natural History, New York, by the donor of the Bement collection, Mr. J. Pierpont Morgan, whose generous gift makes this collection of gems now in the American Museum of Natural History the first in existence. The collection is now being arranged in a special building—Morgan Hall. Both these collections were formed by the writer.

THE BEMENT COLLECTION.

The mineral collection formed by Mr. Clarence S. Bement, of Philadelphia, has been known for years past as the finest private cabinet in America, and perhaps in the world. This last statement was made emphatically by no less an authority than Prof. Gerhard Vom Rath, of the University of Bonn, who published a series of notes upon it in the Verhandlungen der Naturh. Vereins d. preuss. Rheinl. und Westf., in 1884.[1] At that time the collection numbered some 9,000 specimens. It has since been increased to 10,500. Professor Vom Rath then said that it ought to become public property and should find its

[1] Translated by the writer in 1886.

way into the United States National Museum. During the last year this unequaled collection has been purchased for the American Museum of Natural History at New York, through the munificent liberality of Mr. J. Pierpont Morgan.

MINERALS AT THE PARIS EXPOSITION OF 1900.

The mineralogical and metallurgical exhibits at the Paris Exposition of 1900 exceeded in beauty and scientific interest those of any previous exposition. Only a few leading points can be noted, but these will give some idea of the mineralogical and geological treasures assembled.

In the exhibit made by the Alpine Club, of France, M. Demarty, well known as a specialist and a writer concerning the minerals of the Auvergne district, displayed a most interesting collection of the rocks and minerals of that remarkable region of central France. Prominent among these were the Auvergne amethysts, both in polished form and in small, dark, richly colored crystals, with jasper and other siliceous minerals found in association with them.

In section 63 the Norwegian Government exhibited some of the most remarkable specimens of crytallized native silver ever found from the mines of Kongsberg—"the mines of the pauper and the King," as they are called—comprising many types of crystals, groups of cubes and cubo-octahedrons measuring as much as an inch on the face, also wires and ropes of silver nearly a foot in length, in masses weighing up to 1 pound each, besides isolated crystals, and masses of silver on the gangue. There was also a superb collection of thorites and organzites; and columns of polished labradorite and gabbro 12 to 15 inches in diameter and over 20 feet in height. The labradorite is very dark in color, almost black, and the reflections are small and silvery blue.

Another interesting exhibit was that of the soapstone from the quarry of Gudbrandsdalen, used in the interior decoration of the cathedral at Trondjhelm.

In the Finland pavilion was shown the meteorite of the Bjurbo fall, a chondrite that fell on March 12, 1899. The 800-pound mass, broken into many pieces, but with the crust unusually fresh and interesting, was well shown in a cylindrical glass case.

The Russian section contained a magnificent collection of minerals from the Ural Mountains, splendid crystals of beryl, rubellite, topaz, etc., and a wonderful display of vases of rhodonite, malachite, lapis lazuli, and other characteristic Russian minerals; a single bowl of jasper from Kolyvan, Siberia, measured 8 feet in height and 6 in diameter. There was also a superb collection of cut objects of jade and aventurine from the Imperial Lapidary works at Peterhoff.

Among the most remarkable, one might say sensational, exhibits in the whole exposition, was the jeweled map of France, presented by the Czar Nicholas II to President Loubet. This map is about one meter square, and is made entirely of Russian semiprecious stones, set as a mosaic, for the several departments and inlaid with gem stones for the cities. Each department is represented by one special stone—jade, onyx, agate, carnelian, malachite, etc., and a great variety of colored jaspers, for which Russia is noted. For the principal cities, Paris is represented by a ruby, Marseille by an emerald, Lyon by a diamond, Bordeaux by an opal, Lille by a turquoise, etc. The size of each stone is in proportion to the importance of the city or town. The value of this unique map is estimated at two million francs. The emerald alone that represents Marseille is valued at 900 rubles. During the exposition it was displayed in the Russian section of the Art Industry Building. It is now in the museum of the Louvre, having been turned over to the Government of the French Republic by President Loubet as properly national rather than private property.

The only object comparable to this map is probably the jeweled globe belonging to the Shah of Persia, at Teheran, which has rarely been seen by Western eyes.

Denmark appeared especially in her colony of Iceland, whence were displayed hundreds of pounds of Iceland spar, the crystals being of "irreproachable transparency," as the French express it. One crystal, nearly a foot in diameter, had its faces coated with magnificent zeolites—stilbite, epistilbite, heulandite, etc.

The Baltic amber was shown in one of the most comprehensive collections ever made, prepared by Dr. Klebs, of Konigsberg, Prussia, the celebrated amber expert. This collection comprised all the various forms in which amber occurs and all the very interesting inclusions, as of woody matter, insects, spiders, moving bubbles, etc., all accompanied with full explanatory labels and a good catalogue.

In the Austrian and Hungarian sections there was a magnificent collection of minerals, conspicuous among which were crystals of salt from the mines at Wielicza, which have been worked for hundreds of years; from Transylvania, realgar and orpiment, and a great variety of the occurrences of native gold from the mines at Vöröspatak. The Dubnik mines were represented by a fine collection of noble opals and hydrophanes. These mines are now worked under Government patronage, but the recently developed Australian opal fields are outstripping them many-fold in production.

The Servian pavilion contained some fine copper minerals, as well as magnificent crystals of cinnabar, the white chloride, and other mercury compounds.

Passing from Europe to America, in the United States section there was shown a complete metallurgical exhibit of this country, prepared by the chief of the department of mines, Mr. F. J. V. Skiff. Among American mineral dealers only one had an exhibit—Mr. Warren M. Foote, of Philadelphia—who showed a fine collection of both American and foreign minerals. A very complete exhibit of the mineralogy of the United States was for the first time prepared and shown under a cooperative arrangement between the Bureau of Mining Industry and a number of our leading universities, including Cornell, Princeton, Chicago, Michigan, and others. Some 4,000 specimens in all were displayed, the collection being made as complete as possible. It was arranged according to Dana's Mineralogy, each institution taking one section of it.

The Canadian exhibit, in charge of Mr. Fairbault, contained a noble collection of the minerals of the Dominion, notable among which were great crystals of apatite, polished slabs of labradorite, large masses of sodalite, and a great variety of gold and other precious minerals.

In the Mexican section, in addition to the large variety of silver minerals usually shown, was a collection of beautiful specimens of crystallized boleite, cumengite, azurite, and other species from the famous mines at Boleo, in Lower California.

The Australian and Japanese exhibits were especially notable. Among the gems of the entire collection were the extraordinary twin crystals of quartz from Japan. One of these were crystals from 9 to 12 inches long at an angle of 45°. Superb groups of crystallized stibnite and an entire collection of the minerals of Japan, gathered by Mr. Tsunashirō Wada, and many specimens of remarkable beauty from a collection by Mr. Takudzi Ogawa, all are worthy of special mention.

Unquestionably the finest collection shown by any government was that from West Australia, prepared by Mr. Holroyd, who with indefatigable energy and great intelligence induced the many mine owners of that country to make an exhibit of gold and tellurium minerals such as never before has been seen. This collection is valued at not less than $200,000. In some cases several thousand dollars are represented in a single specimen. Every important mine in every district of West Australia was represented by masses of the rock, with free gold, generally associated with tellurides; and besides the products of each mine, there were fine photographs or superb enlarged transparencies. The specimens were all freshly broken and unrubbed, and such large rich masses of free gold, associated with either petzite, calaverite, hessite, or other tellurium minerals, have never been seen together before. At other times the gold is in spongy and wire forms, or in fine dust, which Mr. Holroyd calls "mustard gold."

The French colony of New Caledonia showed magnificent examples of noumeite, garnerite, and associated species.

The richest mineral specimen at the exposition, however, one in which art has added to the work of nature, was the immense diamond from South Africa found in 1893 at Jagersfontein. It was then a crystal of 961 carats in weight, but has been cut into a brilliant of 239 carats—a superb and faultless gem, blue-white in color, now known as the "Imperial" diamond, and valued at $2,000,000.

Several valuable handbooks were prepared for the Paris Exposition, dealing with mineralogy and mining, especially in Russia and Japan. Among these, reference should be made to the following:

Catalogue des Objets exposées par les Usines de Taguil et de Lounia (Oural) appartenant aux héritiers de M. Paul Demidoff, Prince de San-Donato.

This little pamphlet gave a carefully classified list of the extensive mineral exhibit from this famous mining region.

Mines et Usines Metallurgiques du District de Lysva (Oural), Domain du Compto P. P. Schonvaloff.

This handbook contained a large amount of valuable information as to the gold and platinum workings and the numerous metallurgical establishments of this portion of the Ural region, and has already been cited in regard to the occurrence of diamonds.

Catalogue des Minéraux du Japon (collection de M. Tsunashirō Wada), pour l'Exposition Universelle de 1900, à Paris. Service Géologique Impérial du Japon; Tokyo.

This pamphlet gives a list of some 350 numbers, comprising a fine selection of Japanese minerals, partly described above.

An interesting paper on the pleochroism and polychroism of the historical locality of the island of Elba, by Prof. Giovanni D'Archiardi.[1]

Dr. D'Achiardi dwells particularly on the coexistence of achroite, rubelite, indicolite, afrizite, and their variations of perpendicular and horizontal arrangements of color.

JET.

Mr. A. Bibbins, of Baltimore, reports two localities in the Arundel formation in Maryland, where lignite occurs of a quality sufficiently compact and fine-grained to take a high polish and be capable of being worked into ornaments; in other words, a true jet. One of these localities is at the iron mine at Loper Hall, the other at Fort Dorsey, both in Anne Arundel County, Md. The lignite is in both cases coniferous in structure, and at the second locality is described as "limonitized."

[1] Pleocroismo e policromismo delle tormaline elbane, Pisa, 1900, pp. 1-7.

ARIZONA "MEXICAN ONYX" (ORIENTAL ALABASTER).

The report of the governor of Arizona for the fiscal year ending June 30, 1899, shows great advances in the mining interests of the Territory, its remarkable mineral resources becoming better known and attracting capital from year to year, especially with the increase of transportation facilities. The turquoise mines and the Chalcedony Park have been elsewhere referred to in this and previous reports. But an interesting ornamental stone is the onyx marble, or Mexican onyx, found at Cave Creek, 45 miles northeast of Phoenix. Here a large deposit, covering 20 acres, has lately been opened by the Phoenix Onyx Company. The stone occurs in masses, or "bowlders," ranging from 2 or 3 cubic feet to 25, and even larger, but the latter are of inferior beauty. Its geological occurrence is not described, but in quality it is reported by experts to be the finest ever produced in the United States, and superior to any now obtained at the Mexican locality. It is taken to Phoenix in the rough, and there cut by saws and afterwards polished. The coloring is said to be very beautiful and very varied.

Another onyx marble, in black and white zigzag bands, has been discovered at Kirtland Valley, and also near Greaterville, Ariz. Both of these are beautiful ornamental stones, and are beginning to be developed.

CORAL.

Coral, which has not been fashionable in jewelry for some years, is again coming into favor. The preference, however, is now given not to the deep red color, but to lighter shades; and these pale varieties are reported to have trebled in price within two years past. The *Corallium rubrum* is gathered from numerous banks off the coast of Sardinia, Sicily, northern Africa, and the Adriatic. It forms the basis of an important industry, as the annual yield of the Mediterranean is estimated to be from 150,000 to 200,000 kilograms, valued at about $1,500,000. Prices range widely, from $4 up to $600 per kilogram, according to color and quality, the average being perhaps $75. The pale pink varieties are at present the most valuable and expensive. Naples and Paris are the chief coral markets, and in the former most of the sorting and preparing of the material is done, affording employment to a large number of people.

CONCHITE, A NEW FORM OF CALCIUM CARBONATE.

A novel and important contribution to mineralogy, in its relation particularly to such gem materials as coral and pearls, appeared in the Mineralogical Magazine (London) for November, 1900, under the title "Conchite, a new form of calcium carbonate," by Agnes Kelly. The point brought out in this article and clearly determined by extensive and accurate studies and tests is that the carbonate of lime structures secreted by marine animals, besides some inorganic deposits, frequently consist, not of calcite, nor in any case of aragonite, as heretofore supposed, but of a new isomeric substance for which the name of conchite (from *concha*, a shell) is proposed.

Numerous analyses of shells showed them to consist of carbonate of lime almost chemically pure, with about 3 per cent of organic matter. The carbonite, however, often differs in several important respects from calcite, and is never aragonite, as Rose, Sorley, and others generally, following them, had believed from its superior hardness. This newly recognized form is very frequent in organic structures of various kinds, and also in deposits from certain springs, as at Carlsbad, and in boiler and kettle incrustations, when it is apt to contain traces of iron. It is not, however, universal in organic structures, some of them being calcite entirely and some containing both calcite and conchite in different parts of the same structure. Thus in *Mytilus* and *Pinna*, the outer layers of the shell are of calcite and the inner of conchite, and in *Teredo* the valves are of conchite and tube of calcite, etc.

A point of much geological interest is developed in the fact that conchite, being much less stable than calcite, is very rarely preserved in fossils; and that hence the question whether the shell remains or is represented only by a cast is determined by its composition as calcite in the former case or conchite in the latter.

PRODUCTION.

In the following table is given a statement of the production of precious stones in the United States from 1896 to 1900:

Value of product of precious stones in the United States from 1896 to 1900.

Stone.	1896.	1897.	1898.	1899.	1900.
Diamond	None.	None.	None.	$300	$150
Sapphire	$10,000	$25,000	$55,000	68,000	75,000
Ruby	1,000	None.	2,000	3,000	3,000
Topaz	200	None.	100	None.	None.
Beryl (aquamarine, etc.)	700	1,500	2,200	4,000	11,000
Emerald	None.	25	50	50	4,000
Phenacite	None.	None.	None.	None.	None.
Tourmaline	3,000	9,125	4,000	2,000	2,500
Peridot	500	500	500	500	500
Quartz, crystal	7,000	12,000	17,000	12,000	10,000
Smoky quartz	2,500	1,000	1,000	None.	1,000
Rose quartz	500	None.	100	100	100
Amethyst	500	200	250	250	500
Prase	100	None.	None.	None.	None.
Gold quartz	10,000	5,000	5,000	500	2,000
Rutilated quartz	500	None.	100	50	50
Dumortierite in quartz	50	None.	None.	None.	None.
Agate	1,000	1,000	1,000	1,000	1,000
Moss agate	1,000	1,000	1,000	1,000	1,000
Chrysoprase	600	None.	100	100	100
Silicified wood (silicified and opalized)	4,000	2,000	2,000	3,000	6,000
Opal	200	200	200	None.	None.
Garnet (almandite)	500	7,000	5,000	5,000	500
Rhodolite	None.	None.	None.	None.	20,000
Garnet (pyrope)	2,000	2,000	2,000	2,000	1,000
Topazolite	100	None.	None.	None.	None.
Amazon stone	1,000	500	500	250	250
Oligoclase	500	25	10	20	20
Moonstone	250	None.	None.	None.	None.
Turquoise	40,000	55,000	50,000	72,000	82,000
Utahlite (compact variscite)	500	100	100	100	100
Chlorastrolite	500	500	5,000	3,000	3,000
Mesolite (thomsonite, so called)	500	500	1,000	1,000	1,000
Prehnite	100	100	100	50	50
Diopside	200	100	None.	None.	None.
Epidote	250	None.	None.	None.	None.
Pyrite	1,000	1,000	1,000	1,000	2,000
Malachite	None.	None.	None.	250	200
Rutile	100	800	110	200	100
Anthracite	2,000	1,000	1,000	2,000	2,000
Catlinite (pipestone)	3,000	2,000	2,000	2,000	2,000
Fossil coral	1,000	500	500	50	50
Arrow points	1,000	1,000	1,000	1,000	1,000
Total	97,850	130,675	160,920	185,770	233,170

IMPORTS.

The following table shows the value of the diamonds and other precious stones imported into the United States from 1867 to 1900:

Value of diamonds and other precious stones imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	Diamonds.					Diamonds and other stones not set.	Set in gold or other metal.	Total.
	Glaziers'.	Dust.	Rough or uncut.	Set.	Unset.			
June 30—								
1867	$906					$1,317,420	$291	$1,318,617
1868	484					1,060,544	1,465	1,062,493
1869	445	$140				1,997,282	23	1,997,890
1870	9,372	71				1,768,324	1,504	1,779,271
1871	976	17				2,349,482	256	2,350,731
1872	2,386	89,707				2,939,155	2,400	3,033,648
1873		40,424	$176,426			2,917,216	326	3,134,392
1874		68,621	144,629			2,158,172	114	2,371,536
1875		32,518	211,920			3,234,319		3,478,757
1876		20,678	186,404			2,409,516	45	2,616,643
1877		45,264	78,033			2,110,215	1,734	2,235,246
1878		36,409	63,270			2,970,469	1,025	3,071,173
1879		18,889	104,158			3,841,335	538	3,964,920
1880		49,360	129,207			6,690,912	765	6,870,244
1881		51,409	233,596			8,320,315	1,307	8,606,627
1882		92,853	449,513			8,377,200	3,205	8,922,771
1883		82,628	443,996			7,598,176	*g* 2,801	8,126,881
1884	22,208	37,121	367,816			8,712,315		9,139,460
1885	11,526	30,426	371,679			5,628,916		6,042,547
Dec. 31—								
1886	8,949	32,316	302,822			7,915,660		8,259,747
1887	9,027	33,498	262,357			10,526,998		10,831,880
1888	10,025	29,127	244,876			10,223,630		10,507,658
1889	8,156	68,746	196,294			11,704,808		11,978,004
1890	147,227	179,154	340,915			*e* 12,429,395		13,105,691
1891	*a* 565,623	125,688	(*c*)			*f* 12,065,277		12,756,588
1892	532,246	144,487				*f* 13,845,118		14,521,851
1893	357,939	74,255				*f* 9,765,311		10,197,505
1894	82,081	53,691				*f* 7,291,342		7,427,214
1895	107,463	135,558				*f* 6,330,834		6,573,855
1896	78,990	65,690		(*d*)	(*d*)	*f* 4,474,311		4,618,991
1897	*b* 29,576	167,118	1,386,726	$330	$2,789,924	1,903,055		6,276,729
1898	8,058	240,665	2,513,800	6,622	5,743,026	1,650,770		10,162,941
1899	2,428	618,354	4,896,324	13,388	8,795,541	2,882,496		17,208,531
1900	8,333	605,495	3,658,645	10,721	7,803,066	1,472,328		13,561,588

a Including also engravers', not set, and jewels to be used in the manufacture of watches, from 1891 to 1894; from 1894 to 1896 miners' diamonds are also included.
b Including also miners' and engravers', not set.
c Included with diamonds and other stones from 1891 to 1896.
d Not specified prior to 1897.
e Includes stones set and not specially provided for since 1890
f Including rough or uncut diamonds.
g Not specified since 1883.

TALC AND SOAPSTONE.

By Joseph Hyde Pratt.

OCCURRENCE.

Talc is a very common mineral and in small quantity it is widely distributed. It is commonly formed by the alteration of other magnesian minerals, and thus it is an almost constant associate with the peridotite and pyroxenite rocks, with serpentine, with many of the chlorite or talcose schists, and with dolomite. Most of the commercial deposits of talc have been formed from the alteration of other minerals in place. Among the commoner minerals from which it has been derived are enstatite, tremolite, actinolite, and pyroxene. The distinctively fibrous varieties of talc are generally pseudomorph after enstatite. Enstatite rocks, which are found more or less abundantly in the peridotite belt of the southern Appalachian region, have been frequently altered into talcose rocks, some of which have formed extensive beds of soapstone which have been utilized in the construction of fireplaces, etc.

The large deposits of fibrous talc in St. Lawrence County, N. Y., have been shown to have resulted from the alteration of beds of enstatite and tremolite.[1] The beds of talc have the same strike and dip as the crystalline limestone in which they lie. Their walls consist of a tremolite or enstatite schist, which passes gradually over into the crystalline limestone. The large deposits of pure talc occurring in Swain and Cherokee counties, N. C., have been shown to have probably resulted from the alteration of original beds of tremolite,[2] and they also correspond in strike and dip with the marble and quartzite adjacent to them.

Talc in considerable variety is found in nearly every State along the Atlantic slope, the deposits of the best quality being in New York and North Carolina. It is, however, mined in New Hampshire, Vermont, Massachusetts, New Jersey, Pennsylvania, Maryland, Virginia, Georgia, and California. Most of the talc mined in these latter States is of the soapstone variety, and little of it is used in the manufacture of "flour talc."

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[1] C. H. Smythe, jr., On the genesis of the talc deposits of St. Lawrence County, N. Y.: School of Mines, Quart., Vol. XVII, No. 4.

[2] J. H. Pratt, Talc deposits of North Carolina: North Carolina Geol. Survey. Economic Paper No. 3.

NORTH CAROLINA.

ORIGIN OF THE TALC.

As is well known, there are many minerals which under favorable conditions yield talc as an alteration product. Of these the most common are pyroxenes, amphiboles, and certain of the micas. Tremolite is one of the amphiboles that commonly yield talc as an alteration product, and it is the author's opinion that the talc deposits of Cherokee and Swain counties are the result of the alteration of former deposits of tremolite.

There are a number of reasons which have led to these conclusions. In many of the marbles along the contact of the talc there are small branches of radiating crystals of tremolite, while in others there are similar crystals which are entirely altered to talc. Also at a number of places, as at the Maltby mine and on the property of the Cherokee Iron, Marble and Talc Company, talc has been found at the contact of the marble which had branching through it many crystals of tremolite. In examining the structure of the talc it is found to be decidedly fibrous, although this is not always apparent in the large masses. When these masses are crushed and examined with the magnifying glass in many cases they are seen to be made up of small fibers. Even the compact talc is observed to have more or less of a fibrous structure when crushed and examined with the higher power microscope. But very little of what could be called a foliated talc has been seen. Tremolite is the only mineral the writer found associated with the talc, except of course the calcite of the marble and the quartz of the quartzite. Except where tremolite has been observed in the talc, the latter is generally free from grit.

CHARACTER OF THE TALC.

There is a decided difference in the character of the talc east and west of the Red Marble Gap region. That to the east is more compact and of a bluish-white to white color, and a considerable portion of it is suitable for cutting into pencils; while that to the west is of a pale greenish-white to bluish-white color and more fibrous to foliated, although this characteristic is sometimes not distinct in the mass and but little of it is suitable for cutting into pencils. The fibrous structure, which at times is almost a bladed prismatic one, is sometimes quite marked, especially in the talc that is found penetrating the marble. When the talc is crushed and examined under the microscope or magnifying glass the fibrous structure is very pronounced.

Some of the talc found at the Kinsey and Hillyer mines, respectively 4 and 5 miles southwest of Murphy, is translucent to transparent, and is of the finest quality. All the talc, except when stained with iron and of dark bluish color, grinds to a white flour, which is free from grit.

A considerable quantity of the talc is unfit for grinding to a flour on account of its being very badly discolored by iron oxide or having a great many tremolite crystals penetrating it in all directions. This is observed more generally in the talc that is found in the valley of Valley River.

The following analyses of the talc have been made. No. 1 is from the Kinsey mine, representing the extreme western end of the formation; No. 2 is from the Hewitt mine, representing the eastern end; No. 3 is from the Maltby mine, near the middle of the formation.

Analyses of talc from Kinsey, Hewitt, and Maltby mines, North Carolina.

[Chas. Baskerville, Analyst.]

Constituent.	Kinsey mine (1).	Hewitt mine (2).	Maltby mine (3).	Theoretical composition of talc.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Water (loss on ignition), H_2O	4.36	5.10	6.14	4.76
Silica, SiO_2	63.07	61.35	56.80	63.49
Alumina, Al_2O_3	1.56	4.42	9.06	....
Ferrous oxide, FeO	.67	1.68	1.84	....
Lime, CaO	.30	.82	1.40	....
Magnesia, MgO	28.76	26.03	23.98	31.75
Soda, Na_2O	.79	.62	.72	....
Potash, K_2O	Trace.	Trace.	Trace.	....
Total	99.51	100.07	99.95	100.00

In the above analyses the samples taken were of the best quality from each locality, and, as is shown by analysis (1), that from the Kinsey mine approaches closely to a chemically pure talc.

Thus far no use has been made of the talc that is unsuitable for grinding to a flour, which at some of the mines amounts to a considerable percentage of the output, and it would be of great advantage if this waste material could be utilized. There are good reasons for believing that it can be used in the manufacture of fire brick, and experiments that have already been made indicate that this is practicable. The waste talc obtained east of Murphy could be used where produced, for there are beds of good clay for this purpose in the immediate vicinity.

METHODS OF MINING AND CLEANING.

The mining of the talc does not present any serious problems, as the deposits do not extend to any great depth. Those in the lowlands of the valley have to contend against water, which occasionally causes considerable loss of time. Most of the mines thus located have been worked by means of open pits, which during a period of rain have to be abandoned, owing to flooding. While some of these deposits, especially those on the hillsides, can be worked to advantage by an open pit, the majority of them can best be worked by shafts and tunnels, leaving one shaft as a pumping shaft and draining all the water from the others and the tunnels to this one. By using a series of tunnels one above the other the mine is kept as dry as it is practically possible.

At the Hewitt and Kinsey mines, from the nature of their location, the work has been successfully done by open cuts and tunnels. Little blasting is necessary at any of the mines, as the width of the deposit is usually sufficient for open cuts or tunnels without interfering to any great extent with the harder wall rocks.

As the rough blocks of talc are taken from the mine they are hand-cobbed, if necessary, and sorted into three grades. The larger pieces are cleaned by rubbing them with steel brushes and the smaller ones by an ordinary founder's scouring machine. They are then dried by being spread over a floor of steam pipes, which are kept at a temperature of about 212° F. When dry, the pieces are crushed and ground and the foreign material removed by screening. It is then further ground and passed through bolting cloth, making the final product of nearly uniform grain. In grinding or pulverizing the talc a buhrstone mill is used, as in grinding wheat. The ground product is handled very much like flour, and in filling the bags with the flour talc an ordinary flour packer is used.

PRODUCTION.

The production of talc in the United States, exclusive of the fibrous talc that is obtained from New York, was 27,943 short tons in 1900.

The values generally reported to the Survey are of the talc after it has been prepared for market, so that no statistics can be given of the value of the crude talc. The talc is classified according to the manner in which it is marketed as rough talc, sawed into slabs, manufactured articles, and ground talc. The amount sawed into slabs is steadily increasing. The production of ground talc will probably be considerably increased during 1901 by that obtained from the North Carolina mines, which will also probably increase the value of the total production of "flour talc," as it makes the finest quality. In the manufactured articles there is always each year a considerable variation in the value of the production, due, undoubtedly, to the character of the articles made.

In the following table the production of talc and soapstone and the value in the condition in which it was sold is given for the years 1893 to 1900:

Production of talc and soapstone from 1893 to 1900.

Condition in which marketed.	1893.		1894.		1895.		1896.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Rough	5,760	$51,600	5,620	$50,780	1,041	$8,886	1,550	$13,375
Sawed into slabs	104	4,400	1,303	19,500	863	12,320	923	15,481
Manufactured articles *a*	7,070	123,600	6,425	244,000	10,789	170,791	10,133	232,261
Ground *b*	8,137	75,467	9,796	87,045	8,802	74,498	9,577	92,984
Total *c*	21,071	255,067	23,144	401,325	21,495	266,495	22,183	354,065

Condition in which marketed.	1897.		1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Rough	1,020	$12,535	1,380	$16,453	1,540	$18,800	3,086	$32,458
Sawed into slabs	1,107	21,726	1,305	13,240	1,499	12,392	1,065	19,520
Manufactured articles *a*	12,095	267,583	11,336	191,923	12,377	*d* 229,310	10,551	174,270
Ground *b*	7,701	63,785	8,210	65,496	9,349	70,303	13,241	157,293
Total *c*	21,923	365,629	22,231	287,112	24,765	330,805	27,943	383,541

a Includes bath and laundry tubs; fire brick for stoves, heaters, etc.; hearthstones, mantels, sinks, griddles, slate pencils, and numerous other articles of everyday use.
b For foundry facings, paper making, lubricators, dressing skins and leather, etc.
c Exclusive of the amount used for pigment, which is included among mineral paints.
d Includes manufactured materials to the value of $40,275, for which no quantities were given.

The production by States since 1898 is as follows:

Production of talc and soapstone in 1898, 1899, and 1900, by States.

State.	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Georgia	639	$4,054	1,062	*a* $42,085	6,477	$77,213
North Carolina	1,695	27,320	1,817	31,880	4,522	75,308
Pennsylvania	3,778	25,436	5,012	32,872	....	....
Virginia	10,059	119,480	10,886	107,062	9,806	116,930
Other States *b*	6,060	110,822	5,988	*c* 116,906	7,138	114,090
Total	22,231	287,112	24,765	330,805	27,943	383,541

a Includes manufactured articles to the value of $36,000, for which no quantities were given.
b California, Maryland, Massachusetts, New Hampshire, and New Jersey; also Pennsylvania in 1900.
c Includes $40,275 value, for which no quantity was reported.

The total amount and value of talc and soapstone produced in the United States since 1880, exclusive of that used as a mineral pigment and the fibrous talc from New York, is given in the following table:

Annual product of talc and soapstone since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	8,441	$66,665	1891	16,514	$243,981
1881	7,000	75,000	1892	23,208	423,449
1882	6,000	90,000	1893	21,071	255,067
1883	8,000	150,000	1894	23,144	401,325
1884	10,000	200,000	1895	21,495	266,495
1885	10,000	200,000	1896	22,183	354,065
1886	12,000	225,000	1897	21,923	365,629
1887	12,000	225,000	1898	22,231	287,112
1888	15,000	250,000	1899	24,765	330,805
1889	12,715	231,708	1900	27,943	383,541
1890	13,670	252,309			

PRODUCTION OF FIBROUS TALC IN NEW YORK.

As the amonnt of talc produced in St. Lawrence County, N. Y., is more than double that produced in all the other States together, and as it is used for one particular purpose in paper making (due to its fibrous character), its production is taken up separately. In 1900 the production was 63,500 tons, valued at $499,500.

The production of fibrous talc in the United States since 1895 is shown in the table below.

Disposition of fibrous talc produced since 1895.

Uses.	1895.		1896.		1897.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Sold crude	....	....	1,363	$2,726	9,800	$21,500
Paper filling	39,021	$369,007				
Paint	48	552	44,726	396,717	47,209	375,436
Wall plasters	171	1,338				
Total	39,240	370,897	46,089	399,443	57,009	396,936

Uses.	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
Sold crude	500	$1,250	500	$1,250	....	....
Paper filling						
Paint	53,856	410,180	54,155	436,900	63,500	$499,500
Wall plasters						
Total	54,356	411,430	54,655	438,150	63,500	499,500

The increase in the use of fibrous talc in the paper industry is well illustrated in the following table, which shows the production of this variety of talc since 1880. Practically all of this product is used for the one purpose of paper filling.

Production of fibrous talc since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	4,210	$54,730	1891	53,054	$493,068
1881	5,000	60,000	1892	41,925	472,485
1882	6,000	75,000	1893	35,861	403,436
1883	6,000	75,000	1894	39,906	435,060
1884	10,000	110,000	1895	39,240	370,897
1885	10,000	110,000	1896	46,089	499,443
1886	12,000	125,000	1897	57,009	396,936
1887	15,000	160,000	1898	54,356	411,430
1888	20,000	210,000	1899	54,655	438,150
1889	23,746	244,170	1900	63,500	499,500
1890	41,354	389,196			

IMPORTS.

At the present time but little talc is being imported into the United States. From 1880 to 1889 the imports were fairly regular, but since 1889 they have been very irregular, owing, undoubtedly, to the development of good deposits of this mineral in this country. This variation in the amount of talc imported is shown in the following table, which gives the value of the talc imported from 1880 to 1887 and the quantity and value of that imported from 1888 to 1900:

Talc imported into the United States from 1880 to 1900, inclusive.

Year.	Quantity. (a)	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	....	$22,807	1891	81	$1,121
1881	....	7,331	1892	531	5,546
1882	....	25,641	1893	1,360	12,825
1883	....	14,607	1894	622	6,815
1884	....	41,165	1895	3,165	26,843
1885	....	24,356	1896	1,966	18,693
1886	....	24,514	1897	796	8,423
1887	....	49,250	1898	761	9,338
1888	24,165	22,446	1899	254	3,544
1889	19,229	30,993	1900	79	1,070
1890	1,044	1,560			

a Quantity not reported previous to 1888.

CANADIAN PRODUCTION.

In the following table is shown the output of soapstone in Canada for a period of fourteen years. It will be observed that the values are usually much less than those given for the United States product, and the fluctuations in value are even more pronounced than in this country. In 1886 and 1887 the product was valued at $8 per ton. The output in both years was small. In 1888, with an increase of only 40 tons in product, the value fell to $2 per ton. In 1889 the output increased 55 tons, and the price went up to $6 per ton. In 1890 the output increased to 917 tons, nearly five times the amount obtained in 1889, but the value increased only $69, the price per ton declining to $1.35. No output was reported in 1891. In 1892 the product was 50 per cent more than in 1890, the value increasing five times, or to $4.54 per ton. In 1893, with a decrease of nearly 50 per cent in the product, there was a decline to $2.68 per ton. The price declined again in 1894 to $1.78 per ton, and in 1895 advanced to $4.50 per ton, the output of 475 tons being valued at $2,138. In 1896 the production fell off 65 tons to 410 tons, while the price declined to $3 per ton, and dropped to 157 tons in 1897, and the price declined to $2.27. No output has been reported for 1898, but in 1899 a product of 450 tons was obtained, while 420 tons valued at $1,365 were mined in 1900.

These figures are obtained from the annual report of the Canadian Geological Survey:

Production of soapstone in Canada from 1886 to 1900.

Year.	Short tons.	Value.	Year.	Short tons.	Value.
1886	50	$400	1894	916	$1,640
1887	100	800	1895	475	2,138
1888	140	280	1896	410	1,230
1889	195	1,170	1897	157	350
1890	917	1,239	1898	None.	....
1891	None.	....	1899	450	1,960
1892	1,374	6,240	1900	420	1,365
1893	717	1,920			

ABRASIVE MATERIALS.

By Joseph Hyde Pratt.

INTRODUCTION.

Under the subject of abrasive materials are included all the natural products that are used for abrasive purposes. They are treated under the following heads: Oilstones and whetstones, grindstones, pulpstones, buhrstones or millstones, infusorial earth and tripoli, pumice-stone, crystalline quartz, garnet, and corundum and emery. Besides these natural products, the artificial products, carborundum and crushed steel, are briefly considered.

It will be seen in examining the following pages, that while the production of certain of the abrasives is on the decline, that of others is increasing, and that the aggregate amount of abrasive materials used is greater than ever before. This, of course, is the natural outcome of the increase in our manufacturing industries. There could readily be an overproduction of most of the abrasives, as the market is a decidedly limited one; but there will be an increasing demand for them from year to year, although new natural or artificial products may now and then be discovered that will replace those now in use. Thus carborundum has replaced other abrasives that were formerly used in certain cases before it was manufactured. It can not now be stated to what extent the natural abrasives will be replaced by the artificial, and no appreciable change may be observed for some years to come. The more noticeable change is and will be among the natural abrasives themselves.

The total value of all the natural abrasives produced in the United States during 1900 was $1,207,073, as compared with $1,225,211 for 1899.

In the following table is given a list of the values of the production of each of the different abrasives in the United States for the years 1899 and 1900:

Summary of value of product of abrasives in the United States during 1899 and 1900.

Kind of abrasive.	Value.		Kind of abrasive.	Value.	
	1899.	1900.		1899.	1900.
Oilstones, whetstones, etc.	$208,283	$174,087	Corundum and emery	$150,600	$102,715
Grindstones	675,586	710,026	Total	1,225,211	1,207,073
Buhrstones	28,115	32,858	Artificial abrasives:		
Infusorial earth	25,302	*a* 24,207	Carborundum	139,299	(*b*)
Crystalline quartz	39,000	40,705	Crushed steel	47,250	50,000
Garnet	98,325	123,475			

a Includes tripoli.
b Quantity, 2,401,000 pounds; value not given.

OILSTONES, WHETSTONES, ETC.

PRODUCTION.

The production of oilstones and whetstones in the United States has been constantly increasing during the last few years, due partly to the hold that American stones have obtained in foreign markets. The year of maximum production was 1899, when the value of the output amounted to $208,283.

Value of oilstones, whetstones, etc., produced in the United States since 1891.

Year.	Value.	Year.	Value.
1891	$150,000	1896	$127,098
1892	146,730	1897	149,970
1893	135,173	1898	180,486
1894	136,873	1899	208,283
1895	155,881	1900	174,087

IMPORTS.

The oilstones and whetstones that are imported into the United States differ materially from those that are exported, and consist principally of Belgian razor hones, that are made from a slaty mica-schist, found in the Ardenne Mountains of Belgium; razor hones made from a fine hard blue-green slaty mica-schist from Sonneberg, Germany, and a small quantity of Turkey oilstones from France and Italy.

The following table shows the total value of all kinds of hones, whetstones, etc., imported since 1880:

Value of imports of hones and whetstones since 1880.

Year ending—	Value.	Year ending—	Value.
June 30—		December 31—	
1880	$14,185	1890	$37,454
1881	16,631	1891	35,344
1882	27,882	1892	33,420
1883	30,178	1893	25,301
1884	26,513	1894	26,671
1885	21,434	1895	32,439
December 31—		1896	50,588
1886	21,141	1897	34,485
1887	24,093	1898	30,856
1888	30,676	1899	34,510
1889	27,400	1900	39,306

The exports of oilstones, scythestones, etc., are much in excess of the imports, and consist principally of New Hampshire scythestones, which are shipped into nearly all foreign countries, but find their largest market in European countries. There is also a considerable exportation of Arkansas and Indiana oilstones. Thus it is seen that our imports consist for the most part of razor hones and our exports of oilstones and scythestones.

GRINDSTONES.

PULPSTONES.

Since paper began to be manufactured from woodpulp there has been a demand for a stone suited to the grinding of wood to a pulp. The main supply of pulpstones has been imported from Newcastle-upon-Tyne, England. This stone has always been considered of better quality for this kind of grinding than any of the American stones. The grinding of pulp requires a stone that can be run in hot water, which is used in its manufacture. By careful attention to the selection of the grit and the details of quarrying and manufacturing, a good pulpstone should be produced from the Peninsula and Tippecanoe grits of the Ohio sandstones. The Cleveland Stone Company is making a special effort to produce a pulpstone from a particular grit at Peninsula, Ohio, that will thoroughly satisfy the pulp manufacturers. The Haldeman Stone Company, which opened a new quarry at Tippecanoe, Ohio, in the latter part of 1898, has found a grit (the Tippecanoe) that is well adapted to the manufacture of pulpstones, and it is claimed that 20 to 25 feet of the upper portion of the sandstone can be used in this manufacture.

Pulpstones differ from grindstones in having a much broader face (being much thicker). The stones are usually from 48 to 56 inches in diameter and 16 to 26 inches in thickness, weighing from 2,300 to 4,800 pounds.

The production of pulpstones in 1900 was 553 tons, valued at $12,495, as compared with 288 tons, valued at $8,712, produced in 1899, and 296 tons, valued at $10,619, in 1898. While there has been a large increase in the tonnage of pulpstones produced in 1900, the value has decreased from $36 in 1898 to $30 in 1899 and to $26 per ton in 1900. This increase in the production during 1900 is due to the more thorough introduction of the Peninsula and Tippecanoe stones in the trade. The outlook for 1901 is for a greater production even than that for 1900.

PRODUCTION.

The high-water mark in the grindstone industry was reached in 1900, when the value of the product amounted to $710,026. This was nearly equaled in 1882, when it was $700,000. The output in 1900 showed an increase of $34,440 over that of 1899, when it amounted to $675,586. This in turn was an increase of $185,817 over that of 1898. Although the value of the production in 1882 was so high, the tonnage was considerably larger both in 1900 and 1899, for in 1882 the price was $15 per ton at the quarry, while in the latter year it had declined to almost $9 per ton. This marked increase in the production of grindstones during the last two years is probably due to the great increase in all kinds of manufacturing.

In making their reports of production to the Survey some manufacturers use the ton as the unit of measurement, while others state the number of grindstones made and sold, and it was not until 1898 that any separation of quantity was attempted. In 1900 the manufacturers who stated the number of grindstones sold reported a product aggregating 6,085 pieces, valued at $81,722, as compared with 6,300 pieces, valued at $69,776, in 1899. The product reported by weight amounted to 46,406 tons, valued at $619,399, in 1900, against 50,644 tons, valued at $605,810, in 1899.

In the following table is shown the value of grindstones, including pulpstones, produced in the United States since 1880:

Value of grindstones produced in the United States since 1880.

Year.	Value.	Year.	Value.
1880	$500,000	1891	$476,113
1881	500,000	1892	272,244
1882	700,000	1893	338,787
1883	600,000	1894	223,214
1884	570,000	1895	205,768
1885	500,000	1896	326,826
1886	250,000	1897	368,058
1887	224,400	1898	489,769
1888	281,800	1899	675,586
1889	439,587	1900	710,026
1890	450,000		

The decided increase in the production of grindstones is partly due to the large number of agricultural machines manufactured, which call for a corresponding increase in the number of grindstones, and which has caused a less demand for scythestones.

IMPORTS.

The ratio of the imports of grindstones to the domestic production had been decreasing materially during the last few years prior to 1900, but in that year the imports gained considerably more, proportionately, than the product. The imports are kept up largely by the demand of the large pulp manufacturers for the Newcastle pulpstones, which are obtained from Newcastle-upon-Tyne, in England. Other imported grindstones are a coarse, hard one from Bavaria, which is used for razor grinding, and a very hard one from Edinburgh, Scotland, called the Craigleigh, that is used for special purposes in the glass trade. In reporting the imports of grindstones the Bureau of

Statistics of the Treasury Department limits the statements to the value, no figures relating to the quantity having been published since 1883.

The amount and value of the grindstones imported into the United States since 1868 are given below:

Grindstones imported and entered for consumption in the United States, 1868 to 1900, inclusive.

Year ending—	Finished.		Unfinished or rough.		Total value.
	Quantity.	Value.	Quantity.	Value.	
June 30—	*Long tons.*		*Long tons.*		
1868		$25,640		$35,215	$60,855
1869		15,878		99,715	115,593
1870		29,161		96,444	125,605
1871	385	43,781	3,957.15	60,935	104,716
1872	1,202	13,453	10,774.80	100,494	113,947
1873	1,437	17,033	8,376.84	94,900	111,933
1874	1,443	18,485	7,721.44	87,525	106,010
1875	1,373	17,642	7,656.17	90,172	107,814
1876	1,681	20,262	6,079.34	69,927	90,189
1877	1,245	18,546	4,979.75	58,575	77,121
1878	1,463	21,688	3,669.41	46,441	68,129
1879	1,603	24,904	4,584.16	52,343	77,247
1880	1,573	24,375	4,578.59	51,899	76,274
1881	2,064	30,288	5,044.71	56,840	87,128
1882	1,705	30,286	5,945.61	66,939	97,225
1883	1,755	28,055	6,945.63	77,797	105,852
1884					*a* 86,286
1885					50,579
December 31—					
1886					39,149
1887					50,312
1888					51,755
1889					57,720
1890					45,115
1891					21,028
1892					61,052
1893					59,569
1894					52,688
1895					54,276
1896					66,195
1897					49,496
1898					62,973
1899					63,852
1900					92,581

a Since 1884 classed as finished or unfinished.

Grindstones have begun to be exported in considerable numbers, so that now the total of the exports is greater than that of the imports.

BUHRSTONES, OR MILLSTONES.

Many varieties of stone are classed as buhrstone, or millstone, on account of their being used for the same purposes as the regular buhr. The American stone varies from a sandstone to a quartz-conglomerate rock, which occurs along the eastern slopes of the Appalachian Mountains from New York to North Carolina. It is known locally by different names, that from Ulster County, N. Y., being called "Esopus stone," that from Lancaster County, Pa., being known as "cocalico stone," and that from Montgomery County, Va., going by the name of "Brush Mountain stone." These are the only places where it was quarried during 1900. It was formerly obtained from Moore County, N. C., and was known by the name of "North Carolina grit." A buhrstone, or millstone, was also formerly obtained from the Berea grit (sandstone) at Peninsula, Ohio. In the isolated mountain districts, especially of the Southern States, there are a great variety of stones used as buhrstones, for any solid quartz rock will answer the purpose to a certain extent. The owners of many of these small mills, who grind wheat and corn for the neighboring mountaineers, quarry the stone in their vicinity and work it up themselves. Since scrap mica became of value as a ground or flour product a number of mills have been erected in the mica regions that use buhrstones for grinding the mica, some of which are quarried locally.

The buhrstones imported from France, Belgium, and Germany are of a decidedly different character and better than the American stone. The French buhr is considered the best, and both it and the Belgian are hard and porous rocks, consisting of small particles of quartz mixed with calcareous material. The German buhr is said to be a basaltic lava. These foreign stones are usually brought into this country in pieces and then made up into the buhrstone, thus escaping the higher duty of a finished product.

The use of buhrstones for making wheat flour has practically ceased since the introduction of the roller process. It is only in certain of the mountain districts where railroad facilities are wanting that buhrstones are still used for this purpose. They are now used for grinding the coarser cereals, mineral-paint ores, fertilizers, cement rock, and other minerals, but this is a comparatively limited trade. For these latter uses the American stones seem to be as satisfactory as the foreign.

PRODUCTION.

What was a flourishing industry twenty years ago is now hardly worthy of that name. Where in 1880 there were $200,000 worth of buhrstones produced in the United States and $125,072 worth imported, in 1900 the value of the buhrstones produced was only $32,858 and of those imported only $28,904. The sharp decline or break in the production was in 1889, and for the past eleven years the average production has been about $22,500. The importation of buhrstones began to decline sharply in 1883, and there has been a gradual falling off since then.

The reasons for this general decline were natural and have already been referred to. In 1899 there was an increase in the production over that of 1898, and a still further increase in 1900, the production being valued at $32,858, as compared with $28,115 in 1899 and $25,934 in 1898.

The production since 1880 is given in the following table:

Value of buhrstones produced in the United States from 1880 to 1900.

Year.	Value.	Year.	Value.
1880	$200,000	1891	$16,587
1881	150,000	1892	23,417
1882	200,000	1893	16,639
1883	150,000	1894	13,887
1884	150,000	1895	22,542
1885	100,000	1896	22,567
1886	140,000	1897	25,932
1887	100,000	1898	25,934
1888	81,000	1899	28,115
1889	35,155	1900	32,858
1890	23,720		

IMPORTS.

The importation of buhrstones and millstones has continued to grow smaller, not only on account of the introduction of the roller process for making wheat flour, but because the buhrstones produced in this country are as satisfactory as the foreign ones for the purposes for which these stones are now used.

In the following table the value of buhrstones and millstones imported into the United States since 1868 is given:

Value of buhrstones and millstones imported into the United States from 1868 to 1900.

Year ending—	Rough.	Made into millstones.	Total.	Year ending—	Rough.	Made into millstones.	Total.
June 30—				June 30—			
1868	$74,224		$74,224	1885	$35,022	$455	$35,477
1869	57,942	$2,419	60,361	December 31—			
1870	58,601	2,297	60,898	1886	29,273	662	29,935
1871	35,406	3,698	39,104	1887	23,816	191	24,007
1872	69,062	5,967	75,029	1888	36,523	705	37,228
1873	60,463	8,115	68,578	1889	40,432	452	40,884
1874	36,540	43,170	79,710	1890	32,892	1,103	33,995
1875	48,068	66,991	115,059	1891	23,997	42	24,039
1876	37,759	46,328	84,087	1892	33,657	529	34,186
1877	60,857	23,068	83,925	1893	29,532	729	30,261
1878	87,679	1,928	89,607	1894			*a* 18,087
1879	101,484	5,088	106,572	1895			20,316
1880	120,441	4,631	125,072	1896			26,965
1881	100,417	3,495	103,912	1897			22,956
1882	103,287	747	104,034	1898			22,974
1883	73,413	272	73,685	1899			18,881
1884	45,837	263	46,100	1900			28,904

a Not separately classified after 1893.

INFUSORIAL EARTH.

Under this head are included all porous siliceous earths of organic origin, such as infusorial earth, diatomaceous earth, and tripoli. These are formed from the siliceous shells of diatoms and other microscopic species and occur in deposits that are often many miles in area. Deposits of these earths occur in many of the States on the eastern slopes of the Apalachian Mountains and in two of the States of the Pacific slope, Nevada and California. Besides these two States, infusorial earth has been mined in Connecticut, New Hampshire, New Jersey, Maryland, Virginia, Georgia, and Alabama. The last-named State has produced only a few tons, obtained in development work. There is also included here the porous siliceous rock occurring near Carthage, Newton County, Mo., which is classified by the owners as "tripoli." This is an erroneous name, as it is not of the same origin as the infusorial earths, but is evidently residual silica left from an impure siliceous limestone by the leaching out of the calcium carbonate. It does, however, answer all the purposes of infusorial earth or tripoli so far as polishing qualities are concerned. On account of its exceeding porosity and yet compact nature, it makes an excellent material for water filters, and it can readily be cut into any desired shape. It crushes readily to a fine powder and makes a good basis for a variety of polishing powders. These earths are included with the abrasives because they are used to a certain extent in the manufacture of polishing powders and scouring soaps, although this is not their only use. Owing to its porous nature, infusorial earth has been found to make an excellent absorbent for the manufacture of dynamite from nitroglycerine, and its nonconductivity of heat gives it a value for packing for boilers, steam pipes, and safes, and this latter is its principal use.

PRODUCTION.

The quantity and value of infusorial earth produced in the United States vary greatly from year to year. This irregularity is due partly to the varying demand for this material, other minerals being substituted for it in some of its uses, and partly to a production of the raw product that will last a year or more. The variation given in the values of the production is chiefly owing to the different conditions of the product as it is marketed. The production in 1900 amounted to 3,615 tons, valued at $24,207, as compared with 3,302 tons in 1899, valued at $25,302. The increase in tonnage is partly due to some of the producers reporting the amount of material mined instead of the commercial product, and this is also the reason for the apparent decrease in value.

The quantity and value of infusorial earth obtained for the years since 1880 are shown in the following table:

Production of infusorial earth from 1880 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	1,833	$45,660	1891		$21,988
1881	1,000	10,000	1892		43,655
1882	1,000	8,000	1893		22,582
1883	1,000	5,000	1894	2,584	11,718
1884	1,000	5,000	1895	4,954	20,514
1885	1,000	5,000	1896	3,846	26,792
1886	1,200	6,000	1897	3,833	22,385
1887	3,000	15,000	1898	2,733	16,691
1888	1,500	7,500	1899	3,302	25,302
1889	3,466	23,372	1900	3,615	24,207
1890	2,532	50,240			

PUMICE.

Pumice is a general name given to the loose, spongy, cellular, or frothlike parts of lava. This peculiar structure is undoubtedly due to the abundant escape of steam or gas through its mass while in a state of fusion. It is among the acid lavas that the most perfect forms of pumice are found, although some of the basic kinds sometimes assume a similar structure. Pumice is buoyant and floats readily on water, owing to its extreme porous nature. When examined under the microscope, an acid pumice stone is observed to be made up of a groundmass of glass, crowded with an extremely large number of minute cavities that are elongated in the direction of the flow of the lava, and with abundant crystallites. The solid pumice stone that is found comes under this head.

Pumice, as it is known commercially, is also made from another volcanic product called volcanic ash. This includes the finer detritus that is ejected in many eruptions and is often deposited at considerable distances. It is an exceedingly fine, light-gray powder, resembling an ash, but when examined under the microscope it is seen to consist partly of minute rough, rounded, angular, or flaky grains of a glassy nature and partly of minute crystallites, and is in reality merely a lava in extremely fine subdivision. When these have had an opportunity to accumulate, they have sometimes become consolidated into rock formations. Where they have been deposited in the sea or lakes they are liable to have their outer margin pass insensibly into ordinary sediments.

The following analyses will give an idea of the chemical composition of pumice:

Analyses of pumice from Utah and Nebraska.

Constituent.	1. Millard County, Utah.	2. Nebraska.
	Per ct.	*Per ct.*
Silica, SiO_2	72.58	71.97
Alumina, Al_2O_3	15.66	14.86
Ferric oxide, Fe_2O_3	.96	.88
Lime, CaO	.73	.77
Soda and potash, Na_2O and K_2O	8.28	8.28
Loss on ignition	3.64	3.64

Both the solid pumice stone and the volcanic ash are mined as a source of commercial pumice. Where necessary, it is crushed and bolted and is used in the manufacture of various polishing powders and scouring stones.

Almost the entire demand for pumice has been supplied from Lapari, a small island just north of the island of Sicily, in the Tyrrhenian Sea, about 80 per cent of that used in the United States being shipped directly here from the island.

During the summer of 1897 several extensive deposits of pumice were discovered in Nebraska, in the Tertiary deposits, the most extensive exposure being in Sioux, Dawes, Scotts Bluff, Banner, and Cheyenne counties. Another deposit was discovered in South Dakota about 3 miles east of Pine Ridge Agency. The volcanic ash of which these deposits are composed was probably brought by the winds from volcanoes in Colorado and New Mexico, and deposited in the lakes and other water courses which at that time covered this region. A deposit of lump pumice stone was found in Millard County, Utah, and is the only known deposit of lump pumice stone in the United States. These deposits have been described in detail in the Nineteenth Annual Report of the Geological Survey, Part VI, page 529. A large deposit of pumice is reported to occur in Sonoma County, Cal.

On account of the distance of these deposits from the railroad and from the large markets, they have not been able to compete with the pumice imported from Lapari, which is shipped largely as ballast and which sells in New York, after being ground and bolted, at from 2 to 2½ cents per pound. For this reason the production of pumice in the United States, which was inaugurated in 1897 by the shipment of 158 tons, and of over 600 tons in 1898, has practically ceased.

Pumice has been found in sufficient quantity in Hawaii to more than furnish the demand of this country, if it can compete with that from Lapari.

The amount of pumice imported into the United States can not be even approximately given, as no record of this is kept by the Bureau of Statistics of the Treasury Department, only the value of the pumice imported being recorded. Since 1893, with the exception of 1896, the value of the imports has varied between $43,788 and $65,930. In 1896, however, no imports at all were reported.

CRYSTALLINE QUARTZ.

The entire production of crystalline quartz, which is used for wood finishing, is credited to Connecticut. The quartz rock, which must be very pure and white, is crushed and ground to an impalpable powder. It is then floated, precipitated, dried, and bolted. This flour quartz is then combined with the proper proportions of japans, oils, etc., to make a paste. When used, the paste is reduced with turpentine or benzine, so that it will flow freely under the brush, and is then painted on the smooth, fresh surface of the wood. After being left until it becomes "set up," which takes from a few minutes to half an hour, it is wiped off the surface, but leaves the pores of the wood filled with the minute particles of quartz which have been carried by the oil into them. Wood treated in this way will take a high polish.

A limited amount of quartz is crushed and sized and used in the manufacture of sandpaper.

PRODUCTION.

The production of crystaline quartz in 1900 was 12,461 tons, valued at $36,205, as compared with 13,600 tons, valued at $39,000, in 1899.

The values given are for the crude quartz, and not as prepared for market, when its value is about three and one-half times as much. In the following table the quantity and value of crystaline quartz produced in the United States since 1894, the first year it was obtained, are given:

Production of quartz crystal since 1894.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1894	6,024	$18,054	1898	8,312	$23,990
1895	9,000	27,000	1899	13,600	39,000
1896	6,000	18,000	1900	14,461	40,705
1897	7,500	22,500			

GARNET.

PRODUCTION.

The statistics of the production of garnet in the United States have only been taken since 1894, and there has been considerable variation in both the production and the value. On account of the variation of quality of the garnet from the different localitles, the price varies from $25 to $60 per ton at the mines. The higher price has been obtained for the North Carolina garnet. Until this year the North Carolina garnet has not been included in these statistics, and this is one reason for the increase in production and value of garnet during 1900 over 1899. The production for 1900, as reported to the Survey, is 3,185 tons, valued at $123,475, as compared with 2,765 tons, valued at $98,325, in 1899. For the last seven years the production has been as given in the following table:

Production of abrasive garnet since 1894.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1894	2,401	$90,660	1898	2,967	$86,850
1895	3,325	95,050	1899	2,765	98,325
1896	2,686	68,877	1900	3,185	123,475
1897	2,554	80,853			

CORUNDUM AND EMERY.

PRODUCTION.

All the corundum that has been produced during the last year has been in North Carolina, and was obtained from one mine, the Corundum Hill, at Cullasaja, Macon County. The output was small as compared with the possibilities and extent of this deposit of corundum. There is good reason to believe that the production of corundum in 1901 will be considerably more than that in 1900, due to the organization of new companies which intend to work the deposits on a more extensive scale, and to the development and working of new deposits. Emery has been produced from the same localities as last year, and there was an increased production from the Peekskill mines, which in 1900 amounted to about 40 per cent of the total production. Thus it is seen that all the corundum and emery produced during 1900 was from the old well-known localities.

In the table below the statistics of the production of emery and corundum are given for the last twenty years, but in each case it is the total amount of the two that is given.

Annual production of corundum and emery since 1881.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1881	500	$80,000	1891	2,247	$90,230
1882	500	80,000	1892	1,771	181,300
1883	550	100,000	1893	1,713	142,325
1884	600	108,000	1894	1,495	95,936
1885	600	108,000	1895	2,102	106,256
1886	645	116,190	1896	2,120	113,246
1887	600	108,000	1897	2,165	106,574
1888	589	91,620	1898	4,064	275,064
1889	2,245	105,567	1899	4,900	150,600
1890	1,970	89,395	1900	4,305	102,715

IMPORTS.

Most of the corundum used in the United States is of domestic production; but there is a corundum imported from India, that is used to a limited extent in the manufacture of oilstones. Of emery, however, there is more imported than is produced, and it is obtained from Turkey and the island of Naxos, one of the Cyclades group in the Grecian Archipelago.

The imports of emery from 1867 to 1900 are given in the following table:

Emery imported into the United States from 1867 to 1900, inclusive.

Year ending—	Grains.		Ore or rock.		Pulverized or ground.		Other manufactures.	Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.	
June 30—	*Pounds.*		*Long tons.*		*Pounds.*			
1867	....	....	428	$14,373	924,431	$38,131	....	$52,504
1868	....	....	85	4,531	834,286	33,549	....	38,080
1869	....	....	964	35,205	924,161	42,711	....	77,916
1870	....	....	742	25,335	644,080	29,531	....	54,866
1871	....	....	615	15,870	613,624	28,941	....	44,811
1872	....	....	1,641	41,321	804,977	36,103	....	77,424
1873	610,117	$29,706	755	26,065	343,828	15,041	$107	70,919
1874	331,580	16,216	1,281	43,886	69,890	2,167	97	62,366
1875	487,725	23,345	961	31,972	85,853	2,990	20	58,327
1876	385,246	18,999	1,395	40,027	77,382	2,533	94	61,653
1877	343,697	16,615	852	21,964	96,351	3,603	....	42,182
1878	334,291	16,359	1,475	38,454	65,068	1,754	34	56,601
1879	496,633	24,456	2,478	58,065	133,556	4,985	....	87,506
1880	411,340	20,066	3,400	76,481	223,855	9,202	145	105,894
1881	454,790	22,101	2,884	67,781	177,174	7,497	53	97,432
1882	520,214	25,314	2,765	69,432	117,008	3,708	241	98,695
1883	474,105	22,767	2,447	59,282	93,010	3,172	269	85,490
1884	143,267	5,802	4,145	121,719	513,161	21,181	188	148,890
1885	228,329	9,886	2,445	55,368	194,314	8,789	757	74,800

Emery imported into the United States from 1867 to 1900, inclusive—Continued.

Year ending—	Grains.		Ore or rock.		Pulverized or ground.		Other manufactures.	Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.	
December 31—	*Pounds.*		*Long tons.*		*Pounds.*			
1886	161,297	$6,910	3,782	$88,925	365,947	$24,952	$851	$121,638
1887	367,239	14,290	2,078	45,033	*a* 144,380	6,796	2,090	68,209
1888	430,397	16,216	5,175	93,287			8,743	118,246
1889	503,347	18,937	5,234	88,727			111,302	218,966
1890	534,968	20,382	3,867	97,939			5,046	123,367
1891	90,658	3,729	2,530	67,573				71,302
1892	566,448	22,586	5,280	95,625			2,412	120,623
1893	516,953	20,073	5,066	103,875			3,819	127,767
1894	597,713	18,645	2,804	51,487			1,841	71,973
1895	678,761	25,066	6,803	80,386			27,586	133,038
1896	755,693	28,493	6,389	119,738				148,231
1897	539,176	20,865	5,213	107,655			2,211	130,531
1898	577,655	23,320	5,547	106,269			3,810	133,399
1899	728,299	29,124	7,435	116,493			11,514	157,131
1900	661,482	26,520	11,392	202,980			10,006	239,506

a To June 30 only; since classed with grains.

CARBORUNDUM.

An industry that has had a remarkable growth since it was first started is that of the manufacture of carborundum. As is well known, this material was discovered by Mr. E. G. Acheson, formerly of Monongahela, Pa., who was conducting a series of experiments in the hope of securing a substitute for the diamond as an abrasive. The first use that was made of carborundum was by the lapidaries in place of diamond powder, but since then it has begun to be used as an abrasive material and is made into hones, wheels, and other forms, and the price has been reduced until now it can be bought for about $200 per ton. When it was first manufactured as a commercial article an average of one-quarter of a pound per day would represent the production, a portion of which was sold to brass manufacturers for valve grinding while the rest was sold to lapidaries, the price being from $2 to $15 per pound. This was in 1893. By the end of 1894 the company had developed its plant and method of manufacture so that it could produce 100,000 pounds of carborundum a year. In 1895 the company's factory at Niagara Falls was built, and in 1896 it commenced to use 1,000 electrical horsepower. In 1898 this was increased 2,000 horsepower and the company had increased its production for 1899 to 1,741,245 pounds, which was sold at an average price of 8 cents per pound. During 1900 the production of carborundum was 2,401,000 pounds.

Carborundum is composed of carbon and silicon, containing 32 per cent of the former and 68 per cent of the later. As it comes from the furnace it is in the shape of black crystals of great brilliancy and hardness. These are crushed under rolls into grains of various sizes, which are washed in a solution of acid and water to remove soluble material, and then dried and sifted to uniform sizes.

CRUSHED STEEL.

As the larger part of the crushed steel manufactured is used in the stonecutting trade, particularly by the marble and granite cutters, its production is apt to fluctuate with the condition of the building trades. The outlook for the next year or two is favorable to an increase in the erection of buildings, which will mean a corresponding increase in the production of stone for this purpose. The fine grades of crushed steel, known as steel emery and rouge, are used in considerable quantities by lens workers and other glass grinders. There is an attempt being made, which is meeting with some success, to introduce this material into railroad and other machine shops for use in throttle and other valve grinding.

The production of crushed steel by the Pittsburg Crushed Steel Company in 1900 amounted to 700,000 pounds, valued at $50,000, as compared with 675,000 pounds, valued at $47,250, in 1899. This increase is probably due to the large demand for building and decorating stones during 1900.

PHOSPHATE ROCK.

By Edward W. Parker

PRODUCTION.

The phosphate industry in the closing year of the nineteenth century was marked by decreased production in Florida and South Carolina, a slightly increased production in Tennessee, and a general increase in value. The decreased production in Florida and South Carolina was due to two causes—scarcity of transportation facilities, with consequent high ocean freight rates, and low prices for superphosphates, which discouraged manufacturers from buying crude rock at the generally higher prices which prevailed during the year. In Florida the decreased production was in the output of hard rock and river pebble, there being an increase of about 44,000 tons in the production of land pebble. This increase in the production of land pebble was not sufficient, however, to overcome the decreases in the other two grades of rock. There has been no production of soft rock reported from Florida since 1897. In South Carolina the production of land rock increased from 223,949 long tons in 1899 to 266,186 long tons in 1900, while the production of river rock fell off 50 per cent—from 132,701 long tons in 1899 to 62,987 long tons in 1900. Tennessee's production increased from 430,192 long tons to 454,491 long tons. No production was reported from North Carolina in 1900, and the output in Pennsylvania decreased from 2,000 tons in 1899 to 900 tons in 1900. Two States, Alabama and Arkansas, each reported a small production of phosphate rock in 1900, the former having an output of 344 tons and the latter an output of 75 tons. These amounts are insignificant, and of interest only as indicating a possibility of further developments. The total amount of phosphate production reported to the Survey in 1900 was 1,491,216 long tons, against 1,515,702 long tons in 1899, a decrease of 24,486 long tons. Notwithstanding this decrease in production, the total value of the product increased from $5,084,076 to $5,359,248, a gain of $275,172. The distribution of the product by

States and grades of rock produced in 1900 and for the nine preceding years is presented in the following table:

Production of phosphate rock from 1891 to 1900.

State.	1891.		1892.		1893.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Florida:	*Long tons.*		*Long tons.*		*Long tons.*	
Hard rock			*a*155,908	$859,276	215,685	$1,117,732
Soft rock	57,982	....	6,710	32,418	13,675	64,626
Land pebble			21,905	111,271	86,624	359,127
River pebble	54,500	....	*b*102,820	415,453	122,820	437,571
Total	112,482	$703,013	287,343	1,418,418	438,804	1,979,056
South Carolina:						
Land rock	344,978	2,187,160	243,653	1,236,447	308,435	1,408,785
River rock	130,528	760,978	150,575	641,262	194,129	748,229
Total	475,506	2,948,138	394,228	1,877,709	502,564	2,157,014
Grand total	587,988	3,651,151	681,571	3,296,127	941,368	4,136,070

State.	1894.		1895.		1896.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Florida:	*Long tons.*		*Long tons.*		*Long tons.*	
Hard rock	326,461	$979,383	307,098	$1,302,096	296,811	$1,067,525
Soft rock	....	....	6,916	32,000	400	2,300
Land pebble	98,885	296,655	181,011	593,716	97,936	176,972
River pebble	102,307	390,775	73,036	185,090	100,052	300,556
Total	527,653	1,666,813	568,061	2,112,902	495,199	1,547,353
South Carolina:						
Land rock	307,305	1,252,768	270,560	898,787	267,072	792,457
River rock	142,803	492,808	161,415	512,245	135,351	389,192
Total	450,108	1,745,576	431,975	1,411,032	402,423	1,181,649
Tennessee	19,188	67,158	38,515	82,160	26,157	57,370
North Carolina	....	....	....	....	7,000	17,000
Grand total	996,949	3,479,547	1,038,551	3,606,094	930,779	2,803,372

a Includes 52,708 tons of hard rock carried over in stock from 1891.
b Includes 12,120 tons of river pebble carried over in stock from 1891.

Production of phosphate rock from 1891 to 1900—Continued.

State.	1897.		1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Florida:	*Long tons.*		*Long tons.*		*Long tons.*		*Long tons.*	
Hard rock	360,147	$1,063,713	366,810	$1,396,108	460,297	$2,119,130	424,977	$2,229,373
Soft rock	2,300	4,600						
Land pebble	92,132	180,794	155,084	293,688	177,170	515,458	221,403	612,703
River pebble	97,763	244,408	79,000	158,000	88,953	169,473	59,863	141,236
Total	552,342	1,493,515	600,894	1,847,796	726,420	2,804,061	706,243	2,983,312
South Carolina:								
Land rock	267,380	748,050	298,610	856,225	223,949	738,969	266,186	877,405
River rock	90,900	238,522	101,274	251,047	132,701	339,130	62,987	164,565
Total	358,280	986,572	399,884	1,107,272	356,650	1,078,099	329,173	1,041,970
Tennessee	128,723	193,115	308,107	498,392	430,192	1,192,916	454,491	1,328,707
North Carolina					440	(*a*)		
Pennsylvania					2,000	9,000	900	4,500
Alabama							334	534
Arkansas							75	225
Grand total	1,039,345	2,673,202	1,308,885	3,453,460	1,515,702	5,084,076	1,491,216	5,359,248

a Value included in South Carolina land rock.

Taking the total production and value as a basis for ascertaining the average price per ton realized for rock produced and sold, it is seen from the above table that the average price per ton for Florida hard rock advanced from $3.81 in 1898 to $4.60 in 1899 and to $5.25 in 1900. The increased production of land pebble was accompanied by a decrease in the average price per ton from $2.91 in 1899 to $2.77 in 1900. The latter price, however, was considerably in excess of the price in 1898, when the average price per ton was $1.89. The decreased production of river pebble was, on the other hand, accompanied by an advance in price from $1.90 in 1899 to $2.36 in 1900. The price of South Carolina land rock in 1900 was a fraction less than $3.30 a ton, the price which ruled during 1899. In 1898 the average price for South Carolina land rock was $2.87. South Carolina river rock showed an advance from $2.48 in 1898 to $2.56 in 1899 and $2.61 in 1900. The price of Tennessee rock showed a noticeable improvement in 1899 as compared with the preceding year, advancing from $1.62 to $2.77. A further advance to $2.92 is shown in the returns for 1900. The principal reason for the advances in price of Tennessee rock in 1899 and 1900 was the improvements in preparation of the material for market. The general advance in values in these years had also some effect upon the Tennessee market. In addition to these factors the concentration of some of the more important producing regions into the hands of a few large and conservative concerns has eliminated to a considerable extent the competition for trade which adversely affected prices during the three or four years immediately following the development of the phosphate-rock deposits in this State. In 1897 the average price obtained for Tennessee rock was only $1.50 per ton, in the majority of cases below the cost of production.

In considering the foregoing table, and also the ones which follow, it must be remembered that only the marketed product is taken as a record of production. A considerable quantity of phosphate rock was mined in 1900 but not marketed in that year. The total amount of hard phosphate rock mined in Florida was reported at 487,750 long tons, as against 424,977 long tons sold, so that there were at least 62,773 long tons carried over in stock at the end of the year in addition to what may have been carried over from the preceding year. There were five mines whose aggregate product in 1900 was 25,000 long tons, none of which was marketed during the year. Practically all of the land pebble produced was sold, 222,040 long tons being reported as mined and 221,403 as sold. The marketed product of river pebble was 59,863 long tons, whereas the amount mined was 73,382 long tons.

In South Carolina 293,909 tons of land rock were mined, of which 266,186 tons were sold. The river rock mined amounted to 111,415 tons, of which only 55 per cent, or 62,987 long tons, were marketed. The mines of Tennessee produced 511,554 long tons, of which 454,491 long tons were sold.

Since 1880 the amount and value of the phosphate rock produced in the United States have been as follows:

Production of phosphate rock in the United States since 1880.

Year.	Production.	Value.	Year.	Production.	Value.
	Long tons.			*Long tons.*	
1880	211,377	$1,123,823	1891	587,988	$3,651,150
1881	266,734	1,980,259	1892	681,571	3,296,227
1882	332,077	1,992,462	1893	941,368	4,136,070
1883	378,380	2,270,280	1894	996,949	3,479,547
1884	431,779	2,374,784	1895	1,038,551	3,606,094
1885	437,856	2,846,064	1896	930,779	2,803,372
1886	430,549	1,872,936	1897	1,039,345	2,673,202
1887	480,558	1,836,818	1898	1,308,885	3,453,460
1888	448,567	2,018,552	1899	1,515,702	5,084,076
1889	550,245	2,937,776	1900	1,491,216	5,359,248
1890	510,499	3,213,795			

FLORIDA.

The mining of phosphate rock in Florida began in 1888 with an output of 3,000 long tons. The history of this industry in the State has been similar to that which has followed the majority of the discoveries of new sources of mineral wealth. The two years following the discovery of merchantable high-grade phosphate rock were devoted very largely to speculation in land and the formation of companies to mine rock on land which had not even been prospected. The usual result followed, and after the "boom" period there succeeded several years of depression and disastrous failures. Since 1896, however, the conditions have shown a marked improvement and the industry has settled down to a conservative and substantial basis.

The amount of phosphate rock mined in Florida in 1900 was 783,172 long tons, of which the sales amounted to 706,243 long tons, this latter being considered the commercial product. Of the marketed product 424,977 long tons, or a little over 60 per cent, was hard rock, 221,403 long tons, or 31½ per cent, land pebble, and 59,863 long tons, or 8½ per cent, river pebble. No soft-rock product has been reported from Florida since 1897. The marketed product of hard rock in 1900 was 35,320 long tons less than in 1899. The production of river pebble decreased from 88,953 long tons to 59,863 long tons. The production of land pebble increased from 177,170 to 221,403 long tons.

In the following table are shown the amount and value of each kind of rock produced in Florida during the last four years, the marketed product only being considered:

Amount and value of each kind of rock produced in Florida during the last four years.

Year.	Hard rock.		Soft rock.		Land pebble.		River pebble.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*		*Long tons.*		*Long tons.*	
1897	360,147	$1,063,713	2,300	$4,600	92,132	$180,794	97,763	$244,408	552,342	$1,493,515
1898	366,810	1,396,108			155,084	293,688	79,000	158,000	600,894	1,847,796
1899	460,297	2,119,130			177,170	515,458	88,953	169,473	726,420	2,804,061
1900	424,977	2,229,373			221,403	612,703	59,863	141,236	706,243	2,983,312

Messrs. Auchincloss Brothers, in their review of the hard-rock phosphate industry in 1900, show that the shipments in that year declined 22 per cent from those of 1899, or from 444,675 long tons to 348,556 long tons. Production was stimulated by the remunerative prices of 1899, while excessive ocean freight rates seriously interfered with shipments, so that stocks increased largely during the year, particularly during the first half. Manufacturers bought rather liberally in 1899, but the low prices for superphosphates which prevailed during 1900 made them unwilling to replenish their stock of raw material, except at reduced prices. Producers, on the other hand, have been faced by a steadily increasing cost of production and have been unable to meet the views of the manufacturers. In consequence, the market was generally in a sluggish and uncertain condition, which continued into 1901. The majority of the producers have been financially better able to carry over stock than they were in former years, and have preferred to close their works and wait for an improved market rather than take new business at a loss. Nearly all of those who continued mining steadily throughout the year were compelled to do so, as they were employers of convict labor. Messrs. Auchincloss Brothers call attention to the fact that no high-grade deposits of importance were discovered during the year, and the prospecting forces which were at work on new territory were withdrawn. It is the general impression among the producers that the limitations of the high-grade hard-rock field are now known, and that no new territory is to be expected.

In the following table are shown the total amount and value of the phosphate rock produced in Florida since the beginning of the industry in 1888:

Production of phosphate rock in Florida since 1888.

Year.	Long tons.	Value.	Year.	Long tons.	Value.
1888	3,000	$21,000	1895	568,061	$2,112,902
1889	4,100	28,000	1896	495,199	1,547,353
1890	46,501	338,190	1897	552,342	1,493,515
1891	112,482	703,013	1898	600,894	1,847,796
1892	287,343	1,418,418	1899	726,420	2,804,061
1893	438,804	1,979,056	1900	706,243	2,983,312
1894	527,653	1,666,813			

The shipments of high-grade phosphate rock since 1894, as collated by Messrs. Auchincloss Brothers, will be found in the following table. The totals agree very closely with the statistics of production collected by the Geological Survey:

Total shipments of Florida hard-rock phosphate, by months, since 1894.

[Long tons.]

Month.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
January	16,526	15,780	16,996	12,924	11,682	28,560	23,359
February	4,111	17,252	16,853	20,668	26,850	32,630	28,623
March	34,126	31,283	37,155	37,243	34,049	43,051	25,232
April	36,533	41,445	36,559	32,608	22,274	59,001	52,398
May	30,780	45,053	45,846	45,715	31,992	48,584	44,598
June	29,818	31,027	16,511	32,837	31,948	23,051	21,950
July	46,855	21,284	15,296	22,639	53,114	48,747	38,822
August	37,823	14,588	19,914	19,292	27,409	41,155	21,491
September	34,032	25,388	25,116	59,966	46,961	35,728	20,711
October	19,732	27,783	30,605	27,664	21,476	36,694	26,174
November	7,683	18,160	38,402	20,184	30,595	28,947	24,222
December	6,060	17,003	23,618	18,537	22,155	18,527	20,976
Total	304,079	306,046	322,871	350,277	360,505	444,675	348,556

The following is the record of shipments to each country for the last seven years:

Shipments of Florida hard-rock phosphate, by countries.

[Long tons.]

Country.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
England	45,455	27,007	20,533	24,163	23,849	31,789	20,542
Scotland	8,144	3,054	1,038	5,957	6,000	9,545	1,790
Ireland	6,737	3,867	513	2,953	3,420	....	5,852
Germany	153,526	145,377	151,461	181,355	186,731	243,887	208,422
Belgium	....	7,033	27,214	22,954	38,903	37,103	31,639
Holland *a*	47,465	52,724	47,235	53,039	64,309	87,167	54,349
Denmark	7,726	6,735	9,594	11,019	8,287	5,475	2,930
Norway and Sweden	7,940	9,304	12,534	7,442	9,378	11,938	8,000
France	12,101	23,534	6,986	13,931	....	3,165	....
Italy	13,810	21,615	32,999	16,931	11,040	4,546	....
Russia	....	....	1,607	3,613	....	1,700	2,702
Austria	700	3,871	2,494	4,505	4,946	....	5,922
Spain	....	....	....	....	....	....	2,500
United States, West Indies, Australia, etc	475	1,925	8,663	2,415	3,642	8,360	3,908
Total	304,079	306,046	322,871	350,277	360,505	444,675	348,556

a A large proportion of the shipments to Rotterdam are forwarded to the interior of Germany.

Total shipments of Florida hard-rock phosphates since 1890.

[Long tons.]

Year.	Quantity.	Year.	Quantity.	Year.	Quantity.
1890	11,206	1894	304,079	1898	360,505
1891	71,682	1895	306,046	1899	444,675
1892	188,013	1896	322,871	1900	348,556
1893	220,216	1897	350,277		

SOUTH CAROLINA.

The total production of phosphate rock in South Carolina since 1867 and the distribution of the shipments according to sources (land or river) are shown in the following table:

Phosphate rock mined by the land and river mining companies of South Carolina.

[Long tons.]

Year ending—	Land companies.	River companies.	Total.
May 31—			
1867	6	....	6
1868	12,262	....	12,262
1869	31,958	....	31,958
1870	63,252	1,989	65,241
1871	56,533	17,655	74,188
1872	36,258	22,502	58,760
1873	33,426	45,777	79,203
1874	51,624	57,716	109,340
1875	54,821	67,969	122,790
1876	50,566	81,912	132,478
1877	36,431	126,569	163,000
1878	112,622	97,700	210,322
1879	100,779	98,586	199,365
1880	125,601	65,162	190,763
1881	142,193	124,541	266,734
1882	191,305	140,772	332,077
1883	219,202	159,178	378,380
1884	250,297	181,482	431,779
1885	225,913	169,490	395,403
Dec. 31—			
1885 *a*	149,400	128,389	277,789
1886	253,484	177,065	430,549
1887	261,658	218,900	480,558
1888	290,689	157,878	448,567
1889	329,543	212,102	541,645
1890	353,757	110,241	463,998
1891	344,978	130,538	475,516
1892	243,652	150,575	394,227
1893	308,435	194,129	502,564
1894	307,305	142,803	450,108
1895	270,560	161,415	431,975
1896	267,072	135,351	402,423
1897	267,380	90,900	358,280
1898	298,610	101,274	399,884
1899	223,949	132,701	356,650
1900	266,186	62,987	329,173
Total	6,231,707	3,766,248	9,997,955

a Seven months.

From the above table it is shown that the total amount of land and river rock produced in South Carolina during the thirty-four years since the industry was started in that State has amounted to practically 10,000,000 long tons. The production of land rock in 1900 was 42,237 long tons more than that of 1899, but less than in any other year since 1892. The production of river rock in 1900 was less than half of that of the preceding year, and the smallest output reported in twenty-five years. The total production was less than in any year since 1881, conditions affecting the industry in Florida also influencing that of South Carolina; that is, the low price of superphosphates and the excessive ocean freight rates which decreased foreign shipments. It is claimed that the war in South Africa, which took a number of freight-carrying steamers out of the trade in 1900, is responsible for the high ocean freights and the consequent decrease in the foreign shipments of phosphate rock. The shipments of phosphate rock from Charleston in 1900, as reported by the American Fertilizer, amounted to 8,365 long tons. Foreign shipments from Beaufort, as reported by the same authority, amounted to 39,837 long tons, making a total of 47,752 long tons in foreign shipments of South Carolina phosphate, as against 98,628 long tons in 1899. Notwithstanding these decreases in foreign shipments, the price of river rock showed a slight advance, from $2.56 per long ton to $2.61 in 1900, while the price of land rock remained practically steady at $3.30.

The amount and value of land and river rock produced in South Carolina during the last four years are shown in the following table:

Amount and value of each kind of phosphate rock produced in South Carolina during the last four years.

Year.	Land rock.		River rock.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*	
1897	267,380	$748,050	90,900	$238,522	358,280	$986,572
1898	298,610	856,225	101,274	251,047	399,884	1,107,272
1899	223,949	738,969	132,701	339,130	356,650	1,078,099
1900	266,186	877,405	62,987	164,565	329,173	1,041,970

TENNESSEE.

The production of phosphate rock in Tennessee began in 1894 with a total of 19,188 long tons, valued at $67,158. The discovery of phosphate rock in the State was followed by much the same incidents as occurred in Florida after the discovery of phosphate rock in that State ten years before—first a "boom," and then a collapse. It was not until 1898 that the industry became established upon a sound and satisfactory basis, and conditions in 1899 and 1900 were much improved. Tennessee was the only important phosphate rock producing State whose product increased in 1900. The production during the seven years that phosphate mining has been carried on in the State is shown in the following table:

Production of phosphate rock in Tennessee since 1894.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Long tons.			*Long tons.*	
1894	19,188	$67,158	1898	308,107	$498,392
1895	38,515	82,160	1899	424,109	1,177,166
1896	26,157	57,370	1900	454,491	1,328,707
1897	128,723	193,115			

A RECENTLY DISCOVERED EXTENSION OF THE TENNESSEE WHITE PHOSPHATE FIELDS.

By Edwin C. Eckel.

The white phosphates of Perry County, Tenn., have been described in detail and their relations and origin discussed by Dr. C. W. Hayes.[1] During the present year a westward extension of this field into Decatur County has been discovered. The geological relations are similar, and the phosphates from the two counties, separated only by the Tennessee River, are closely alike in character. For a discussion of these relations reference must be made to the latest of the three papers just cited.

Ever since the discovery of the Toms Creek deposits more or less prospecting for phosphate has been carried on in Decatur County. Mr. L. H. Burke, of Parsons, found the first workable deposits, and he and his associate, Mr. Hughes, now own, lease, or have mineral rights on most of the phosphate-bearing area in Decatur County. Several hundred small pits and trenches have been dug on their property, phosphate of workable quality and quantity being shown in over half of these. About thirty of these pits were visited by the writer in August, 1901, and the present notes are based upon the results of that trip.

The phosphates of Decatur County, so far as at present known, can be grouped in three well-separated areas, within each of which the phosphate occurs in isolated deposits. A small area occurs on Cub Creek, several miles north of Parsons. The second and largest area includes deposits lying along the tributaries of Beech River between Parsons and Decaturville, while the third area is located along Whites Creek, about 10 miles south of Decaturville. Of these, the second area only was visited, the others not having been developed so extensively. So far as can be estimated at present, the three areas together contain some 300 to 400 acres of land on which the phosphate exists in workable thickness and quality.

[1] Sixteenth Ann. Rept. U. S. Geol. Survey, Part IV, p. 610; Seventeenth Ann. Rept., Part II, p. 513; Twenty-first Ann. Rept., Part III, p. 473.

In the Beech River area the phosphate is found on the low divide lying between the various tributaries of Beech River. Of the streams entering from the north, only Bear Creek shows phosphate. Along the tributaries coming from the south the phosphate deposits are more numerous, workable quantities being found on the divides between these streams as far east as Lost Creek. As yet no phosphate has been found between Lost Creek and the Tennessee River.

Occasionally the phosphate shows at the surface, but commonly it is concealed by a variable thickness of other materials. A typical pit in this area would show a section, from the ground surface down, about as follows:

Feet.	
2–5	Chert fragments, mingled with soil or clay.
1–3	Phosphate fragments, scattered through clay.
3–8	Massive phosphate.
——	Unaltered limestone (Silurian).

The overburden, as shown in the pits visited, rarely exceeded 5 or 6 feet. It should be remembered, however, that most of these pits are located on the lower levels of the divides, and that the thickness of the overburden may be expected to increase as the workings get farther into the hill; for Dr. Hayes has shown[1] that deposits of white phosphate, though in no sense stratified, occupy practically horizontal positions.

The thickness of workable phosphate varies from 3 to 18 feet, the latter being shown in one exceptional pit. The average thickness is probably about 5 feet. Various analyses of the material show that it is of sufficiently high grade to be readily marketable.

Shipments can be made either via the Nashville, Chattanooga and St. Louis Railroad from Parsons or Perryville, or by the Tennessee River. Wagon haulage for from 1 to 5 miles will be required in either case, but the grades are easy and the highways are in very fair condition.

OTHER STATES.

During 1900 small amounts of phosphate rock were reported as mined in Alabama and Arkansas. In the former State 334 long tons, valued at $544, were produced, and Arkansas produced 75 long tons, valued at $225. The product reported from Pennsylvania was 900 long tons, valued at $4,500. This is the second year in which any production of phosphate rock was reported from Pennsylvania, the output in 1899 being 2,000 long tons, valued at $9,000. No product was reported from North Carolina in 1900.

[1] Seventeenth Ann. Rept., Part II, p. 513.

IMPORTS.

The following table shows the imports of fertilizers of all kinds into the United States from 1868 to 1899:

Fertilizers imported and entered for consumption in the United States, 1868 to 1899.

Year ending—	Guano.		Crude phosphates and other substances used for fertilizing purposes.		Total value.
	Quantity.	Value.	Quantity.	Value.	
June 30—	*Long tons.*		*Long tons.*		
1868	99,668	$1,336,761	....	$88,864	$1,425,625
1869	13,480	217,004	....	61,529	278,533
1870	47,747	1,414,872	....	90,817	1,505,689
1871	94,344	3,313,914	....	105,703	3,419,617
1872	15,279	423,322	....	83,342	506,664
1873	6,755	167,711	....	218,110	385,821
1874	10,767	261,085	....	243,467	504,552
1875	23,925	539,808	....	212,118	751,926
1876	19,384	710,135	....	164,849	874,984
1877	25,580	873,459	....	195,875	1,069,334
1878	23,122	849,607	....	285,089	1,134,696
1879	17,704	634,546	....	223,283	857,829
1880	8,619	108,733	....	317,068	425,801
1881	23,452	399,552	....	918,835	1,318,387
1882	46,999	854,463	133,956	1,437,442	2,291,905
1883	25,187	537,080	96,586	798,116	1,335,196
1884	28,090	588,033	35,119	406,233	994,266
1885	20,934	393,039	40,068	611,284	1,004,323
Dec. 31—					
1886	13,520	306,584	82,608	1,179,724	1,486,308
1887	10,195	252,265	53,100	644,301	896,566
1888	7,381	125,112	36,405	329,013	454,125
1889	15,991	313,956	35,661	403,205	717,161
1890	4,642	59,580	31,191	252,787	312,367
1891	11,937	199,044	29,743	214,671	413,751
1892	3,073	46,014	92,476	666,061	712,075
1893	5,856	97,889	106,549	718,871	816,760
1894	5,757	105,991	126,820	904,247	1,010,238
1895	4,270	51,642	80,088	450,379	502,021
1896	6,532	79,815	113,955	639,858	719,673
1897	4,930	55,715	200,598	970,836	1,026,551
1898	4,482	50,783	139,472	720,053	770,836
1899	2,700	27,000	150,902	906,181	933,181
1900	5,161	38,184	202,605	1,382,734	1,420,918

SULPHUR AND PYRITE.

By Edward W. Parker.

SULPHUR.

PRODUCTION.

All of the sulphur produced in the United States in 1900 was obtained from Louisiana and Utah, no product having been reported from either Nevada or Texas, each of which contributed a small amount to the output in 1899. The sulphur product of the United States has always been of insignificant proportions when considered with the amount consumed in this country. As will be seen from a subsequent table, the amount of sulphur consumed in the United States, including the sulphur contents of iron pyrite, which is used in the manufacture of sulphuric acid, approximates 400,000 short tons annually. The largest domestic production of sulphur in the United States was in 1896, when it amounted to 5,260 short tons, and the average production during the last five years has been less than 3,500 tons, from which it appears that the domestic production of sulphur amounts to less than 1 per cent of the total consumption, excluding iron pyrite. The amount of sulphur produced in the United States in 1900 was 3,525 short tons, valued at $88,100, as compared with 4,830 short tons, valued at $107,500, in 1899.

The following table shows the annual production of sulphur in the United States since 1880:

Sulphur product of the United States since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	600	$21,000	1891	1,200	$39,600
1881	600	21,000	1892	2,688	80,640
1882	600	21,000	1893	1,200	42,000
1883	1,000	27,000	1894	500	20,000
1884	500	12,000	1895	1,800	42,000
1885	715	17,875	1896	5,260	87,200
1886	2,500	75,000	1897	2,275	45,590
1887	3,000	100,000	1898	1,200	32,960
1888	....	....	1899	4,830	107,500
1889	450	7,850	1900	3,525	88,100
1890	....	....			

DOMESTIC CONSUMPTION.

In considering the consumption of sulphur it is necessary to include a statement in regard to the use of iron pyrite for the manufacture of sulphuric acid. The use of iron pyrite for this purpose has shown remarkable increases within the last ten years. Accurate statistics in regard to the consumption of iron pyrite prior to 1891 are not available, as the statistics of imports previous to 1891 did not make any separation of the pyrite imported for this purpose. Prior to 1884 pyrite was included among other sulphur ores in the statistics compiled by the Bureau of Statistics of the Treasury Department. Pyrite ores were separately reported from 1884 to 1887, but the small quantities reported indicate that a considerable amount was imported either under the former classification of sulphur ore or as iron ore, under which it was classified from 1887 to 1891, unless it contained copper exceeding 3.5 per cent. Any review of the growth of consumption of sulphur and pyrite must necessarily begin, therefore, with 1891, in which year the total amount of sulphur used (imported and domestic) was 118,258 long tons. The sulphur contents of the iron pyrite consumed in the same year was 93,233 long tons, making a total of 211,491 long tons. In 1900 the domestic production of sulphur amounted to 3,147 long tons, and the imports to 167,696 long tons, a total of 170,843 tons. The sulphur contents of the imported pyrite amounted to 145,118 long tons, while the domestic production was 92,077 long tons, making a total of 237,195 long tons. This would make the total sulphur consumption in 1900 amount to 408,038 long tons, or almost double that consumed in 1891. The amount of sulphur consumed in 1900 was 44.5 per cent more than that of 1891, while the use of iron pyrite as a source of sulphur has increased 154.4 per cent.

The statistics of production, and imports of sulphur and the sulphur contents of domestic and imported pyrite exhibiting together the total domestic consumption, are presented in the following table:

Estimated consumption of sulphur in the United States from 1891 to 1900.

	1891.	1892.	1893.	1894.	1895.
Sulphur:	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Domestic	1,071	2,400	1,071	446	1,607
Imported *a*	117,187	101,122	105,823	125,459	122,096
Sulphur contents of pyrite: *b*					
Domestic	47,941	49,405	34,100	47,673	44,697
Imported	45,292	68,561	87,715	74,596	85,796
Total domestic consumption	211,491	221,488	228,709	248,174	254,196

a Includes crude sulphur, flowers of sulphur, refined sulphur, and sulphur lac.
b Based on average sulphur contents of 45 per cent.

Estimated consumption of sulphur in the United States from 1891 to 1900—Continued.

	1896.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Sulphur:					
Domestic	4,696	2,031	1,071	4,300	3,147
Imported *a*	139,280	141,905	164,504	141,533	167,696
Sulphur contents of pyrite: *b*					
Domestic	51,968	64,440	87,014	78,630	92,077
Imported	90,076	116,796	113,748	121,441	145,118
Total domestic consumption	286,020	325,172	366,337	345,904	408,038

a Includes crude sulphur, flowers of sulphur, refined sulphur, and sulphur lac.
b Based on average sulphur contents of 45 per cent.

PRODUCTION OF SULPHUR IN ITALY.

In the following table the statistics of the amount and value of the sulphur produced in Italy since 1860 (practically all of which is from the island of Sicily) are taken from the official report Rivista del Servizio Minerario.

Production of sulphur in Italy from 1860 to 1899, inclusive.

Year.	Production.	Value.	Year.	Production.	Value.
	Long tons.			*Long tons.*	
1860	155,067	$3,693,036	1880	353,883	$7,037,859
1861	163,217	3,865,950	1881	367,163	8,088,237
1862	162,825	3,872,376	1882	438,751	9,002,010
1863	179,637	4,273,992	1883	439,332	8,181,887
1864	177,707	4,134,870	1884	404,431	7,048,751
1865	168,829	3,756,507	1885	418,708	6,748,077
1866	195,019	4,579,547	1886	368,327	5,396,720
1867	195,873	4,641,046	1887	336,715	4,572,979
1868	198,097	4,822,158	1888	370,486	4,827,512
1869	197,493	5,071,715	1889	365,524	4,758,005
1870	200,597	4,702,716	1890	363,305	5,455,201
1871	196,518	4,869,515	1891	389,171	8,593,413
1872	235,323	5,746,251	1892	411,828	7,569,781
1873	269,794	6,566,050	1893	410,958	5,716,018
1874	247,221	6,813,675	1894	399,260	4,876,715
1875	204,086	5,562,575	1895	364,807	3,989,877
1876	271,605	6,372,385	1896	419,501	5,919,554
1877	256,141	5,184,313	1897	488,676	8,680,800
1878	300,238	5,896,665	1898	494,278	9,368,268
1879	370,268	7,040,165	1899	554,638	10,392,415

EXPORTS OF SULPHUR FROM SICILY.

Taken in connection with the foregoing statistics, the following table, exhibiting the exports of sulphur from Sicily and the countries to which exported during the last five years, will be found of interest. This table is compiled from the annual statement published by Mr. Alfred S. Malcolmson, of New York.

Total exports of sulphur from Sicily since 1896.

Country.	1896.	1897.	1898.	1899.	1900.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
United States	124,923	118,137	138,435	128,441	162,505
France	76,739	84,895	88,657	96,043	103,647
Italy	54,009	73,052	62,652	87,230	101,073
United Kingdom	21,913	24,520	26,983	25,038	23,973
Greece and Turkey	18,556	13,866	24,808	18,656	19,647
Portugal	12,001	7,054	8,257	12,269	10,937
Russia	18,752	17,532	12,285	19,211	22,090
Germany	15,680	19,721	27,048	25,933	28,702
Austria	13,799	15,993	15,796	18,519	21,594
Spain	5,910	4,039	3,233	7,757	6,187
Belgium	7,527	9,253	8,402	7,481	9,721
Holland	3,834	3,599	5,646	6,408	18,595
Sweden and Denmark	14,540	11,226	12,331	12,476	22,681
Other countries	8,562	7,651	12,791	13,569	6,810
Total	396,745	410,538	447,324	479,031	558,162

The following table shows the total exports from Sicily since 1883:

Total exports of sulphur from Sicily since 1883.

Year.	Tons.	Year.	Tons.	Year.	Tons.
1883	335,392	1889	351,451	1895	347,636
1884	314,058	1890	344,763	1896	396,745
1885	314,582	1891	293,323	1897	410,538
1886	329,446	1892	309,536	1898	447,324
1887	311,302	1893	349,192	1899	479,031
1888	347,775	1894	328,930	1900	558,162

PORTS IN UNITED STATES RECEIVING SICILIAN SULPHUR.

The ports in the United States to which such shipments were made, together with the amount shipped to each since 1896, and the total imports since 1883, are shown in the following tables:

Ports in the United States receiving Sicilian sulphur and the amount received by each.

Port.	1896.	1897.	1898.	1899.	1900.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
New York	68,353	70,474	72,089	83,396	94,753
Charleston	7,700	5,130	2,100		
Philadelphia	6,000	5,409	6,600	10,740	6,700
Baltimore	14,150	13,831	14,365	12,400	12,200
Boston	5,300	8,220	6,050	1,600	4,000
Wilmington, N. C	2,660	1,550	1,700		
Savannah	9,395	4,700	1,980		1,750
Pensacola					
Port Royal	660				
Providence					
San Francisco	3,125		2,539		
New Orleans	2,100	3,340	2,500	800	3,000
Mobile					
Delaware Breakwater					
Portland, Me	2,550	4,343	13,750	18,915	27,612
Norfolk	2,930	1,140			
Canada			12,692		7,250
Other ports			2,070	590	5,240
Total	124,923	118,137	138,435	128,441	162,505

Total imports of Sicilian sulphur since 1883.

Year.	Tons.	Year.	Tons.	Year.	Tons.
1883	96,629	1889	109,008	1895	99,227
1884	94,929	1890	106,656	1896	124,923
1885	99,378	1891	97,520	1897	118,137
1886	98,590	1892	84,850	1898	138,435
1887	89,419	1893	83,901	1899	128,441
1888	128,265	1894	105,773	1900	162,505

The quality of Sicilian sulphur imported in each year since 1886 has been as follows:

Quality of Sicilian sulphur received at the different ports of the United States since 1886.

Port.	1886.		1887.		1888.		1889.		1890.	
	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
New York	36,352	13,600	29,919	16,060	35,573	25,133	32,983	22,956	20,801	16,589
Charleston	7,506	3,050	8,875	5,449	15,485	7,011	6,325	6,074	20,873	6,690
Philadelphia	4,660	11,002	2,127	9,637	3,050	8,743	2,000	12,334	1,000	10,094
Baltimore	7,325	8,355	4,463	5,843	11,380	5,950	7,656	7,660	5,930	10,770
Boston	600	3,200	200	3,100	700	5,600	750	4,200	200	2,300
Savannah					2,130	1,415	2,790	1,450	2,750	3,170
Wilmington, N. C.			1,020		2,355		2,040		1,309	
Other ports	1,180	1,760	106	2,620	1,500	2,240	200	590	1,540	2,640
Total	57,623	40,967	46,710	42,709	72,173	56,092	54,744	55,264	54,403	52,253

Port.	1891.		1892.		1893.		1894.		1895.	
	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
New York	29,358	19,665	34,390	14,700	29,146	14,250	33,150	13,725	35,888	19,975
Charleston	17,196	4,450	4,010	500	11,665	1,860	3,273	12,023	700	8,450
Philadelphia	450	6,406	3,600	6,800	1,900	6,260	350	5,050	1,200	7,150
Baltimore	4,510	6,855	900	11,455	2,050	7,900	600	14,700	1,100	8,620
Boston	1,300	650	1,825	1,500	500		1,017	3,300	2,350	2,600
Savannah	850	700	600	570	3,450	1,880	5,695	4,100	3,784	800
Wilmington, N. C.	1,900	700				1,140		1,890		650
New Orleans					1,900		2,400		1,700	
Portland, Me									1,300	
Other ports	1,200	1,330	4,000				800	3,700	580	2,380
Total	56,764	40,756	49,325	35,525	50,611	33,290	47,285	58,488	48,602	50,625

Quality of Sicilian sulphur received at the different ports of the United States since 1886—Continued.

Port.	1896.		1897.		1898.		1899.		1900.	
	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.	Best unmixed seconds.	Best thirds.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
New York	50,557	17,796	57,174	13,300	49,614	22,475	56,746	26,650	70,446	24,307
Charleston	2,330	5,370	1,500	3,630	500	1,600	....	....	....	....
Philadelphia	500	5,500	199	5,210	1,200	5,400	2,740	8,000	1,600	5,100
Baltimore	3,650	10,500	3,798	10,033	2,350	12,015	3,800	8,600	6,800	5,400
Boston	4,600	700	7,220	1,000	4,500	1,550	600	1,000	1,500	2,500
Savannah	8,370	1,025	4,700	....	1,980	....	....	....	1,750	....
Wilmington, N. C.	1,260	1,400	....	1,550	500	1,200	....	....	....	....
New Orleans	2,100	....	3,340	....	500	2,000	....	800	....	3,000
Portland, Me	2,550	....	4,343	....	13,750	....	18,915	....	27,612	....
Other ports	5,425	1,290	540	600	14,101	3,200	590	....	12,490	....
Total	81,342	43,581	82,814	35,323	88,995	49,440	83,391	45,050	122,198	40,307

PRICES OF SICILIAN SULPHUR.

Mr. Alfred S. Malcolmson has furnished the Survey with the following statement of the prices of Sicilian sulphur, best unmixed seconds, ex steamer at New York, for each month during 1896, 1897, 1898, 1899, and 1900. The wide variation between the extremes of prices in April and May, 1898, was due to the war with Spain. In each case the lower figure was for sulphur sold previously for April and May delivery. The higher prices were for spot sulphur after hostilities began and before the syndicate could make arrangements for shipping.

Spot prices for Sicilian sulphur, per long ton, ex steamer at New York.

Date.	1896.	1897.	1898.	1899.	1900.
January	$15.50	$20.00 @ $20.50	$20.50	$21.00 @ $21.25	$21.00 @ $21.50
February	15.50	19.75	20.50	21.00	21.50 @ 21.75
March	15.00	20.00	21.50	22.00 @ 22.50	21.50 @ 22.00
April	15.50	19.25 @ 19.50	$21.50 @ 35.00	21.00	21.00 @ 21.50
May	$15.50 @ 16.00	19.25 @ 19.50	21.75 @ 32.00	20.50 @ 21.00	20.75 @ 21.00
June	19.00	19.25	24.00	20.75 @ 21.00	20.50 @ 21.00
July	19.50	19.75	22.00	20.50	21.00 @ 21.50
August	20.00 @ 21.00	20.00	21.00	20.50	21.75 @ 22.50
September	22.50 @ 23.00	21.00	20.50 @ 21.00	20.50	22.00 @ 22.50
October	24.00 @ 25.00	21.00	21.00 @ 22.00	21.00	22.75 @ 23.00
November	22.00	21.00	21.00 @ 21.50	21.00	21.25 @ 21.50
December	21.00	20.75	21.00	21.25	20.75 @ 21.00

IMPORTS.

The following statements, showing the amount and value of sulphur imported into the United States for a series of years, are obtained from the Bureau of Statistics of the Treasury Department:

Sulphur imported and entered for consumption in the United States, 1867 to 1900.

Year ending—	Crude.		Flowers of sulphur.		Refined.		All other. *a*		Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
June 30—	*Long tons.*		*Long tons.*		*Long tons.*		*Long tons.*		
1867	24,544	$620,373	110	$5,509	251	$10,915			$636,797
1868	18,151	446,547	16	948	65	2,721			450,216
1869	23,590	678,642	97	4,576	645	27,149			710,367
1870	27,380	819,408	76	3,927	157	6,528		$1,269	831,132
1871	36,131	1,212,448	66	3,514	92	4,328		754	1,221,044
1872	25,380	764,798	36	1,822	57	2,492			769,112
1873	45,533	1,301,000	55	2,924	36	1,497			1,305,421
1874	40,990	1,260,491	51	2,694	57	2,403			1,265,588
1875	39,683	1,259,472	18	891					1,260,363
1876	46,435	1,475,250	41	2,114	44	1,927			1,479,291
1877	42,963	1,242,888	116	5,873	1,171	36,962			1,285,723
1878	48,102	1,179,769	159	7,628	150	5,935			1,193,332
1879	70,370	1,575,533	138	6,509	69	2,392			1,584,434
1880	87,837	2,024,121	124	5,516	158	5,262			2,034,899
1881	105,097	2,713,485	98	4,226	71	2,555			2,720,266
1882	97,504	2,627,402	159	6,926	59	2,196			2,636,524
1883	94,540	2,288,946	79	3,262	115	4,487			2,296,695
1884	105,112	2,242,697	178	7,869	126	4,765			2,255,331
1885	96,839	1,941,943	121	5,351	114	4,060			1,951,354
1886	117,538	2,237,989	213	8,739	116	3,877			2,250,605
1887	96,882	1,688,360	279	9,980	84	2,383			1,700,723
Dec. 31—									
1888	98,252	1,581,583	128	4,202	27	734			1,586,519
1889	135,933	2,068,208	15	1,954	10	299			2,070,461
1890	162,674	2,762,953	12	1,718	103	3,060			2,767,731
1891	116,971	2,675,192	206	6,782	10	1,997			2,683,971
1892	100,938	2,189,481	158	5,439	26	4,106			2,199,026
1893	105,539	1,903,198	241	5,746	43	1,017			1,909,961
1894	125,241	1,703,265	173	4,145	45	1,207			1,708,617
1895	121,286	1,546,481	581	12,888	229	4,379		50,006	1,613,754
1896	138,168	1,967,454	665	13,266	447	8,226		183,683	2,172,629
1897	136,563	2,395,436					5,342	58,637	2,454,073
1898	151,225	2,891,767	507	14,548	163	4,396	12,609	159,213	3,069,924
1899	140,182	2,484,801	335	9,917	184	4,519	832	23,966	2,523,203
1900	166,825	2,917,172	628	17,437	243	6,279			2,940,888

a Includes sulphur lac and other grades not otherwise provided for, but not pyrite.

Statement, by countries and by customs districts, showing the imports into the United States of crude sulphur or brimstone each fiscal year from 1898 to 1900.

Countries whence exported and customs districts through which imported.	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
COUNTRY.	*Long tons.*		*Long tons.*		*Long tons.*	
Canada	10,437	$265,969	5,098	$127,960		
England	7,359	157,747	5,163	109,381	7,425	$155,882
Italy	146,596	2,613,394	114,051	2,050,078	138,011	2,369,037
Japan	7,489	146,813	4,328	81,818	9,958	186,847
Other countries	508	9,605	43	1,212	5	146
Total	172,389	3,193,528	128,683	2,370,449	155,399	2,711,912
DISTRICT.						
Baltimore, Md	16,938	296,073	15,276	262,146	12,798	213,893
Boston and Charlestown, Mass	15,866	308,092	9,596	188,519	10,023	203,014
Champlain, N. Y	5,678	144,216	1,546	38,915		
Charleston, S. C	7,230	123,871				
Mobile, Ala	299	9,256				
New Orleans, La	2,300	35,690	2,588	51,652	1,000	16,111
New York, N. Y	86,761	1,539,858	61,476	1,098,389	85,885	1,467,947
Norfolk and Portsmouth, Va	406	9,868				
Philadelphia, Pa	6,585	116,264	8,611	151,065	7,448	120,284
Portland, Me	10,100	191,065	16,450	309,948	24,880	436,692
San Francisco, Cal	6,338	121,050	5,371	99,767	8,237	152,335
Savannah, Ga	4,780	89,928			751	13,675
Vermont, Vt	2,675	72,121	1,161	29,204		
Willamette, Oreg	1,653	37,804	3,001	56,871	1,630	33,134
Wilmington, N. C	2,450	45,063				
All other	2,330	53,309	3,607	83,973	2,747	54,827
Total	172,389	3,193,528	128,683	2,370,449	155,399	2,711,912

PYRITE.

PRODUCTION.

In 1900 the production of iron pyrite for the manufacture of sulphuric acid reached a maximum amounting to 204,615 long tons, with a total value of $749,991. As compared with 1899 this is an increase of 29,881 long tons, or 17 per cent, in amount, and of $206,742, or 38 per cent, in value. Previous to 1900 the largest production in any one year was obtained in 1898, when the total product amounted to 193,364 long tons, valued at $593,801, which was exceeded in 1900 by 11,251 long tons in amount and $156,190 in value. In addition to this large increase in production there was an unusually large amount of pyrite imported, the imports amounting, in 1900, to 322,484 long tons, an increase of 52,616 long tons, or nearly 20 per cent, over 1899. The value of the imported pyrite in 1900 was, however, a little less than that imported in 1899.

Considering that the stocks carried forward from one year to another are practically the same, and estimating the domestic consumption by combining the imports and the domestic production, it will be seen that the amount of iron pyrite consumed in this country in 1900 was 527,099 long tons as compared with 444,602 long tons in 1899 and 446,137 long tons in 1898. Notwithstanding the large increases in both the production and the imports of pyrite in 1900 and the decrease in the value of the imported material, the price of the domestic product shows a substantial advance from $3.07 per ton in 1898 and $3.11 in 1899 to $3.67 in 1900.

The amount and value of pyrite mined for sulphur contents in the United States since 1882 have been as follows:

Production of pyrite in the United States from 1882 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Long tons.			*Long tons.*	
1882	12,000	$72,000	1892	109,788	$305,191
1883	25,000	137,500	1893	75,777	256,552
1884	35,000	175,000	1894	105,940	363,134
1885	49,000	220,500	1895	99,549	322,845
1886	55,000	220,000	1896	115,483	320,163
1887	52,000	210,000	1897	143,201	391,541
1888	54,331	167,658	1898	193,364	593,801
1889	93,705	202,119	1899	174,734	543,249
1890	99,854	273,745	1900	204,615	749,991
1891	106,536	338,880			

IMPORTS.

The following table shows the imports of pyrite containing not more than 3.5 per cent of copper from 1884 to 1900:

Imports of pyrite containing not more than 3.5 per cent of copper from 1884 to 1900. (*a*)

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Long tons.			*Long tons.*	
1884	16,710	$50,632	1894	163,546	$590,905
1885	6,078	18,577	1895	190,435	673,812
1886	1,605	9,771	1896	200,168	648,396
1887	16,578	49,661	1897	259,546	747,419
1891	100,648	392,141	1898	252,773	717,813
1892	152,359	587,980	1899	269,868	1,077,061
1893	194,934	721,699	1900	322,484	1,055,121

a Previous to 1884, classed among sulphur ores; 1887 to 1891, classed among other iron ores; since 1891, includes iron pyrite containing 25 per cent and more of sulphur.

CONSUMPTION.

As the imports of iron pyrite for use in the manufacture of sulphuric acid were not stated separately by the Bureau of Statistics of the Treasury Department prior to 1891, a comparison with the preceding years can not be made. The following table shows the amount of pyrite mined and imported for the past five years, and as no exports are reported by the Treasury Department these figures may be accepted as representing the domestic consumption. The table also shows the estimated amount of sulphur displaced each year, on a basis of 45 per cent of sulphur contents.

It will be observed that in the ten years covered by the following table the amount of sulphur displaced by the use of pyrite for acid making has increased more than 150 per cent. In 1891 the amount of sulphur displaced by the use of pyrite was 93,233 long tons; in 1900 the amount of sulphur displaced was 237,195 long tons, more than two and a half times that of 1891. This increased use of pyrite for acid making has been due very largely to the development of the sulphite wood-pulp industry for the manufacture of paper. Another important factor has been the increased production of phosphate rock from Florida and Tennessee and the domestic manufacture of superphosphates. For these purposes a chemically pure acid is not essential, and that made from pyrite serves the purpose equally as well as that made from sulphur.

Amount of pyrite consumed in the United States, and estimated sulphur displaced, from 1891 to 1900.

Source.	1891.	1892	1893.	1894.	1895.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Domestic product	106,536	109,788	75,777	105,940	99,549
Imports	100,648	152,359	194,934	163,546	190,435
Domestic consumption	207,184	262,147	270,711	269,486	289,984
Sulphur displaced, estimated on basis of 45 per cent contents	93,233	117,966	121,820	121,269	130,493

Source.	1896.	1897.	1898.	1899.	1900.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Domestic product	115,483	143,201	193,364	174,734	204,615
Imports	200,168	259,546	252,773	269,868	322,484
Domestic consumption	315,651	402,747	446,137	444,602	527,099
Sulphur displaced, estimated on basis of 45 per cent contents	142,043	181,236	200,762	200,071	237,195

CANADIAN PRODUCTION.

The production of iron pyrite in Canada received an impetus from the demand in the United States last year, and increased from 27,687 short tons in 1899 to 40,031 short tons in 1900. The output last year was the largest since 1894, when it amounted to 40,527 short tons. The production since 1894 had shown a declining tendency until 1900, when it received the benefit of the increased demand in the United States.

Since 1886 the production of pyrite in Canada has been as follows:

Annual production and value of pyrite in Canada since 1886.

Calendar year.	Tons of 2,000 lbs.	Value.	Calendar year.	Tons of 2,000 lbs.	Value.
1886	42,906	$193,077	1894	40,527	$121,581
1887	38,043	171,194	1895	34,198	102,594
1888	63,479	285,656	1896	33,715	101,155
1889	72,225	307,292	1897	38,910	116,730
1890	49,227	123,067	1898	32,218	128,872
1891	67,731	203,193	1899	27,687	110,748
1892	59,770	179,310	1900	40,031	155,164
1893	58,542	175,626			

WORLD'S PRODUCTION.

The following table has been compiled, chiefly from official sources, to show the pyrite production in the principal producing countries and to exhibit to what an extent pyrite has supplanted sulphur for acid making. In the case of Spain the exports are taken instead of the production for such years as they are available. The published figures of pyrite production in Spain show an output in each year averaging from 20 to 25 per cent of the exports. As the export figures are probably taken from the custom-house records they are considered more reliable.

World's product of iron pyrite, and amount of sulphur displaced.

Country.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Spain *a*	279,161	435,906	393,453	511,769	480,255	98,393	217,545	255,896	316,212
France	243,030	226,304	227,288	278,452	248,934	295,325	298,571	306,002	313,087
United States	106,536	109,788	75,777	105,940	99,549	115,483	143,201	193,364	174,734
Italy	....	....	....	....	....	....	57,383	66,120	75,308
Canada	60,474	53,372	52,270	36,185	30,534	30,103	34,471	24,721	35,742
United Kingdom	....	....	....	....	....	....	10,583	12,102	12,230
Total	689,211	1,005,370	748,788	932,346	859,272	539,304	761,754	858,205	927,313
Sulphur displaced *b*.	310,145	452,416	336,955	419,556	386,672	242,687	342,789	386,192	417,291

a Exports except in 1896. *b* Based on estimated 45 per cent of sulphur contents.

GYPSUM.

By Edward W. Parker.

PRODUCTION.

The production of gypsum in the United States has shown a continual increase since 1896. The output in 1900 amounted to 594,462 short tons, valued at $1,627,203, an increase of 108,227 short tons, or 22 per cent in amount, and of $340,123, or 26 per cent in value, over 1899, when the product amounted to 486,235 short tons, valued at $1,287,080. The production in 1900 was more than double, both in amount and value, that of 1898, or of any earlier year. The remarkable advances in the production of gypsum in the last few years is attributable to the increased use of plaster of paris in the manufacture of wall plasters in modern office buildings, this product supplanting the use of that made from ordinary lime for this purpose. All plasters made of gypsum are much harder and more durable than ordinary lime plasters and have proved exceedingly popular among architects and builders. A large quantity of plaster made from gypsum has also been used in the last few years for the manufacture of staff, which is used for the construction of temporary buildings, such as those built for exposition purposes. In 1890, just one decade earlier than the year for which this report is prepared, the production of calcined plaster amounted to less than 80,000 short tons and was worth a little over $400,000. In 1900 the production of calcined plaster amounted to 396,284 tons, with a value a little over $1,500,000. During this period the amount of gypsum used as fertilizer, or land plaster, has not materially changed, the slight fluctuations in the amount so consumed being due to climatic conditions. In dry seasons the consumption of gypsum for land plaster is increased, while in the wet seasons it is reduced. Most of the gypsum sold in the crude state is also used for land plaster, it being ground for this purpose by the consumers. As compared with 1899, the production of calcined plaster shows an increase in 1900 from 286,227 tons to 396,284 tons, while the value increased from $1,119,521 to $1,500,270. The production of land plaster decreased from 50,033 short tons, valued at

$100,797, to 45,682 short tons, valued at $82,806. The amount of gypsum sold crude also showed a decrease, from 58,352 short tons, valued at $66,762, to 35,479 short tons, valued at $44,127. The average price per ton for crude plaster increased from $1.14 in 1899, to $1.24 in 1900. The prices received for land plaster were the lowest reported in eleven years, the average being $1.81, a loss of 10 per cent, as compared with 1899. The average price for calcined plaster declined from $3.91 to $3.79.

There were 17 States and Territories which produced gypsum in 1900, the same as in 1899.

The production by States in the last two years is shown in the following tables. It is necessary, in some instances, in order to protect individual statistics, to combine the production of two or more States.

Production of gypsum in the United States in 1899, by States.

State.	Total product.	Sold crude.		Ground into land plaster.		Calcined into plaster of paris.			Total value.
		Quantity.	Value.	Quantity.	Value.	Before calcining.	After calcining.	Value.	
	Short tons.	*Short tons.*		*Short tons.*		*Short tons.*	*Short tons.*		
California	2,950	....	....	2,600	$10,700	350	250	$4,250	$14,950
Colorado and Wyoming	5,675	....	....	18	72	5,657	4,293	24,882	24,954
Iowa and Kansas	160,620	16,109	$16,147	4,175	7,336	140,336	106,272	520,427	543,910
Michigan	144,776	39,266	47,178	17,195	27,030	88,315	71,543	209,329	283,537
New York	52,149	1,900	1,677	13,924	25,290	36,325	26,443	78,566	105,533
Virginia	11,480	225	463	9,349	22,758	1,906	1,589	8,822	32,043
Other States *a*	108,585	852	1,297	2,772	7,611	104,961	75,837	273,245	282,153
Total	486,235	58,352	66,762	50,033	100,797	377,850	286,227	1,119,521	1,287,080

a Includes the product of Arizona, 47 tons; Indian Territory, 12,000 tons; Montana, 582 tons; Ohio, 27,205 tons; Oklahoma Territory, 11,526 tons; Oregon, 550 tons; South Dakota, 550 tons; Texas, 53,773 tons, and Utah, 2,352 tons.

Production of gypsum in the United States in 1900, by States.

State.	Total product.	Sold crude.		Ground into land plaster.		Calcined into plaster of paris.			Total value.
		Quantity.	Value.	Quantity.	Value.	Before calcining.	After calcining.	Value.	
	Short tons.	*Short tons.*		*Short tons.*		*Short tons.*	*Short tons.*		
California	3,280	....	....	....	....	3,280	2,522	$10,088	$10,088
Colorado and Wyoming	5,812	125	$188	15	$60	5,672	4,487	29,281	29,529
Iowa, Kansas, and Texas	313,858	1,184	1,740	2,266	3,065	310,408	233,120	899,458	904,263
Michigan	129,654	32,328	40,410	10,354	13,930	86,972	70,489	230,779	285,119
New York	58,890	1,402	1,122	21,444	47,292	36,044	27,979	102,174	150,588
Oklahoma	18,437	....	....	....	....	18,437	14,881	60,380	60,380
Virginia	11,940	200	262	9,124	11,996	2,616	2,093	5,853	18,111
Other States *a*	52,591	240	405	2,479	6,463	49,872	40,713	162,257	169,125
Total	594,462	35,479	44,127	45,682	82,806	513,301	396,284	1,500,270	1,627,203

a Includes product of Arizona, 35 tons; Indian Territory, 6,500 tons; Montana, 1,025 tons; Nevada, 1,000 tons; Ohio, 39,034 tons; Oregon, 550 tons; South Dakota, 2,050 tons, and Utah, 2,397 tons.

The following table is interesting as showing how the production of calcined plaster has increased during the last twelve years, while the production of land plaster and the amount of gypsum sold crude have shown variations in production and value without any regular increasing tendency. The amount and value of the product in each of the conditions in which it was marketed are given for twelve years, with the average price per ton. In the case of calcined plaster the value is given for the amount of plaster after calcining, and not for the raw product.

Distribution of the gypsum product of the United States since 1889.

Year.	Total amount produced.	Sold crude.			Ground into land plaster.		
		Quantity.	Value.	Average price per ton.	Quantity.	Value.	Average price per ton.
	Short tons.	*Short tons.*			*Short tons.*		
1889	267,769	73,243	$82,704	$1.13	108,771	$233,307	$2.14
1890	182,995	18,742	19,148	1.02	56,525	143,014	2.53
1891	208,126	18,574	28,690	1.54	51,700	117,356	2.27
1892	256,259	58,080	80,797	1.39	47,668	106,247	2.23
1893	253,615	42,808	71,860	1.68	50,408	106,365	2.11
1894	239,312	34,702	56,149	1.62	41,996	95,944	2.28
1895	265,503	26,624	37,837	1.42	35,079	85,355	2.43
1896	224,254	17,302	19,134	1.11	27,354	59,749	2.18
1897	288,982	23,164	27,020	1.17	31,562	67,083	2.13
1898	291,638	5,758	7,200	1.25	40,929	90,777	2.22
1899	486,235	58,352	66,762	1.14	50,033	100,797	2.01
1900	594,462	35,479	44,127	1.24	45,682	82,806	1.81

Year.	Calcined into plaster of paris.				Total value.
	Weight befor calcining.	Calcined plaster produced.	Value.	Average price per ton.	
	Short tons.	*Short tons.*			
1889	85,755	64,711	$448,107	$6.92	$764,118
1890	107,728	79,257	412,361	5.20	574,523
1891	137,852	110,006	482,005	4.38	628,051
1892	150,511	106,141	508,448	4.79	695,492
1893	160,399	122,937	518,390	4.22	696,615
1894	162,614	127,158	609,626	4.79	761,719
1895	203,800	150,801	674,255	4.47	797,447
1896	179,598	137,505	494,461	3.60	573,344
1897	234,256	180,935	661,761	3.66	755,864
1898	244,951	190,083	657,303	3.46	755,280
1899	377,850	286,227	1,119,521	3.91	1,287,080
1900	513,301	396,284	1,500,270	3.79	1,627,203

PRODUCTION BY STATES.

The total production and value, by States, for the same period were as follows:

Comparative statistics of gypsum production for twelve years.

State.	1889.		1890.		1891.		1892.	
	Product.	Value.	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Colorado	7,700	$28,940	4,580	$22,050	....	....	....	....
Iowa	21,784	55,250	20,900	47,350	31,385	$58,095	(*a*)	(*a*)
Kansas	17,332	94,235	20,250	72,457	40,217	161,322	46,016	$195,197
Michigan	131,767	373,740	74,877	192,099	79,700	223,725	139,557	306,527
New York	52,608	79,476	32,903	73,093	30,135	58,571	32,394	61,100
Ohio	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)
South Dakota	320	2,650	2,900	7,750	3,615	9,618	....	....
Virginia	6,838	20,336	6,350	20,782	5,959	22,574	6,991	28,207
Other States	29,420	109,491	20,235	138,942	17,115	94,146	31,301	104,461
Total	267,769	764,118	182,995	574,523	208,126	628,051	256,259	695,492

States.	1893.		1894.		1895.		1896.	
	Product.	Value.	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
California	....	....	....	....	5,158	$51,014	1,452	$11,738
Colorado	....	....	....	....	1,371	8,281	1,600	10,547
Iowa	21,447	$55,538	17,906	$44,700	25,700	36,600	18,631	34,020
Kansas	43,631	181,599	64,889	301,884	72,947	272,531	49,435	148,371
Michigan	124,590	303,921	79,958	189,620	66,519	174,007	67,634	146,424
New York	36,126	65,392	31,798	60,262	33,587	59,321	23,325	32,812
Ohio	(*a*)	(*a*)	20,827	69,597	21,662	71,204	(*a*)	(*a*)
South Dakota	5,150	12,550	4,295	16,050	6,400	20,600	(*a*)	(*a*)
Texas	....	....	6,925	27,300	10,750	36,511	(*a*)	(*a*)
Virginia	7,014	24,359	8,106	24,431	5,800	17,369	5,955	17,264
Other States	15,657	53,256	4,608	27,875	15,609	50,009	56,222	172,168
Total	253,615	696,615	239,312	761,719	265,503	797,447	224,254	573,344

State.	1897.		1898.		1899.		1900.	
	Product.	Value.	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
California	(*a*)	(*a*)	3,800	$24,977	2,950	$14,950	3,280	$10,088
Colorado	*b* 12,309	$50,355	*c* 5,390	23,712	*c* 5,675	24,954	*c* 5,812	29,529
Iowa Kansas	83,783	225,129	83,913	237,208	75,574 85,046	296,220 247,690	*d* 313,858	904,263
Michigan	94,874	193,576	93,181	204,310	144,776	283,537	129,654	285,119
New York	33,440	78,684	31,655	81,969	52,149	105,533	58,890	150,588
Ohio	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)
South Dakota	8,350	19,240	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)
Texas	24,454	65,651	34,215	58,130	(*a*)	(*a*)	(*e*)	(*e*)
Virginia	6,374	16,899	8,378	23,388	11,480	32,043	11,940	18,111
Other States	25,398	76,880	31,106	101,586	108,585	282,153	71,028	229,505
Total	288,982	755,864	291,638	755,280	486,235	1,287,080	594,462	1,627,203

a Included in other States. *b* Includes Indian Territory. *c* Includes Wyoming.
d Includes Texas. *e* Included with Iowa and Kansas.

The following table shows the annual production of gypsum in the United States since 1880:

Production of gypsum in the United States since 1880.

Year.	Product.	Value.	Year.	Product.	Value.
	Short tons.			*Short tons.*	
1880	90,000	$400,000	1891	208,126	$628,051
1881	85,000	350,000	1892	256,259	695,492
1882	100,000	450,000	1893	253,615	696,615
1883	90,000	420,000	1894	239,312	761,719
1884	90,000	390,000	1895	265,503	797,447
1885	90,405	405,000	1896	224,254	573,344
1886	95,250	428,625	1897	288,982	755,864
1887	95,000	425,000	1898	291,638	755,280
1888	110,000	550,000	1899	486,235	1,287,080
1889	267,769	764,118	1900	594,462	1,627,203
1890	182,995	574,523			

IMPORTS.

The imports of gypsum are chiefly from Canada, the product from the Dominion being very pure and well adapted for the manufacture of plaster of paris. It will be noticed that the large increases in the production of domestic gypsum have not had any marked influence on the imports of Canadian gypsum. Most of this material is imported in the crude state and calcined into plaster of paris at various points in the New England States, New York, and New Jersey. The imports of crude or unground plaster in 1900 were the largest on record, although the value in 1900 was less than the value of the imported material in 1892. What is also worthy of note is the decrease in the imports of calcined plaster, which in 1891 were valued at $97,316 and in 1900 were worth only $19,179. The following table exhibits the total amount and value of gypsum imported into the United States since 1867:

Gypsum imported into the United States from 1867 to 1900.

Year ending—	Ground or calcined.		Unground.		Value of manufactured plaster of paris.	Total value.
	Quantity. *a*	Value.	Quantity.	Value.		
June 30—	*Long tons.*		*Long tons.*			
1867	....	$29,895	97,951	$95,386	....	$125,281
1868	....	33,988	87,694	80,362	....	114,350
1869	....	52,238	137,039	133,430	$844	186,512
1870	....	46,872	107,237	100,416	1,432	148,720
1871	....	64,465	100,400	88,256	1,292	154,013
1872	....	66,418	95,339	99,902	2,553	168,873
1873	....	35,628	118,926	122,495	7,336	165,459
1874	....	36,410	123,717	130,172	4,319	170,901
1875	....	52,155	93,772	115,664	3,277	171,096
1876	....	47,588	139,713	127,084	4,398	179,070
1877	....	49,445	97,656	105,629	7,843	162,917

a Quantity not reported previous to 1882.

Gypsum imported into the United States from 1867 to 1900—Continued.

Year ending—	Ground or calcined.		Unground.		Value of manufactured plaster of paris.	Total value.
	Quantity.*a*	Value.	Quantity.	Value.		
June 30—	*Long tons.*		*Long tons.*			
1878		33,496	89,239	100,102	6,989	$140,587
1879		18,339	96,963	99,027	8,176	125,542
1880		17,074	120,327	120,642	12,693	150,409
1881		24,915	128,607	128,107	18,702	171,724
1882	*a*5,737	53,478	128,382	127,067	20,377	200,922
1883	4,291	44,118	157,851	152,982	21,869	218,969
1884	4,996	42,904	166,310	168,000	(*b*)	210,904
1885	6,418	54,208	117,161	119,544		173,752
1886	5,911	37,642	122,270	115,696		153,338
1887	4,814	37,736	146,708	162,154		199,890
Dec. 31—						
1888	3,340	20,764	156,697	170,023		190,787
1889	5,466	40,291	170,965	179,849		220,140
1890	7,568	55,250	171,289	174,609		229,859
1891	9,560	97,316	110,257	129,003		226,319
1892	6,832	75,608	181,104	232,403		308,011
1893	3,363	31,670	164,300	180,254		211,924
1894	2,027	16,823	162,500	179,237	(*b*)	196,060
1895	3,295	21,526	192,549	215,705	10,352	247,583
1896	3,292	21,982	180,269	193,544	11,722	227,248
1897	2,664	17,028	163,201	178,686	16,715	212,429
1898	2,973	18,501	166,066	181,364	40,979	240,844
1899	3,265	19,250	196,579	220,603	58,073	297,926
1900	3,109	19,179	209,881	229,878	66,473	315,530

a Quantity not reported previous to 1882. *b* Not specified from 1884 to 1894, inclusive.

CANADIAN PRODUCTION AND EXPORTS.

As the imports of gypsum into the United States are principally from the Provinces of Ontario, New Brunswick, and Nova Scotia, in the Dominion of Canada, the following table, showing the production in and the exports from the Dominion, will be found interesting:

Production and exports of Canadian gypsum since 1886.

Year.	Production.		Exports.	
	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*	
1886	162,000	$178,742	107,237	$114,736
1887	154,008	157,277	148,533	166,514
1888	175,887	179,393	124,515	133,238
1889	213,273	205,108	176,875	189,491
1890	226,509	194,033	175,111	193,899
1891	203,605	206,251	172,496	184,977
1892	241,048	241,127	175,518	194,304
1893	192,568	196,150	*a* 176,489	178,979
1894	223,631	202,031	162,412	160,082
1895	226,178	202,608	*a* 160,898	156,897
1896	207,032	178,061	200,857	205,641
1897	239,691	244,531	180,540	183,376
1898	219,256	230,440	180,350	193,515
1899	244,566	257,329	163,719	166,222
1900	252,001	259,009	233,395	236,065

a Entire exports went to the United States.

WORLD'S PRODUCTION.

The United States is the second country in the world as a producer of gypsum. France leads with more than one-half the entire world's production. Canada follows the United States in importance, though in one year (1896) the output of Great Britain exceeded that of Canada.

The following table exhibits, in short tons, the amount of gypsum produced by the principal countries of the world in each year for which statistics are available since 1893:

The world's production of gypsum since 1893.

Year.	United States.		Great Britain.		Canada.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1893	253,615	$696,615	158,122	$287,940	192,568	$196,150
1894	239,312	761,719	169,102	321,822	223,631	202,031
1895	265,503	797,447	196,037	348,400	226,178	202,608
1896	224,254	573,344	213,028	361,509	207,032	178,061
1897	288,982	755,864	203,151	325,513	239,691	244,531
1898	291,638	755,280	219,549	345,882	219,256	230,440
1899	486,235	1,287,080	238,071	372,073	244,566	257,329

Year.	France.		German Empire.		India.		Cyprus.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
1893	....	....	....	....	....	....	2,357	$6,625
1894	1,693,831	$2,891,365	....	....	3,548	$1,566	3,104	9,006
1895	2,175,448	3,392,768	23,994	$11,040	7,511	2,987	2,093	5,252
1896	1,866,498	2,661,200	31,736	14,598	8,248	3,130	1,050	2,590
1897	1,845,874	2,673,033	28,821	13,228	9,025	3,333	4,167	8,162
1898	1,931,712	2,777,816	28,315	13,166	9,249	1,503	4,279	7,551
1899	1,802,812	2,641,020	32,760	19,660	7,216	768	4,402	8,866

SALT.

By Edward W. Parker.

PRODUCTION.

The activity which prevailed in the salt-manufacturing industry of the United States in 1899 continued through 1900, resulting in an increase of a little over 1,000,000 barrels, or about 6 per cent over the preceding year. The actual production in 1900 was 20,869,342 barrels of 280 pounds net, as against 19,708,614 barrels in 1899. The value of the product in 1900 was $6,944,603, as compared with $6,867,467 in 1899, a gain of $77,136, or only a little over 1 per cent, as compared with an increase of almost 6 per cent in product. In the twenty years covered by this series of reports the salt-making industry of the United States has shown an increase in development probably second to none. In 1880 the total amount of salt produced in the United States was 5,961,060 barrels, not much more than one-fourth of the production in 1900. In 1890 the output of salt in the United States was 8,876,991 barrels. By 1895 this amount had increased a little more than 50 per cent, to 13,669,649 barrels, and the records for 1900 show that another increase of 50 per cent has been made since 1895. During the last seventeen years there has been one exception to the regularly increasing yearly production. This exception was in 1889, when the production was about 50,000 barrels, or 0.6 per cent less than that of 1888. Notwithstanding, and perhaps because of, the rapid increase in the production of salt in the United States during the last twenty years, the business has not been a lucrative one. This condition was due in a great many cases to overproduction and keen competition for trade, and as a natural result the tendency to combination which has been marked in other industries during the last few years extended also to the salt manufacturers. Combinations have been effected among the majority of producers in New York, Ohio, Michigan, Kansas, Utah, and California, which are among the most important of the salt-producing States.

In the following table is presented the distribution of the total salt product of the United States, by grades, during the last eight years.

It will be observed that the production of common fine salt has approximated 40 per cent of the total output during this period.

Production of salt in the United States, 1893 to 1900, inclusive, by grades.

Year.	Table and dairy.	Common fine.	Common coarse.	Packers'.	Solar.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*
1893	1,791,577	5,478,054	444,498	96,657	2,110,287
1894	2,839,140	5,281,754	438,074	103,041	587,305
1895	2,173,123	6,099,480	280,284	118,801	983,870
1896	2,230,409	6,598,733	300,365	163,035	2,531,086
1897	2,555,278	6,868,798	516,143	609,378	3,614,491
1898	2,198,339	8,583,128	873,671	379,635	3,077,024
1899	1,866,165	6,383,352	4,562,217	182,930	3,483,858
1900	2,312,130	6,773,217	1,921,321	145,305	1,086,916

Year.	Rock.	Milling.	Other grades.	Total product.	Total value.
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	
1893	1,884,145	5,141	6,413	11,816,772	$4,054,668
1894	2,266,606	95,621	1,356,876	12,968,417	4,739,285
1895	2,089,763	40,107	1,884,221	13,669,649	4,423,084
1896	1,783,886	133,271	109,941	13,850,726	4,040,839
1897	1,649,459	....	159,655	15,973,202	4,920,020
1898	2,183,801	156,579	160,457	17,612,634	6,212,554
1899	2,544,036	96,178	89,878	19,708,614	6,867,467
1900	2,974,033	85,357	5,571,063	20,869,342	6,944,603

The total production of salt in the United States in each year since 1880 is shown in the following table. This statement shows that in proportion to the production the value in some of the earlier years was greater than it has been since 1892. Part of this is due to the fact that the competition was not so strong during the first ten years of which records have been available, and, in addition to that, the value of the product when reported by a great many of the manufacturers included the value of the packages in which the salt was shipped. From 1893 on the value as stated includes only the net value of the product, exclusive of any boxes, bags, barrels, or other packages.

Amount and value of salt produced in the United States since 1880.

Year.	Amount.	Value.	Year.	Amount.	Value.
	Barrels.			*Barrels.*	
1880	5,961,060	$4,828,566	1891	9,987,945	$4,716,121
1881	6,200,000	4,200,000	1892	11,698,890	5,654,915
1882	6,412,373	4,320,140	1893	11,897,208	4,154,668
1883	6,192,231	4,251,042	1894	12,968,417	4,739,285
1884	6,514,937	4,197,734	1895	13,669,649	4,423,084
1885	7,038,653	4,825,345	1896	13,850,726	4,040,839
1886	7,707,081	4,825,345	1897	15,973,202	4,920,020
1887	8,003,962	4,093,846	1898	17,612,634	6,212,554
1888	8,055,881	4,374,203	1899	19,708,614	6,867,467
1889	8,005,565	4,195,412	1900	20,869,342	6,944,603
1890	8,876,991	4,752,286			

PRODUCTION BY STATES.

New York continued to hold first place among the salt-producing States, a position which it has held since 1893. Prior to that time the leading place was held by Michigan. New York produced in 1900 7,897,071 barrels, or about 38 per cent of the total. Michigan produced in the same year 7,210,621 barrels, or 35 per cent of the total. Kansas, the third among the salt-producing States, had an output in 1900 of 2,233,878 barrels, or not quite 11 per cent of the total, and Ohio, the fourth in importance, produced 1,425,283 barrels, or 7 per cent of the total. It will be seen from this that these four States produced 90 per cent of the total salt product of the United States.

The production of salt, by States, during the years 1898, 1899, and 1900 is shown in the following table. For a statement of the production by States in earlier years the reader is referred to the preceding reports of this series.

Production of salt, by States and Territories, during 1898, 1899, and 1900.

State or Territory.	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value
	Barrels.		*Barrels.*		*Barrels.*	
New York	6,791,798	$2,369,323	7,489,105	$2,540,426	7,897,071	$2,171,418
Michigan	5,263,564	1,628,081	7,117,382	2,205,924	7,210,621	2,033,731
Kansas	1,882,329	616,591	1,645,350	546,291	2,233,878	1,076,945
Ohio	1,682,247	826,868	1,460,516	575,864	1,425,283	696,326
Oklahoma					5,861	6,136
California	653,009	185,848	642,563	281,741	621,857	216,291
Texas	(*a*)	(*a*)	312,436	204,330	(*a*)	(*a*)
West Virginia	247,668	88,462	221,534	107,987	243,873	118,407
Utah	266,250	103,778	236,135	115,100	249,128	151,662
Pennsylvania	154,287	46,000	(*a*)	(*a*)	(*a*)	(*a*)
Other States	671,482	347,603	570,674	275,016	981,770	473,687
Total	17,612,634	6,212,554	19,708,614	6,867,467	20,869,342	6,944,603

a Included in other States.

DOMESTIC CONSUMPTION.

In connection with the statistics of the production of salt in the United States it is interesting to note the increase in the proportion in which the salt of domestic product has entered into the domestic consumption. This is clearly illustrated in the following table, which shows that since 1880 the salt of domestic production consumed in the United States has increased from 63.5 per cent to 93.6 per cent, and the amount of imported salt consumed in the United States has decreased from 36.5 per cent of the total to 6.4 per cent of the total. The domestic consumption of salt in 1900 was 22,343,613 barrels, more than 2½ times that of 1880. In 1880 the domestic production was

5,961,060 barrels, and the imports 3,427,639 barrels. In 1900 the production had increased to 20,869,342 barrels, while the imports had decreased to 1,427,921 barrels.

The following table presents the production, imports, exports, and domestic consumption since 1880:

Supply of salt for domestic consumption from 1880 to 1900.

[Barrels.]

Source.	1880.	1881.	1882.	1883.
Domestic production	5,961,060	*a* 6,000,000	6,412,373	6,192,231
Imports	3,427,639	3,839,994	3,085,168	3,099,698
Total	9,388,699	9,839,994	9,497,541	9,291,929
Exports	4,436	9,091	8,417	10,829
Domestic consumption	9,384,263	9,830,903	9,489,124	9,281,100
Increase over preceding year	....	446,640	*b* 341,779	*b* 208,024
Percentage of imports to total consumption	36.5	39.1	32.5	33.4

Source.	1884.	1885.	1886.	1887.
Domestic production	6,514,937	7,038,653	7,707,081	8,003,962
Imports	3,246,349	3,227,380	2,818,623	2,587,745
Total	9,761,286	10,266,033	10,525,704	10,591,707
Exports	14,003	14,649	17,246	16,732
Domestic consumption	9,747,283	10,251,384	10,508,458	10,574,975
Increase over preceding year	466,183	504,101	257,074	66,517
Percentage of imports to total consumption	33.3	31.5	26.8	24.5

Source.	1888.	1889.	1890.	1891.
Domestic production	8,055,881	8,055,565	8,876,991	9,987,945
Imports	2,232,253	1,833,452	1,838,024	1,694,048
Total	10,288,134	9,839,017	10,715,015	11,681,993
Exports	19,140	19,209	17,597	15,889
Domestic consumption	10,268,994	9,819,808	10,697,418	11,666,104
Increase over preceding year	*b* 305,981	*b* 449,186	877,610	968,686
Percentage of imports to total consumption	21.7	18.7	17.2	14.5

Source.	1892.	1893.	1894.	1895.
Domestic production	11,698,890	11,897,208	12,968,417	13,669,649
Imports	1,633,419	1,244,711	1,550,555	1,996,970
Total	13,332,309	13,141,919	14,518,972	15,666,619
Exports	18,603	20,686	38,763	36,855
Domestic consumption	13,313,706	13,121,233	14,480,209	15,629,764
Increase over preceding year	1,647,602	*b* 192,473	1,358,976	1,149,555
Percentage of imports to total consumption	12.3	9.49	10.71	12.78

a Estimated. *b* Decrease.

Supply of salt for domestic consumption from 1880 to 1900—Continued.

[Barrels.]

Source.	1896.	1897.	1898.	1899.	1900.
Domestic production	13,850,726	15,973,202	17,612,634	19,708,614	20,869,342
Imports	1,858,614	1,493,033	1,325,212	1,350,366	1,427,921
Total	15,709,340	17,466,235	18,937,846	21,058,980	22,297,263
Exports	63,391	54,195	61,715	90,000	53,650
Domestic consumption	15,645,949	17,412,040	18,876,131	20,968,980	22,243,613
Increase over preceding year	16,185	1,766,091	1,464,091	2,092,849	1,274,633
Percentage of imports to total consumption	11.88	8.57	7.02	6.4	6.4

IMPORTS AND EXPORTS.

The imports of salt into the United States, as reported by the Bureau of Statistics of the Treasury Department, show that from 1867 to 1881 there was a persistent increasing tendency from 483,775,185 pounds in the former year to 1,075,198,397 pounds in 1881. From 1881 the imports decreased almost as steadily until 1893. The decrease was largely in the imports of fine salt, due to the successful efforts of American manufacturers to produce table, dairy, and other special grades of salt equal, if not superior, in quality and price to the imported article. The tariff act of 1894 placed salt upon the free list, and importations increased from 348,519,173 pounds in 1893 to 434,155,708 pounds in 1894, and to nearly 560,000,000 pounds in 1895. In 1896 the imports of foreign salt amounted to 520,411,822 pounds. The tariff act of 1897 returned salt to the dutiable list. Salt in bags, barrels, or other packages is now subjected to a duty of 12 cents per 100 pounds (33.6 cents per barrel), and salt in bulk is taxed at the rate of 8 cents per 100 pounds, or 22.4 cents per barrel. The duty on imported salt in bond used in curing fish taken by vessels licensed to engage in the fisheries and in curing fish on the navigable waters of the United States, or on salt used in curing meats for export, may be remitted. The quantity of salt imported in 1897 was nearly 20 per cent less than in 1896, the total amounting to 418,049,214 pounds, while in 1898 the imports fell off to 371,059,452 pounds, with one exception the smallest amount reported in thirty-two years. In 1899 the imports increased slightly to 378,102,567 pounds, a gain of 7,043,115 pounds over 1898, but the value showed a decline of about $9,000.

Since 1867 the imports have been as follows:

Salt imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	In bags, barrels, and other packages.		In bulk.	
	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*	
1867	254,470,862	$696,570	229,304,323	$336,302
1868	308,446,080	915,546	219,975,096	365,458
1869	297,382,750	895,272	256,765,240	351,168
1870	288,479,187	797,194	349,776,433	507,874
1871	283,993,799	800,454	274,730,573	355,318
1872	258,232,807	788,893	257,637,230	312,569
1873	239,494,117	1,254,818	388,012,132	525,585
1874	358,375,496	1,452,161	427,294,209	649,838
1875	318,673,091	1,200,541	401,270,315	549,111
1876	331,266,140	1,153,480	379,478,218	462,106
1877	359,005,742	1,059,941	444,044,370	532,831
1878	352,109,963	1,062,995	414,813,516	483,909
1879	375,286,472	1,150,018	434,760,132	532,706
1880	400,970,531	1,180,082	449,743,872	548,425
1881	412,442,291	1,242,543	529,361,041	658,068
1882	329,969,300	1,086,932	399,100,228	474,200
1883	312,911,360	1,035,946	412,938,686	451,001
1884	340,759,010	1,093,628	441,613,517	433,827
1885	351,276,969	1,030,029	412,322,341	386,858
Dec. 31—				
1886	319,232,750	966,993	366,621,223	371,000
1887	275,774,571	850,069	343,216,331	328,201
1888	238,921,421	620,425	272,650,231	246,022
1889	180,906,293	627,134	234,499,635	249,232
1890	172,611,041	575,260	243,756,044	252,848
1891	150,033,182	492,144	220,309,985	224,569
1892	150,799,014	488,108	201,366,103	196,371
1893	98,037,648	358,575	146,945,390	63,404
1894	60,793,685	206,229	101,525,281	86,718
1895	601,086	1,723	1,874,644	1,874
1896	350,620	814	1,627,030	1,640
1897	36,801,048	114,072	50,775,105	46,412
1898	114,573,146	361,366	178,458,117	165,784
1899	119,720,721	372,921	158,263,237	133,862
1900	113,194,092	368,802	198,697,810	193,873

Salt imported and entered for consumption in the United States, etc.—Continued.

Year ending—	For the purpose of curing fish.		Not elsewhere specified.		Total quantity.	Total value.
	Quantity.	Value.	Quantity.	Value.		
June 30—	*Pounds.*		*Pounds.*		*Pounds.*	
1867					483,775,185	$1,032,872
1868					528,421,176	1,281,004
1869					554,147,990	1,246,440
1870	68,597,023	$87,048			706,852,643	1,392,116
1871	64,671,139	66,008			623,395,511	1,221,780
1872	57,830,929	60,155			773,700,966	1,161,617
1873	86,756,628	86,193			714,262,877	1,866,596
1874	105,613,913	126,896			891,283,618	2,228,895
1875	110,294,440	119,607			830,237,846	1,869,259
1876	118,760,638	126,276			829,504,996	1,741,862
1877	132,433,972	140,787			935,484,084	1,733,559
1878	100,794,611	96,898			867,718,090	1,643,802
1879	94,060,114	95,841			904,106,718	1,778,565
1880	109,024,446	119,667			959,738,849	1,848,174
1881	133,395,065	144,347			1,075,198,397	2,044,958
1882	134,777,569	147,058			863,847,097	1,708,190
1883	142,065,557	154,671			867,915,603	1,641,618
1884	126,605,276	122,463			908,977,803	1,649,918
1885	140,067,018	121,429			903,666,328	1,538,316
Dec. 31—						
1886	103,360,362	94,721			789,214,335	1,432,714
1887	105,577,947	107,089			724,568,849	1,285,359
1888	113,459,083	111,120			625,030,735	977,577
1889	97,960,624	100,123			513,366,552	976,489
1890	98,279,719	96,648			514,646,804	924,753
1891	103,990,324	89,196			474,333,491	805,909
1892	105,192,086	90,327			457,357,203	774,806
1893	103,536,135	87,749			348,519,173	509,728
1894	93,723,885	79,482	178,112,857	$263,707	434,155,708	636,136
1895	8,668,490	12,195	548,007,449	739,122	559,151,669	754,914
1896	8,351,913	11,814	510,082,259	687,890	520,411,822	702,158
1897	32,961,953	33,962	297,511,108	370,592	418,049,214	565,038
1898	78,028,189	61,503			371,059,452	588,653
1899	100,118,609	72,899			378,102,567	579,682
1900	87,925,922	71,632			399,817,824	634,307

Salt of domestic production exported from the United States from 1790 to 1900, inclusive.

Year ending—	Quantity.	Value.
Sept. 30—	*Bushels.*	
1790	31,935	$8,236
1791	4,208	1,052
1830	47,488	22,978
1831	45,847	26,848
1832	45,072	27,914
1833	25,069	18,211
1834	89,064	54,007
1835	126,230	46,483
1836	49,917	31,943
1837	99,133	58,472
1838	114,155	67,707
1839	264,337	64,272
1840	92,145	42,246
1841	215,084	62,765
1842	110,400	39,064
June 30—		
1843 *a*	40,678	10,262
1844	157,529	47,755
1845	131,500	45,151
1846	117,627	30,520
1847	202,244	42,333
1848	219,145	73,274
1849	312,063	82,972
1850	319,175	75,103
1851	344,061	61,424
1852	1,467,676	89,316
1853	515,857	119,729
1854	548,185	159,026
1855	536,073	156,879
1856	698,458	311,495
1857	576,151	190,699
1858	533,100	162,650
1859	717,257	212,710
1860	475,445	129,717
1861	537,401	144,046
1862	397,506	228,109
1863	584,901	277,838
1864	635,519	296,088
June 30—	*Bushels.*	
1865	589,537	$358,109
1866	70,644	300,980
1867	605,825	304,030
1868	624,970	289,936
1869	442,947	190,076
1870	298,142	119,582
1871	120,156	47,115
1872	42,603	19,978
1873	73,323	43,777
1874	31,657	15,701
1875	47,094	16,273
1876	51,014	18,378
1877	65,771	20,133
1878	72,427	24,968
1879	43,710	13,612
1880	22,179	6,613
1881	45,455	14,752
1882	42,085	18,265
1883	54,147	17,321
1884	70,014	26,007
1885	*b* 4,101,587	26,488
Dec. 31—		
1886	4,828,863	29,580
1887	4,685,080	27,177
1888	5,359,237	32,986
1889	5,378,450	31,405
1890	4,927,022	30,079
1891	4,448,846	23,771
1892	5,208,935	28,399
1893	5,792,207	38,375
1894	10,853,759	46,780
1895	7,203,024	30,939
1896	10,711,314	43,202
1897	11,593,321	52,320
1898	17,280,193	63,624
1899	25,200,191	86,465
1900	15,021,861	65,410

a Nine months. *b* Pounds from 1885.

In connection with the above tables it is interesting to note the sources from which our imported salt is obtained and the markets supplied by our exports of domestic salt. For this purpose the following tables, showing the countries from which we import, the amount and value of the salt received from each, and also the amount and value of the salt exported to each country, are given for the three fiscal years ending June 30, 1898, 1899, and 1900. It will be observed that Great Britain is the principal exporter of salt to the United States, the amount imported from the United Kingdom averaging somewhat over 40 per cent of the total imports. Next in importance are the West Indian Islands (chiefly British), and after these comes Italy. The amount received from other countries is comparatively small.

The principal exports are through the port of San Francisco, and to the Central American States, Mexico, the Hawaiian Islands, Japan, and Asiatic Russia. About 25 per cent, or a little more, goes across the Great Lakes to the Dominion of Canada.

The imports and exports for the past three fiscal years, with the countries from which imported, and to which exported, have been as follows:

Imports of salt during the fiscal years ending June 30, 1898, 1899, and 1900.

Country from which exported.	Year ending June 30, 1898.				Year ending June 30, 1899.		Year ending June 30, 1900.	
	Free.		Dutiable.*a*		Dutiable and free.		Dutiable and free.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*		*Pounds.*	
United Kingdom..	13,011,441	$23,117	163,796,501	$362,913	155,802,586	$401,397	174,211,930	$449,520
Italy	3,413,600	2,138	59,803,075	38,478	68,133,438	42,562	89,445,529	43,851
Canada			5,054,777	12,506	3,850,891	7,719	8,359,966	14,971
West Indies	9,628,849	8,913	78,294,591	69,170	131,962,790	102,825	133,734,505	111,939
Other countries			9,251,272	7,424	4,033,228	4,419	5,040,510	5,582
Total	26,053,890	34,168	316,200,216	490,491	363,782,933	558,922	410,792,440	625,863

a The tariff act of 1894 provided that salt should be free of duty, but when in bags or other packages the coverings should pay duty as if imported separately, and salt imported from countries imposing a duty on salt exported from the United States, should pay the rate of duty imposed prior to the act of 1894. Under the tariff act of 1897 salt in bulk is subject to a duty of 8 cents per 100 pounds; salt in packages, 12 cents per 100 pounds, with duty remitted on salt used in curing meats for export, or in curing fish, on the navigable waters of the United States.

Exports of salt during the fiscal years ending June 30, 1898, 1899, and 1900.

Country to which exported.	Year ending June 30, 1898.		Year ending June 30, 1899.		Year ending June 30, 1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
United Kingdom	570,507	$4,554	45,230	$360	3,000	$49
Bermuda	181,806	1,466	155,088	1,589	135,140	1,346
British Honduras	28,150	241	19,951	223	19,152	304
Dominion of Canada:						
Nova Scotia, New Brunswick, etc	114,452	1,261	30,383	572	51,630	679
Quebec, Ontario, etc	2,247,640	7,090	2,415,988	6,832	2,888,751	10,409
British Columbia	1,119,949	5,663	2,012,080	7,755	2,197,726	7,042
Newfoundland and Labrador	109,700	1,226	107,320	1,028	95,865	973
Central American States:						
Costa Rica	111,820	864	140,945	1,058	106,380	1,309
Guatemala	207,470	982	693,797	4,714	15,995	167
Honduras	101,310	1,006	99,242	1,004	131,487	1,506
Nicaragua	266,240	2,481	270,931	3,216	285,400	2,947
Salvador	251,640	1,005	37,500	146	4,500	17
Mexico	1,210,258	8,367	1,713,796	10,872	1,090,033	9,243
West Indies:						
British	235,263	924	129,415	512	226,900	1,177
Danish	1,700	17	500	3	2,300	25
Dutch and French *a*	7,455	82	10,180	120	11,211	133
Haiti	10,298	115	4,793	60	2,400	37
Porto Rico	....	....	2,426	19	13,602	105
Santo Domingo	56,364	662	27,744	322	30,292	335
Cuba	17,372	118	853,572	5,311	399,431	2,227
Colombia	48,783	407	112,057	699	121,371	1,043
Japan	240,000	804	1,204,000	2,810	1,111,400	2,485
China	150,000	1,500	114,200	245	....	....
Russia, Asiatic	8,883,000	20,745	14,093,100	32,020	2,502,000	6,220
French Oceania	107,110	450	103,950	500	114,850	475
British Australasia	86,830	893	169,100	859	162,400	748
Hawaiian Islands	613,500	2,776	634,970	2,843	851,500	3,689
Philippine Islands	....	....	....	....	74,800	416
British Africa	15,855	148	14,000	145	7,300	71
Other countries	78,742	504	40,376	478	75,103	656
Total	17,073,214	66,151	25,256,634	86,315	12,731,919	55,833

a In 1899 and 1900 French only.

WORLD'S PRODUCTION.

With the exception of the production of the United States and Canada, the latest statistics available for the countries contributing to the world's supply of salt are for the calendar year 1899. The subsequent table, accordingly, brings the output for these countries down to that year only. It shows that the United States, which since 1892 has held second place among the countries of the world, became the leader in 1897, ranking Great Britain by about 5 per cent. This advantage was increased in 1898 by a gain in the production of the United States and a decrease in the output of Great Britain.

Both countries increased their production in 1899, the United States by nearly 300,000 short tons and Great Britain by a little over 40,000 tons, so that the lead of the United States over her principal rival was increased. The United States produced in 1899 nearly 30 per cent more salt than Great Britain. The increase in the production of salt in Great Britain in 1899 was the first time since 1894 in which year that country's output of salt had increased over the preceding year, whereas the production in the United States has increased annually since 1890. The table further shows that the United States produced in 1899 a little over 22 per cent of the world's supply, while Great Britain produced but 17.4 per cent. The latest statistics available for Russia are for the calendar year 1898, in which year that country produced about 14 per cent of the total; Germany's production in 1899 was 12.8 per cent of the total; France produced not quite 11 per cent, and India 8½ per cent; Austria-Hungary produced a little less than 5 per cent in 1899.

It is noticeable, however, that while the production of Austria-Hungary was less than 5 per cent of the total world's output, the value of the product in that country was more than 42 per cent of the total value. This is due to the fact that the salt-producing industry of Austria-Hungary is a government monopoly and one of its principal sources of revenue. The production of salt in Austria-Hungary in 1899 was only a little more than one-fifth the production in the United States, while the value of the salt product of the United States was but little more than one-third of that produced in Austria-Hungary. The value of the product in Austria-Hungary was nearly six times that of Great Britain, the value of whose product was less than one-half that of the United States, while the amount produced in the United States was 30 per cent more than that of Great Britain. The first cost of salt to the consumer in the United States is a little over $2 per ton; in Austria-Hungary it is over $30 per ton, and with such conditions the small production is readily accounted for. The mere fact that salt is so cheaply produced in Great Britain and in the United States has increased its consumption, and has had no little influence in the development of our packing industries and also in the development of the chlorination process for the extraction of gold and silver from their ores.

In the following table the production of salt in Turkey is not included. The industry in that country, as it is in Austria-Hungary, is a government monopoly, and no statistics of production are published. In this table the statistics of salt production in the principal countries of the world are shown for each year from 1890 to 1899, with the exception of Russia, where the latest statistics available are for 1898. For the sake of convenience the quantities are expressed in short tons.

The world's salt production.

Year.	United States.		Great Britain.		France.*a*	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1890	1,242,778	$4,752,286	2,403,462	$5,354,400	955,434	$3,458,174
1891	1,398,312	4,040,839	2,288,800	4,737,596	932,292	2,868,945
1892	1,637,845	5,654,915	2,191,307	4,177,795	1,100,898	3,318,366
1893	1,665,609	4,154,668	2,154,912	3,565,827	1,248,560	3,291,422
1894	1,815,438	4,739,285	2,504,221	3,703,601	1,001,498	2,762,216
1895	1,913,751	4,423,084	2,434,043	3,442,292	988,273	2,421,378
1896	1,939,102	4,040,839	2,265,040	3,233,073	1,178,038	2,492,402
1897	2,236,248	4,920,020	2,131,912	3,017,564	1,070,290	2,236,755
1898	2,465,769	6,212,554	2,103,718	3,016,011	1,132,415	2,156,196
1899	2,759,206	6,867,467	2,144,680	3,134,873	1,334,962	2,484,103

Year.	German Empire.		Italy.		Austria-Hungary. *b*	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1890	1,156,769	$3,750,642	524,552	$999,933	515,736	$17,863,887
1891	1,289,560	3,903,438	492,144	927,812	508,022	17,436,392
1892	1,286,365	3,968,650	461,738	857,692	490,390	16,069,952
1893	1,293,748	4,016,909	466,146	990,283	524,552	16,475,059
1894	1,386,316	4,143,710	477,166	912,118	565,326	17,256,516
1895	1,347,014	4,131,945	526,370	1,030,350	530,062	17,075,675
1896	1,436,258	4,204,910	497,915	935,466	538,951	15,497,873
1897	1,306,684	3,730,950	507,778	968,031	554,078	15,725,518
1898	1,510,511	3,755,201	497,002	802,108	639,830	19,535,222
1899	1,578,314	3,783,270	432,720	616,144	578,000	18,112,471

Year.	Russia.		Spain.		India.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1890	1,531,736	$2,613,611	678,531	$1,750,444	1,159,395	$1,948,104
1891	1,489,008	4,978,589	642,292	1,687,300	1,139,468	1,690,294
1892	1,608,595	4,627,700	750,059	2,505,855	1,008,330	1,750,317
1893	1,489,687	4,281,970	166,913	82,076	940,547	1,546,597
1894	1,493,572	3,317,160	227,645	85,786	1,452,654	2,538,121
1895	1,705,896	3,887,090	359,604	918,775	1,282,522	2,058,678
1896	1,484,782	4,917,250	574,970	1,113,494	1,131,472	1,753,371
1897	1,682,337	4,357,253	560,484	1,118,720	1,033,601	1,560,415
1898	1,642,980	4,255,318	527,858	989,704	1,104,513	1,902,377
1899	(*c*)	(*c*)	659,140	1,052,988	1,031,149	1,637,836

a Includes product of Algeria.

b Government monopoly.

c Production in 1898 is used in making up the total for the world's production.

The world's salt production—Continued.

Year.	Canada.		Other countries.		The world.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*	
1890	43,754	$198,857	....	....	10,212,147	$42,690,338
1891	45,021	161,179	....	....	10,224,919	42,432,384
1892	45,486	162,041	....	....	10,581,013	43,093,283
1893	62,324	195,926	....	....	10,013,004	38,600,737
1894	57,199	170,687	*a* 2,772	$9,515	10,983,807	39,638,715
1895	52,376	160,455	*b* 159,129	1,155,738	11,299,040	40,605,460
1896	43,960	169,693	*c* 128,959	408,111	11,219,447	38,766,482
1897	51,348	225,730	*c* 35,373	204,468	11,170,133	38,065,424
1898	57,126	248,639	*d* 463,707	1,567,034	12,145,429	44,440,364
1899	57,095	234,520	123,179	755,531	12,341,425	42,934,521

a Cape Colony and Ceylon.
b Cape Colony, Ceylon, Greece, Bosnia, and Herzegovina.
c Cape Colony, Greece, Bosnia, and Herzegovina.
d In addition to this amount Brazil produced 26,882; Peru, 19,836; Roumania, 119,103; Switzerland, 52,116; Turkey, 247,663. Total, 465,600 short tons, for which no value is given.

MICA.

PRODUCTION.

The production of mica in the United States in 1900 largely exceeded that of any previous year in amount, although the value of the product was considerably less than that obtained in any of the years from 1881 to 1885. The total amount of sheet mica reported to the Survey as produced in 1900 was 456,283 pounds, valued at $92,758, as compared with 108,570 pounds, valued at $70,587, in 1899. This large increase in amount, with a comparatively slight increase in value, was due to the increased use of small-sized mica, which in previous years has been considered as a waste product or ground as scrap mica. In fact, a considerable quantity of the product reported in 1900 was material taken from scrap heaps. This was particularly the case in New Hampshire and North Carolina. South Dakota reported a production of 123,090 pounds, which was included in the sheet-mica product, but nearly all of it was sold in the rough blocks and shipped to Eastern factories for manufacture. The total value of this product is given as $3,745. The value of the sheet mica obtained from it largely exceeded this amount.

The amount of scrap mica produced in 1900 was reported as 5,497 short tons, valued at $55,502, as compared with 1,505 short tons in 1899, valued at $50,878.

There was a slight increase in the amount of unmanufactured mica imported into the United States—from 1,709,839 pounds in 1899, valued at $233,446, to 1,892,000 pounds, valued at $290,872, in 1900. The imports of cut or trimmed mica decreased slightly—from 67,293 pounds, valued at $42,538, to 64,391 pounds, valued at $28,688.

The following table shows the annual production of mica in the United States since 1880:

Production of mica since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Pounds.			*Pounds.*	
1880	81,669	$127,825	1894 Sheet	35,943	$52,388
1881	100,000	250,000	1894 Scrap	*a* 191	
1882	100,000	250,000	1895 Sheet	44,325	55,831
1883	114,000	285,000	1895 Scrap	*a* 148	
1884	147,410	368,525	1896 Sheet	49,156	65,441
1885	92,000	161,000	1896 Scrap	*a* 222	1,750
1886	40,000	70,000	1897 Sheet	82,676	80,774
1887	70,000	142,250	1897 Scrap	*a* 740	14,452
1888	48,000	70,000	1898 Sheet	129,520	103,534
1889	49,500	50,000	1898 Scrap	*a* 3,999	27,564
1890	60,000	75,000	1899 Sheet	108,570	70,587
1891	75,000	100,000	1899 Scrap	*a* 1,505	50,878
1892	75,000	100,000	1900 Sheet	456,283	92,758
1893 Sheet	51,111	88,929	1900 Scrap	*a* 5,497	55,202
1893 Scrap	*a* 156				

a Short tons.

The production of mica during 1899 and 1900, by States, was as follows:

Production of mica in 1899, by States.

State.	Sheet mica.	Scrap mica.
	Pounds.	*Short tons.*
New Hampshire	16,113	165
New Mexico	5,500	123
North Carolina	85,707	737
South Dakota and Wyoming	1,250	480
Total	108,570	1,505

Production of mica in 1900, by States.

State.	Sheet mica.	Scrap mica.
	Pounds.	*Short tons.*
New Hampshire	191,118	645
North Carolina	107,255	4,450
South Dakota	*a* 123,090	80
New Mexico	9,620	258
Virginia	16,000	....
Other States *b*	9,200	64
Total	456,283	5,497

a Sold in rough or unmanufactured condition. *b* Idaho, Maine, Nevada, and Rhode Island.

IMPORTS.

The following table shows the imports of unmanufactured mica from 1869 to 1896:

Value of unmanufactured mica imported and entered for consumption in the United States, 1869 to 1896, inclusive.

Year ending—	Value.	Year ending—	Value.	Year ending—	Value.
June 30—		June 30—		Dec. 31—	
1869	$1,165	1879	$9,274	1888	a$57,541
1870	226	1880	12,562	1889	a97,351
1871	1,460	1881	5,839	1890	a207,375
1872	1,002	1882	5,175	1891	95,242
1873	498	1883	9,884	1892	218,938
1874	1,204	1884	28,284	1893	147,927
1875	....	1885	28,685	1894	126,184
1876	569	Dec. 31—		1895	174,886
1877	13,085	1886	a56,354	1896	169,085
1878	7,930	1887	a49,085		

a Including mica waste.

Under the new classification made necessary by the Dingley tariff act, in effect from and after July 24, 1897, mica is designated as "unmanufactured" and "cut or trimmed." A specific import duty of 6 cents per pound is imposed upon the former and 12 cents per pound upon the latter, with an additional 20 per cent ad valorem duty on each. The imports during 1897 after the new classification took effect, and for the years 1898, 1899, and 1900, were as follows:

Mica imported and entered for consumption in 1897, 1898, 1899, and 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
1897.	*Pounds.*		1899.	*Pounds.*	
Prior to July 24	656,118	$140,353	Unmanufactured	1,709,839	$233,446
After July 24:			Cut or trimmed	67,293	42,538
Unmanufactured	66,821	10,981	Total	1,777,132	275,984
Cut or trimmed	226,771	41,068	1900.		
Total	949,710	192,402	Unmanufactured	1,892,000	290,872
1898.			Cut or trimmed	64,391	28,688
Unmanufactured	877,930	115,930	Total	1,956,391	319,560
Cut or trimmed	78,567	34,152			
Total	956,497	150,082			

The Mica Industry in 1900.

By J. A. Holmes.

Perhaps the three most notable features connected with the mica industry in the United States during the year 1900 were the increasingly large use of American mica in electrical machinery, notwithstanding the continued large importation of foreign mica, the somewhat abnormal development of the ground mica industry, and the plans for the establishment in the United States of a plant for the use of scrap mica in the manufacture of a new boiler-tube covering. The increased activity in mica mining is shown in the preceding pages.

NEW HAMPSHIRE.

In New Hampshire, in the Gilsum district, the Davis-Mitchell mine, on the old Kidder farm, 1 to 2 miles northwest of Gilsum, has been worked to a considerable extent and has yielded a large quantity of both sheet and scrap mica. In connection with the former working of this mine, a shaft has been sunk to a depth of 100 feet, and open-cut work has been carried for a distance of several hundred feet and to a depth of 20 to 30 feet. The work during the last year has been mainly in this open cut. Just to the northeast of this Davis-Mitchell mine, and on the same dike, another opening (the Hoskins mine) was made during the year, and a considerable quantity of both sheet and scrap mica taken out. The sheet mica from this mine was shipped to New York and Boston, while the scrap mica was ground in large part at the Hoskins mica mill at Gilsum. In the Grafton district the Grafton Mica Company worked both the Hoyt Hill mine, 2 to 4 miles east of Canaan, and the Waverly mine, just west of Grafton station, to some extent, taking from the two approximately 250 tons of mica. The work at both these mines has been mainly in the open cut. The former is located on the northwest slope of Hoyt Hill, where two or three adjacent openings have been made. The mica-bearing portion of the pegmatite dike has a thickness of from 2 to 4 feet in a fine gray biotite-granite. The latter of these two mines is located on the southwest side of Prescott Hill. The dike has a thickness of from 10 to 18 feet, the strike being northeast-southwest and the dip toward the southeast. When visited it had been mined for a length of some 200 feet and to a depth of 30 to 40 feet. The Springfield or Old Sullivan mica mine, 2½ miles southwest of Grafton station and on the northeast slope of Springfield Mountain, has been worked at intervals during the year on a small scale, but mainly for the beryls and other rarer minerals that are to be found there. The old Ruggles mine, on Isinglass Hill, in this same district, which is perhaps the most famous mica mine in this country, and where the first mica mining in the United States by white men is said to nave been carried on, has been idle for several years, owing to legal complications; but the great dumps of scrap mica to be found about the openings indicate the large quantity of fine mica which has been taken from this property in the past, and a partial examination of the workings indicates that the dike still carries a considerable quantity of mica available for future mining operations.

In the North Groton district of New Hampshire the Fletcher mine, on Fletcher Hill, 2½ miles northeast of North Groton, was worked during the year on a small scale. Some years ago it was worked on a much larger scale. The dike here is 20 to 40 feet wide, with a northeast course, and has been worked mainly as an open cut for a distance of some 150 feet. A new mine was opened up during the year and worked to a considerable extent by Messrs. Lay and Grange, 3 to 4 miles northwest of North Groton. When visited the open cut on this mine had extended to a depth of 30 feet and a length of about 150 feet, and it was said that some 200,000 pounds of crude mica had been taken out during the preceding six months. This mine was equipped with modern steam drills and had associated with it at North Groton a well-equipped plant employing a dozen or fifteen men, where the mica was cut and prepared for market. In this district also are the famous Palermo and Valencia mines, but no work has been done at either of these for several years, except to remove in part from the old dumps the scrap mica, of which considerable quantities still remain. The Rice mine, about 1½ miles southwest from North Groton, has been worked at intervals during the last several years and a large amount of good mica is said to have been taken from it, but only a little work was done there during the year 1900.

In Alexandria Township the Newfound mica mine, 3 miles northwest of Alexandria post-office, was worked during a considerable portion of the year by the Newfound Mica Company, with an outfit of two steam drills and a cutting house. The dike here has a thickness of 8 to 15 feet and contains a fair proportion of good mica. The Patten mine, 3 miles west of Alexandria post-office, has in the past yielded a large quantity of good mica, and will doubtless again in the future be a good producing mine, but it has not been worked during the last few years. This statement may be said to apply to a number of well-known New Hampshire mica mines.

NORTH CAROLINA.

In North Carolina mica mining has made some progress during the year, although it has been handicapped by low prices for the product, due to the large importations of foreign mica. The principal work has been done in the mountain counties, mainly Mitchell, Yancey, Haywood, Jackson, and Moscow, where a number of the older mines were reopened and a few new mines were developed. East of the Blue Ridge Mountains, in McDowell County, a mine (the Cochran) has been developed about 8 miles north of Marion, and some good plate mica has been obtained. Another mine has been opened up and worked on a small scale during the year in Stokes County, near Sandy Ridge, and a limited amount of similar development work was carried on in Cleveland and Rutherford counties.

West of the Blue Ridge, in Ashe County, the Carolina Mica Company has developed a mine on Beaver Creek, near Jefferson, employing 20 men during the last three months of the year. This company has also erected near by a mill for grinding the scrap mica. In Mitchell and Yancey counties nearly all of the older and well-known mines, such as the Deake, Spread Eagle, Cloudland, Double Head, Hawkins, Clarissa, and others, have been worked at intervals during the year, though some of them on a small scale. Nearly all of this work was done by parties whose available capital was so small that they were unable to purchase modern pumps and other equipment needed in working these deeper mines—one shaft in the Clarissa, for example, having been sunk to a depth of more than 300 feet.

In Haywood County the Big Ridge mica mine, 7 miles from Waynesville, was worked on a considerable scale throughout the entire year, and was probably the largest producer of the region. The Shiny mine, 8 miles from Waynesville, was worked for about five months of the year, and yielded considerable quantities of both sheet and scrap mica. In Jackson County a number of mines have been actively worked during longer or shorter periods. The Toxaway Company has developed several mica deposits on its lands near Sapphire, taking out a considerable quantity of crude sheet mica. Several additional deposits have been developed with similar result on the adjoining Grimshawe lands. In other portions of the county the Frady and East Fork mines were operated successfully during half of the year, and the Long and Ferguson and other deposits were worked during shorter periods. In Macon County mining has been less active than during the recent past, the work at the Lyle, Knob, and Raby mines extending over not exceeding half of the year, and that at other deposits being rather developmental and irregular.

SOUTH DAKOTA.

In the Black Hills district of South Dakota there has also been renewed activity in mica mining during the latter part of the year. The well-known New York mine was opened up in October and has been worked by a force of from 10 to 30 men since that time. Several carloads of crude mica have been produced and shipped to the eastern markets. Indications at this mine are favorable for a future output of considerable magnitude. The Monarch (Old Wormly), 2½ miles west of Custer, has been worked during the year as an open cut to a depth of 20 or more feet, and in the bottom of this open cut a shaft was sunk to a considerable depth. The pegmatite dike at this point is a large one, having a thickness of more than 100 feet and being a prominent topographic feature in that region. It has a general course northwest-southeast, and rises above the surface at intervals for more than a mile. Other similar dikes lying just to the east of these are known to carry tin ore, but no tin has as yet been found in the dike on which the Monarch mine is located. The McMackin mica mine, 3 miles northwest from Custer, perhaps the most famous and the largest producer among the mica mines of the Black Hills region, had not been worked for several years, but was prospected and opened up anew toward the end of 1900. It will probably again become one of the large producers of that region. The Etna mine, 1 mile south of Custer, was operated during the summer of 1900, the work being mainly by the open cut, but a shaft was being sunk when the mine was visited in October. The mica-bearing dike is here a large one, being exposed for 1,500 to 2,000 feet and having a thickness, including the interbedded masses of schist, of 30 to 100 feet. A limited amount of prospecting work was done at several of the well-known mines in the vicinity of Custer, and the outlook for larger mining operations during the year 1901 is good.

In the Keystone district, on the east side of the Black Hills, several well-known mica dikes, including the Etta tin dike, have during the last few years been worked for spodumene; and during the year 1900 considerable quantities of this mineral were mined and shipped to eastern markets.

NEW MEXICO.

In New Mexico the mining for mica during 1900 was limited to two districts. In the Petaca district some development work was done at the well-known Cribbens mine, but the more extensive mining operations were carried on by the American Mica Mining and Milling Company at the Petaca mine, 1 mile west of Petaca village; at the Texas mine, 1¼ miles southwest from the Petaca, and at the Gulch mine, the Talco Grandy, Keystone, Vivian, and Kit Carson mines, all lying to the north of the Petaca. A considerable amount of work was done at these places, but the product was largely scrap mica and was shipped East for grinding purposes. Only a small per cent (from 1 to 3) of the mica at these different mines was saved as sheet mica. At the Highlands mica mine, 3 to 4 miles northwest of Petaca, a limited amount of mining was done during the year by the Standard Mica Company, the entire output of the mine being shipped east in the crude form. The Kansas City (No. 3) mica mine, located about 1 mile northwest of the Highlands and on the west side, about 100 feet above the bottom of the canyon which passes between the two, has been worked to some extent during both 1899 and 1900, the work being mainly in an open cut about 30 feet deep and 30 to 40 feet long. One of the features of this mica region during the year has been the working of several mines, notably the Keystone, for scrap mica alone, which was hauled 10 to 15 miles by wagon and shipped to Cleveland, Ohio, in the crude form for grinding purposes.

In the region about Harvey's ranch, some 25 miles northwest of Las Vegas, New Mexico, a limited amount of mica mining has been carried on during the year, but this has been largely of a prospecting nature. Several of the openings, however, have yielded a quantity of mica of good quality. Among these may be mentioned the Smuggler mine, one-third of a mile northwest of Garnet Peak, where an old tunnel was some years ago run into the hill for a distance of 245 feet. At the Kirhowreger mine, about 400 feet southeast from the Smuggler, a tunnel has been run into the pegmatite dike for a distance of 40 feet. Little mica, however, was exposed. The Hillside mica mine, about three-quarters of a mile southwest from the Smuggler, has been worked to a limited extent as an open cut in the face of a large pegmatite dike, which can be traced for a distance of several hundred yards. The Rising Sun mica mine, 300 to 400 yards northwest from Harvey's ranch, was opened up as a prospect hole in 1883 by Messrs. Beatty and Gray. This opening was still further enlarged in 1899 and a limited amount of mica taken from the mine. No work has been done there since that date. The Gray Eagle mica mine, one-half mile southwest from Harvey's, was opened up to a depth of 10 to 12 feet in 1882; it was enlarged in 1896 and again in 1899, a limited amount of mica being taken out each time, but no work has been done since the latter date.

On the west slope of Baldy Mountain, some 25 miles north of Santa Fe, a limited amount of prospecting for mica has been carried on during the last year, but no extensive mining operations have as yet been attempted in that region. The pegmatite dikes found there are both large and numerous and at a number of places small crystals of mica appear in the surface of these masses, but the development work has not been carried on to a sufficient extent to open up any large deposits of commercial mica.

FLUORSPAR.

By Edward W. Parker.

PRODUCTION.

The production of fluorspar continues to increase. In 1900 the total production amounted to 18,450 short tons, as compared with 15,900 tons in 1899 and 7,675 tons in 1898. The value of the product in 1900 was, however, $2,150 less than that of the preceding year. This decline in value is more apparent than real, and was due to the fact that a comparatively large amount of fluorspar was marketed in the crude or raw state in 1900. At the same time there was an actual decline in the price of the crude material as compared with that which was obtained in 1899, the lower price being probably due to the increased supply. Over 80 per cent of the product in 1900 was obtained from the counties of Caldwell, Crittenden, and Livingston, in Kentucky. The Kentucky deposits are of recent development, the first commercial product reported from them being in 1898. The remainder of the product was obtained from the old and well-known district near Rosiclare, Ill. The larger part of the fluorspar product is sold without further preparation than the removal of dirt and such impurities as lead and zinc, with which it is frequently associated. Two of the producing companies are, however, constructing plants for grinding the material before marketing. The statistics for 1901 will probably show a larger proportion of ground fluorspar sold, with a corresponding increase in value.

The amount of crude fluorspar sold in 1900 was 15,450 short tons, which was shipped in bulk, and valued at $77,500, as compared with 12,400 short tons of crude fluorspar sold in 1899 and valued at $71,500. The amount ground and shipped in barrels in 1900 was 3,000 tons, valued at $17,000, as compared with 3,400 short tons, valued at $25,000, in 1899.

In addition to the localities in Illinois and Kentucky from which the entire product in 1899 and 1900 was claimed, fluorspar has been reported as occurring in abundance near Castle Dome, in Yuma County, Ariz., and as associated with the telluride ores of Cripple Creek, Colo. No production has been reported from these localities.

The following table shows the annual production of fluorspar since 1882:

Production of fluorspar in the United States from 1882 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1882	4,000	$20,000	1892	12,250	$89,000
1883	4,000	20,000	1893	12,400	84,000
1884	4,000	20,000	1894	7,500	47,500
1885	5,000	22,500	1895	4,000	24,000
1886	5,000	22,000	1896	6,500	52,000
1887	5,000	20,000	1897	5,062	37,159
1888	6,000	30,000	1898	7,675	63,050
1889	9,500	45,835	1899	15,900	96,650
1890	8,250	55,328	1900	18,450	94,500
1891	10,044	78,330			

USES.

Fluorspar, or calcium fluoride, is chiefly used in the preparation of hydrofluoric acid by the distillation of the fluorspar with sulphuric acid, producing hydrofluoric acid and calcium sulphate. It is used also to a considerable extent in the manufacture of opalescent glass, and possesses superior qualifications as a flux for iron smelting, the principal reason for the relatively small amount used, as compared with limestone, being the higher first cost and the distance of the producing localities from the iron-making centers. The advanced prices obtained for iron products during 1899 and 1900 enabled the iron masters to use a higher-priced flux in a number of instances, and the increased production of fluorspar in the last few years has been due to the demand from iron furnaces. Owing to the fact that fluorspar in this case requires little preparation, it is sold at a lower figure than for other purposes to which it is adapted and accounts for the decline in value in 1900.

IMPORTS OF CRYOLITE.

The records of the Bureau of Statistics of the Treasury Department do not make any separation of fluorspar imported into the United States. It is included among minerals and ores not elsewhere specified. Cryolite, which is a fluoride of sodium and aluminum, is imported from Ivigtok, in Greenland. It is used, as is fluorspar, in the manufacture of hydrochloric acid and opalescent glass, and also in the manufacture of aluminum and sodium salts.

The imports of cryolite for a series of years are shown in the following table:

Imports of cryolite from 1871 to 1900.

Year ending—	Amount.	Value.	Year ending—	Amount.	Value.
June 30—	*Long tons.*		Dec. 31—	*Long tons.*	
1871	....	$71,058	1886	8,230	$110,152
1872	....	75,195	1887	10,328	138,068
1873	....	84,226	1888	7,388	98,830
1874	....	28,118	1889	8,603	115,158
1875	....	70,472	1890	7,129	95,405
1876	....	103,530	1891	8,298	76,350
1877	....	126,692	1892	7,241	96,932
1878	....	105,884	1893	9,574	126,688
1879	....	66,042	1894	10,684	142,494
1880	....	91,366	1895	9,425	125,368
1881	....	103,529	1896	3,009	40,056
1882	3,758	51,589	1897	10,115	135,114
1883	6,508	97,400	1898	6,201	88,501
1884	7,390	106,029	1899	5,879	78,676
Dec. 31—			1900	5,437	72,763
1885	8,275	110,750			

ASBESTOS.

By Joseph Hyde Pratt.

VARIETIES.

Two distinct minerals are mined and put on the market as asbestos. They are very similar in their physical properties, but are distinct chemically. One is a silicate of calcium and magnesium and is a variety of the mineral amphibole. There are a number of the nonaluminous varieties of amphibole which pass into fibrous varieties, especially the tremolite and actinolite, and all these fibrous varieties are included under the name of asbestos. The other mineral that is called asbestos is a variety of serpentine, a hydrous magnesium silicate known as chrysotile. It was the former of these minerals that was originally used commercially, but as the chrysotile began to be used for the same purposes it was placed on the market under the same name. While these minerals are equal in their heat-resisting properties, the chrysotile is superior in strength and elasticity of fiber to any variety of amphibole asbestos. The former mineral is usually greenish-white, green, yellowish to brownish in color, and has a decidedly silky luster. The fibers are flexible, easily separating from each other, and have a silky appearance. It is usually found in seams of varying width in serpentine rocks. The amphibole asbestos has been found in longer fibers than the former, and these are flexible and easily separated by the fingers. They do not have the silky luster of the chrysotile, but have more the appearance of flax. The color varies from white to greenish and woody-brown.

One of the main chemical differences between the two is that the amphibole asbestos is an anhydrous mineral, while the serpentine or chrysotile variety is hydrous, containing from 12 to 14 per cent of water. They can be readily distinguished by making a test for water.

OCCURRENCE.

The amphibole variety of asbestos is quite widely distributed, but there are not many localities known at present where it occurs in quantity, and then again on account of the superior qualities of the chrysotile asbestos there is not as large a demand for the other variety and thus there is but little stimulus given to prospecting for it.

The only two States in which mining has been carried on for asbestos during the past two years are California and Georgia. The latter has produced practically all of the asbestos mined in the United States during the past year. The production of California asbestos has been decreasing on account of its distance from the principal manufacturers. The asbestos deposits of Georgia are located at Sall Mountain, White County.

It is quite common to find the chrysotile asbestos or fibrous variety of serpentine in small amounts associated with the serpentine rocks in various localities throughout the United States. Until recently, however, there were no deposits found where the chrysotile occurred in commercial quantity. At Casper, Wyo., deposits of this variety of asbestos have been found that have warranted further investigation and development, and this work is being done by the McConnell Asbestos Company, of Pittsburg, Pa.

As is well known nearly all of the asbestos used in this country is obtained from the deposits at Black Lake and Thetford, Canada, and this is also true of that used by European manufacturers. Thus with any interruption of the supply from the Canadian mine there is at once a scarcity of the crude asbestos and its price at once begins to rise. With the new uses to which asbestos is being put there is a constant increase in the demand for the mineral, and, in order to meet this, new sources of supply must be found. Thus any new locality that gives evidence of producing chrysotile in quantity is worthy of further investigation. On the land of Mr. J. B. Church near North Wilkesboro, N. C., chrysotile of good quality has been found, and it is reported that there are indications that it occurs in considerable quantity. Asbestos is reported by Mr. Horace Engle, of Roanoke, Va., to occur in the central portion of Bedford County, Va.

The most interesting occurrence of chrysotile asbestos recently discovered is that located on the eastern slope of Belvidere Mountain, in Lowell Township, near the Eden line, Vermont. The deposit was first discovered in November, 1899, by Mr. Melvin E. Tucker, of Hardwick, Vt.

A brief account of this deposit, by Prof. J. F. Kemp, is given below:

NOTES ON THE OCCURRENCE OF ASBESTOS IN LAMOILLE AND ORLEANS COUNTIES, VT.

By J. F. Kemp.

Asbestos, or "asbestus," as it was earlier called, was discovered many years ago in various parts of Vermont. As is usually the case, the actual mineral was probably in most instances chrysotile or amianthus rather than the asbestos of the mineralogists. It is referred to on pp. 527, 528 (amianthus), and 544 of Volume I of the Geological Survey of Vermont, which was issued in 1861. It was even reported as a loose mineral in the soil at Lowell, one of the towns visited by the writer, but it seems to have attracted no special attention until within a year or two. The revival of interest appears to be due to the fact that some seven or eight years ago a French-Canadian lumberman in the employ of Mr. M. E. Tucker discovered, while felling trees on the eastern side of Belvidere Mountain, in the extreme western portion of Lowell, a vein of chrysotile, and at once recognized its similarity to the Canadian product, which he had seen in the Quebec mines. Mr. Tucker therefore began the search for the workable deposits, and either through his own efforts or through the interest aroused in others, the present developments have been attained. They bid fair to be commercially productive, although they are now in the initial stages of development.

Geographical situation.—The asbestos is found in the town of Eden, Lamoille County, and the adjacent town of Lowell, Orleans County. Both these towns are in northern central Vermont, and neither is on a railroad. Eden post-office is from 10 to 12 miles north of either Johnson or Hyde Park stations, on the St. Johnsbury and Lake Champlain Railroad, now a part of the Boston and Maine system. Eden Mills is 1 mile north of Eden.

In the town of Eden there are two asbestos enterprises, occupying adjacent lots. Both are situated on the southern slope of Belvidere Mountain, nearly due north of Eden post-office. One of the enterprises is the New England Asbestos Mining and Milling Company, which has a home office in Fall River, Mass. Its developments are the most advanced of all and it bids fair to be in full operation early in 1902. The National Asbestos Company occupies the tract next west of the New England company, but it controls only the mineral rights. Its headquarters are in Morrisville, Vt.

At no great distance east or northeast of the New England company the line between Eden and Lowell towns and likewise between Lamoille and Orleans counties runs across the serpentine belt in a northwesterly direction. Crossing this and continuing northeasterly one meets, on the southern side of the serpentine belt, one of the openings which have been made by Mr. M. E. Tucker in Lowell. At a short distance from the highway and from 200 to 300 feet above it serpentine appears in a great ledge, which has been cleared by fire. It is bounded on the south, east, and west by gulches, so that it forms a sort of projecting buttress extending outward from the mountain. Some drilling and blasting have been done, and the rock is very well exposed.

About 6 miles northeast of this exposure and beyond Lowell village a belt of serpentine distinct from that at Belvidere Mountain appears, and in it Mr. Tucker and his associates have done some blasting and have exposed considerable fiber.

Geology.—The principal country rock throughout the valleys in Eden and Lowell is a slaty mica-schist. It lies to the southeast and east of Belvidere Mountain. As the mountain is approached, a great shoulder is found projecting to the south from the foot of the main peak. Wherever crossed by the writer, it consists of serpentine. It rises 1,000 feet or more above the valley, and on the top forms a sort of step against the remainder of the peak. To the north of the serpentine, and rising above it as a precipitous wall, a great mass of hornblende schist appears. It has a rather flat dip to the east, and is broken into blocks by two pronounced sets of joints. It rises in a series of precipitous escarpments 1,500 or 2,000 above the serpentine. In places the hornblende schist has been altered to chlorite schist. Just to the south of the excavation made by the National Asbestos Company an important fault is visible, which strikes into the mountain in a direction 15° west of north, according to magnetic compass, but since local attraction sometimes appears in this region, the observation may not be exact. At all events, the fault brings the hornblendic or chloritic schist abruptly against the serpentine, and cuts off the latter from extending farther to the west. Several feet of fault breccia mark the location of the fault. The serpentine belt appears to be a broad one, but its approximate width can not be readily stated, because it is concealed by forests and because the writer's observations were of necessity made without a map. It is evident that the location of the New England and the National companies is on the northern edge of the serpentine, while the prospects of Mr. Tucker are on the eastern edge, and much lower down. The New England and National exposures are fairly near to the outcrops of the hornblende schist forming the mountain on the north.

In all the exposures where the asbestos appears, the serpentine forms precipitous cliffs and the excavations have been made in the face of these escarpments. For a long time, therefore, the rock can be blown out from open cuts which will be above the general surface of the ground. In the openings made by Mr. Tucker near Tucker's Mill, the conditions are very similar. A hillock or shoulder of serpentine projects from the mountain side, and is bounded by gulches on the west, south, and east. The openings near the town of Lowell are likewise situated in a ridge of serpentine, and have been driven in on both sides and from the northern end.

The character of the asbestos.—The asbestos occurs in two distinct and contrasted varieties. In one case it forms veins which ramify in every direction through the serpentine. The asbestos fibers are perpendicular or at a high angle to the walls, and vary from a maximum length, as at present exposed, of three-fourths of an inch, down to not more than one-sixteenth of an inch. The variety is similar in all respects to the Canadian product, but it is met only in the prospects owned by Mr. Tucker at Tucker's Mill and near Lowell. The second variety of asbestos is what, for lack of a better name, I will call "slip-fiber," because it occurs upon the slickensided surfaces that are common to this exposure of serpentine just as to all others the world over. These fibers form layers of varying thickness, seldom more than a quarter of an inch, but as they run parallel to the slickensided surfaces they may themselves be of various lengths, from a fraction of an inch up to 3 or 4 inches. The fiber is coarser than that of the veins, and will not furnish so good a grade. At the same time it occurs in larger quantity. This is the variety of fiber which will be produced by the New England and the National companies. It also appears in a minor degree in the other openings.

Present developments.—The developments of the New England company are the most advanced. Foundations have been laid for a mill of an estimated daily capacity of 400 tons. An engine house has already been erected and equipped, and a superintendent's house is nearly completed, in addition to boarding houses for the men. The mill is admirably located, so that from the cliff of asbestos rock, which rises to the north of it and is much higher, the crude material will be run into it on tram cars and will pass by gravity through the concentrating process. The mill will, in the natural order of things, be productive in 1902. At the National company only a small open cut has been made, in order to expose the deposit. The writer was unable to learn whether the installation of a mill, etc., is immediately contemplated or not. In the town of Lowell the enterprises have as yet only reached the stage of open cuts. In the openings thus far made near Lowell the quantity is apparently not so great as at Tucker's Mill, although the general quality appears to be much the same.

Conclusions.—There is little doubt that the region will become commercially productive, and that very considerable amounts of asbestos will be contributed by it to the markets. It is possible that in time larger veins may be discovered which will give the first grade, but at present all estimations of value should be based upon a product of second and third grade. Under present conditions there seems to be an excellent opportunity for these to prove remunerative. The serpentine belts, as shown by the geological survey of Vermont, run for great distances to the north, and while it is impossible at this time to report other definite discoveries, the area within which the geological formations are favorable for the occurrence of asbestos appears to be considerable. At the same time, the existence of serpentine does not necessarily imply the presence of asbestos. Even in the belt on Belvidere Mountain the fiber is sharply limited to restricted localities. Although the serpentine has been somewhat carefully searched already, and was in large part traversed by the writer, in company with Mr. Tucker, yet no other exposures were observed which appeared to be anything like as favorable as the ones which have been opened. In many ledges no fiber appeared at all.

This report is written so soon after the writer's visit that it has been impossible to make any investigations that would throw light upon the nature of the serpentine and the derivation of the asbestos. The writer's sincere thanks are due to Capt. Matthew Penhale, the superintendent of the New England company, for courtesies extended in a visit to its property; and especially to Mr. M. E. Tucker for many attentions and much information about the location and distribution of the mineral.

USES.

The uses of asbestos are very varied. The amphibole asbestos is used almost exclusively where strength of the asbestos fiber is not essential and where its nonconductivity of heat is the principal quality desired, such as an ingredient in fireproof paints, for wall plasters, for boiler covering, for packing in the manufacture of fireproof safes, etc. The chrysotile variety, on the other hand, is used for those purposes in which the strength of fiber as well as nonconductivity of heat are required, such as in the manufacture of cloth, rope, felt, boards, tubes, washers, etc.

PRODUCTION.

All the asbestos produced in the United States during 1900 was from the mines at Sall Mountain, White County, Ga., with a little from Elsinore, Cal., and Dalton, Mass., and amounted to 1,054 short tons, valued at $16,310, as compared with 681 tons, valued at $11,470, in 1899. If the expectations from the Vermont and Wyoming mines are realized there will undoubtedly be a large increase in the production of asbestos during 1901.

In the following table is given the annual production of asbestos in the United States and its value since 1880:

Annual product of asbestos since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	150	$4,312	1891	66	$3,960
1881	200	7,000	1892	104	6,416
1882	1,200	36,000	1893	50	2,500
1883	1,000	30,000	1894	325	4,463
1884	1,000	30,000	1895	795	13,525
1885	300	9,000	1896	504	6,100
1886	200	6,000	1897	580	6,450
1887	150	4,500	1898	605	10,300
1888	100	3,000	1899	681	11,740
1889	30	1,800	1900	1,054	16,310
1890	71	4,560			

By comparing the figures of this table with those of the following table, which gives the value of the imports of asbestos, it will be seen how almost insignificant the home production is and how much room there is for the development of asbestos mining in this country provided a domestic asbestos can be found which is equal in quality to the Canadian. It is not improbable that there will be a considerable difference in the ratio of the domestic production and the imports of asbestos for the year 1901.

IMPORTS.

The value of the asbestos imported since 1869 is given in the following table:

Value of asbestos imported since 1869.

Year ending—	Unmanufactured.	Manufactured.	Total.	Year ending—	Unmanufactured.	Manufactured.	Total.
June 30—				Dec. 31—			
1869	....	$310	$310	1885	$73,026	$617	$73,643
1870	....	7	7	1886	134,193	932	135,125
1871	....	12	12	1887	140,264	581	140,845
1872	....	....	....	1888	168,584	8,126	176,710
1873	$18	....	18	1889	254,239	9,154	263,393
1874	152	....	152	1890	252,557	5,342	257,899
1875	4,706	1,077	5,783	1891	353,589	4,872	358,461
1876	5,485	396	5,881	1892	262,433	7,209	269,642
1877	1,671	1,550	3,221	1893	175,602	9,403	185,005
1878	3,536	372	3,908	1894	240,029	15,989	256,018
1879	3,204	4,624	7,828	1895	225,147	19,731	244,878
1880	9,736	....	9,736	1896	229,084	5,773	234,857
1881	27,717	69	27,786	1897	263,640	4,624	268,264
1882	15,235	504	15,739	1898	287,636	12,897	300,533
1883	24,369	243	24,612	1899	303,119	8,949	312,068
1884	48,755	1,185	49,940	1900	331,796	24,155	355,951

CANADIAN PRODUCTION.

As has already been stated, practically all of the supply of asbestos for the United States is obtained from Canada, and for this reason the following table, which gives the production of asbestos in that country, will be of interest:

Annual product of asbestos in Canada since 1879.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1879	300	$19,500	1890	9,860	$1,260,240
1880	380	24,700	1891	9,279	999,978
1881	540	35,100	1892	6,042	388,462
1882	810	52,650	1893	6,473	313,806
1883	955	68,750	1894	7,630	420,825
1884	1,141	75,079	1895	8,756	368,175
1885	2,440	142,441	1896	12,250	429,856
1886	3,458	206,251	1897	*a* 30,442	445,368
1887	4,619	226,976	1898	*a* 23,785	486,227
1888	4,404	255,007	1899	*a* 25,536	485,849
1889	6,113	426,554	1900	*a* 30,641	763,431

a Including asbestic.

The increased production of nearly 150 per cent in 1897, accompanied by an increase of less than 4 per cent in value, was due to the large amount of asbestic and low grade of fiber included in the product. Conversely, the increase of 9.17 per cent in value in 1898, with a decrease of nearly 22 per cent in the product, was due to a smaller proportion of asbestic. The annual report for 1897 gives the production of asbestos in 1896 at 10,892 tons, valued at $423,066, and that of asbestic 1,538 tons, worth $6,790. In 1897 the asbestos product was 13,202 tons, worth $399,528, and that of asbestic 17,240 tons, valued at $45,840. In the reports of production in 1898, 1899, and 1900 the amount of asbestic included in the product is not stated. The larger output in 1899, combined with a decrease in value, indicates a smaller proportion of asbestos and a larger yield in asbestic. The decrease in the production of 1900 and increase in value are due to the temporary shutting down of one of the larger mines, which caused the price of asbestos at once to rise, as the demand was greater than the supply.

LITHOGRAPHIC STONE.

By S. J. Kübel.

INTRODUCTION.

Lithographic stone is a fine, compact, homogeneous limestone, which may be either a pure carbonate of lime or dolomitic. Although limestone is one of the most common rocks, there are but few localities known where it is of a quality suitable for lithographic purposes. Thus, with the enormous amount of limestone known to occur in the United States, practically all of the lithographic stone used in this country is imported. The actual value of lithographic stone and the extent of the industry is but little understood by people in general, and it is thought by many that fabulous prices are obtained and that the market is very large. In many respects the reverse is true and the annual consumption in the United States amounts in value to less than $100,000. With this small amount used, it can readily be seen that there is no great profit for the producers, and the market must be kept in the hands of few concerns working in harmony. It must be stated, however, that the value of the annual consumption mentioned above is that of the stone at the point of shipment and does not include ocean freight or other charges. The cost to the consumer in the United States is probably more than double the amount quoted.

LITHOGRAPHIC STONE IN THE UNITED STATES.

Many samples of supposed lithographic stone said to have been obtained in this country have been sent to the engraving division of the Geological Survey for examination. Some of these gave promise of being good stone, but as a rule no information was given as to the locality nor the extent of the deposit. Then, again, the samples were usually very small, irregular pieces, that were worthless for purposes of examination, and it was impossible to determine their value by practical tests.

Inquiries and investigations indicate that there are prospects of lithographic stone in Alabama, Arizona, California, Colorado, South Dakota, Georgia, Illinois, Kentucky, Missouri, Nevada, Tennessee, Texas, and Utah. Some of these have been developed to a slight extent, and in some cases what might have become good quarries have been damaged by heavy blasting, which would reduce the chances of finding stones of serviceable size and has probably hastened the abandonment of the properties. Many of these prospects have not been developed because of poor transportation facilities, which would make it doubtful if they could compete in price with the German stone. The information regarding the location of these prospects is in most cases indefinite, little being known except the name of the State.

At Custer, S. Dak., are located the quarries of the Black Hills Porcelain Clay and Marble Company. Samples of this stone have been examined and give indication of possessing high-class lithographic properties. It is reported that it occurs in large quantity, but thus far it has not been developed to any extent.

Perhaps the most important quarry opened is that at Brandenburg, Meade County, Ky., which is operated on practical lines by the American Lithographic Stone Company. The layer of limestone which furnishes the best stone is about 3 feet in thickness and is nearly horizontal. The overlying strata are easily and economically removed, and there are excellent natural facilities for the disposition of the waste material, an important factor in the cost of production. This quarry produces no "yellow" stone. Its entire output is a stone of good quality for an engraving and printing base for certain classes of work, and is of a blue-gray color. Stones of the largest sizes required have been obtained, and in some respects this product compares favorably with that from the German quarries. These stones are now on the market, some being in use in engraving establishments in the South and Southwest, and favorable reports are made by those using them. This is perhaps the first quarry to be developed and in active operation in this country.

It is not at all improbable that there are many localities in the United States where limestone can be found that is suitable for lithographic work, but unless it can be obtained in quantity, quarried economically, and has good transportation facilities it will be difficult for it to compete with the German stone. The output at the German quarries is not limited to lithographic stone, but there are by-products that add to the revenue of the quarry. If a market could be secured for the by-products of the lithographic-stone quarries in this country, there should be little difficulty in making them paying propositions. It must be remembered, however, that the market for these stones is limited, and that as soon as competition begins the price will be materially reduced, for the price of the German stone can be lowered considerably and the industry continue profitable. The production of one or two ample and well-managed quarries would be sufficient to supply the demands of this country and even to enter into competition in foreign markets.

FOREIGN SOURCES OF LITHOGRAPHIC STONE.

The main source of supply of lithographic stone is at Solnhofen, Bavaria, Germany. These quarries have been supplying the United States with stone for many years, but are said to be becoming unsatisfactory both in regard to quality and dependability of supply. This latter complaint in the lithographic world may be due to the falling off in the production at these quarries, but, on the other hand, it very probably is due to a large increase in the number of stones that are desired. Whatever the cause, the orders for German stone by firms in this country have not been expeditiously filled. These facts are tending to stimulate the search for good deposits of this stone in the United States.

Recently a limestone quarry has been opened in Harvey Township, Peterboro County, Ontario, Canada, and samples of the stone examined give evidence of having excellent lithographic properties. A stock company is being formed to develop the property.

CHEMICAL COMPOSITION OF LITHOGRAPHIC STONE.

As is well known, limestone is very variable in its composition, changing from a pure lime to one that is rich in magnesia (dolomitic limestone), and there is a similar variation in the composition of the lithographic stone.

In the table below are given the analyses of the lithographic stone (1) from Brandenburg, Ky., and (2) from Solnhofen, Bavaria, which were made in the chemical laboratory of the United States Geological Survey:

Analyses of Kentucky and Bavarian lithographic limestone.

	Brandenburg, Ky.	Solnhofen, Bavaria.
Insoluble in hydrochloric acid.		
Silica, SiO_2	3.15	1.15
Aluminum-iron oxide $(AlFe)_2O_3$	.45	.22
Lime, CaO	.09	Trace.
Magnesia, MgO	None.	None.
Soluble in hydrochloric acid.		
Alumina, Al_2O_3	.13	.23
Ferrous oxide, FeO	.31	.26
Magnesia, MgO	6.75	.56
Lime, CaO	44.76	53.80
Soda, Na_2O / Potash, K_2O	.13	.07
Hygroscopic water, H_2O	.41	.23
Water of composition, H_2O	.47	.69
Carbon anhydride, Co_2	43.06	42.69
Sulphuric anhydride, SO_3	None.	None.
Total	99.71	99.90

It will be seen from the above analyses that the Bavarian stone is a nearly pure limestone, while the one from Kentucky is a dolomitic one, containing 6.75 per cent of magnesia. Whether the pure or the dolomitic limestone will make the better lithographic stone has not been determined, for up to the present time it has been the Bavarian product that has been used. With the introduction of a dolomitic lithographic stone, some interest will be aroused as to the results obtained with it as compared with the purer limestones.

SUBSTITUTES FOR LITHOGRAPHIC STONE.

An interesting fact brought out by the writer's investigations is the use, to a limited extent, of onyx slabs for lithographic purposes in some of the Western cities. They were quarried near Salt Lake City, Utah. Opinions as to their utility are rather diverse, but it is admitted that for long runs on hard paper, printed dry, these onyx stones can be made more serviceable than the best grade of imported stone. The preparation of the stone for printing purposes depends to a great extent upon the intelligence and prejudice of the transferrer, and the peculiar coloring, characteristics, etc., of the onyx, which are so decidedly different from those of the well-known lithographic stone, will make its adoption for general use somewhat difficult. The introduction and use of this stone make an interesting phase of the search for domestic lithographic stone or a substitute for it.

Zinc and aluminum plates, particularly the latter, are being used to a considerable extent as a substitute for lithographic stone, and are giving good satisfaction on certain classes of work. While their introduction is comparatively recent, they materially affect the lithographic stone market.

PRODUCTION.

There has been no domestic production of lithographic stones until within the past year or two, and during 1900 all that was produced was obtained from the quarry at Brandenburg, Ky. The actual figures are withheld in the protection of individual statistics.

IMPORTS.

There is considerable variation in the importation of lithographic stones from year to year, dependent, to some extent at least, upon the condition of the business world.

From 1880 to 1889, inclusive, the imports amounted to $878,132, and from 1890 to 1900, inclusive, they were $874,560, which are nearly the same for the two decennials.

From 1890 to 1894 the imports were $486,707, and from 1895 to 1899 they were only $387,853, a falling off of nearly $100,000. This decline is probably due to business depression and partly to the substitution of zinc and aluminum plates for stone. There was a decided increase in the value of the imports for 1899 ($86,695) over that of

1898 ($60,522). The value of the imports for 1900 was $94,134, about the same as that of 1899. From observation of methods past and present, and as a result of conference with importers, the writer believes it safe to assume that the average of the imports for the past ten years will represent approximately the average for the ensuing ten years.

In the following table are given the values of the imports of lithographic stones into the United States for the years 1868 to 1900, inclusive:

Value of lithographic stone imported into the United States from 1868 to 1900, inclusive.

Year ending—	Value.	Year ending—	Value.	Year ending—	Value.
June 30—		June 30—		Dec. 31—	
1868	$13,258	1880	$56,310	1890	$105,288
1869	17,044	1881	77,894	1891	107,339
1870	14,225	1882	111,925	1892	107,777
1871	21,311	1883	104,313	1893	91,849
1872	36,146	1884	128,035	1894	74,454
1873	44,937	1885	54,022	1895	107,670
1874	36,902	1886	71,009	1896	74,044
1875	41,963	Dec. 31—		1897	58,922
1876	47,101	1887	83,182	1898	60,522
1877	44,503	1888	113,365	1899	86,695
1878	42,700	1889	78,077	1900	94,134
1879	37,746				

PRICES.

The value of the stones varies with the quality and size, from 3½ cents per pound for stones 16 by 22 inches to 17 cents for stones 43 by 64 inches. These prices are for "best yellow stones," such as are used in the printing work of the Geological Survey. "Gray" and "blue" stones cost considerably more. In the table below are given the values of thirty-six different sizes of imported German stones:

Value of lithographic stones.

No.	Size.	Price per pound.	No.	Size.	Price per pound.	No.	Size.	Price per pound.
		Cents.			*Cents.*			*Cents.*
1	16 by 22	3½	13	26 by 36	8	25	32 by 48	13
2	18 by 24	4½	14	26 by 38	9	26	34 by 48	13
3	19 by 25	4½	15	28 by 38	9	27	35 by 50	14
4	20 by 26	5	16	28 by 40	10	28	36 by 50	14
5	22 by 28	6	17	28 by 42	11	29	36 by 51	14
6	22 by 30	6	18	29 by 43	12	30	36 by 52	14
7	22 by 32	6	19	30 by 40	12	31	40 by 60	14
8	22 by 34	7	20	30 by 43	12	32	40 by 62	15
9	24 by 30	7	21	30 by 44	12	33	42 by 60	15
10	24 by 32	8	22	32 by 43	12	34	42 by 62	16
11	24 by 34	8	23	32 by 44	12	35	42 by 64	16
12	24 by 36	8	24	32 by 46	12	36	43 by 64	17

GRAPHITE.

By Joseph Hyde Pratt.

PRODUCTION.

Wisconsin is the only State that has been added to those producing graphite. This State and Michigan, New York, Pennsylvania, and Rhode Island were the only producers of graphite during 1900. Alabama, which furnished some graphite in 1899, failed to produce any in 1900. As usual the larger part of the crystalline product was obtained from Ticonderoga, N. Y., with a smaller quantity from Chester County, Pa. The amorphous product was mostly from Rhode Island and Michigan. The increased production of graphite during 1900 was largely due to the extensive development of the deposits in Pennsylvania.

In the following table, which shows the annual production of graphite since 1880, the refined product is given in pounds, and that which was used just as it was mined is given in tons:

Production of graphite since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
1880 .... pounds..	622,500	$49,800	1894 .... pounds..	918,000	$64,010
1881 .... do....	400,000	30,000	1895 ....do....	644,700	52,582
1882 .... do....	425,000	34,000	short tons..	2,793	
1883 .... do....	575,000	46,000	1896 .... pounds.....	535,858	48,460
1884 .... do....	500,000	35,000	short tons..	760	
1885 .... do....	327,883	26,231	1897 .... pounds.....	1,361,706	65,730
1886 .... do....	415,525	33,242	short tons..	1,070	
1887 .... do....	416,000	34,000	1898 .... pounds.....	2,360,000	75,200
1888 .... do....	400,000	33,000	short tons..	890	
1889	....	72,662	1899 .... pounds.....	2,900,732	167,106
1890	....	77,500	short tons..	2,324	
1891 .... pounds..	1,559,674	110,000	1900 .... pounds.....	*a* 5,507,855	197,579
1892 .... do....	1,398,365	87,902	short tons..	611	
1893 .... do....	843,103	63,232			

a Exclusive of 860,750 pounds of artificial graphite.

IMPORTS.

As is seen from the following table giving the amount of graphite imported into the United States, the amount mined in this country is but a comparatively small portion of that which is consumed. Not only has the production of graphite in this country increased very materially in the last two or three years, but also the importation. Thus it is seen that there is a wide opening for graphite mining in this country, and therefore any newly discovered deposits of this mineral near a railroad are worthy of investigation. The principal portion of the graphite imported into the United States is from Ceylon. In 1899 the value of the graphite imported into the United States was twelve times that of the domestic product, and in 1900 it was seven times.

Graphite imported into the United States since 1867.

Year ending—	Unmanufactured.		Manufactured.	Total.
	Quantity.	Value.	Value.	Value.
June 30—	*Cwt.*			
1867	27,113	$54,131	....	$54,131
1868	68,620	149,083	....	149,083
1869	74,846	351,004	....	351,004
1870	80,795	269,291	$833	270,124
1871	51,628	136,200	3,754	139,954
1872	96,381	329,030	....	329,030
1873	157,539	548,613	....	548,613
1874	111,992	382,591	....	382,591
1875	46,492	122,050	....	122,050
1876	50,589	150,709	17,605	168,314
1877	75,361	204,630	18,091	222,721
1878	60,244	154,757	16,909	171,666
1879	65,662	164,013	24,637	188,650
1880	109,908	278,022	22,941	300,963
1881	150,927	381,966	31,674	413,640
1882	150,421	363,835	25,536	389,371
1883	154,893	361,949	21,721	383,670
1884	144,086	286,393	1,863	288,256
1885	110,462	207,228	....	207,228
1886	83,368	164,111	....	164,111
1887	168,841	331,621	....	331,621
December 31—				
1888	184,013	353,990	....	353,990
1889	177,381	378,057	....	378,057
1890	255,955	594,746	....	594,746
1891	212,360	555,080	....	555,080
1892	233,540	667,775	....	667,775
1893	288,740	865,379	....	865,379
1894	*a* 5,814	225,720	....	225,720
1895	8,814	260,090	....	260,090
1896	15,230	437,159	....	437,159
1897	8,533	270,952	....	270,952
1898	13,482	743,820	....	743,820
1899	20,793	1,990,649	....	1,990,649
1900	14,417	1,390,144	....	1,390,141

a Long tons since 1894.

CANADIAN PRODUCTION.

The first production of graphite in Canada was in New Brunswick, where a low-grade mineral was mined, which brought only $8 per ton. In 1889 graphite of better quality was mined in the Province of Quebec, which very materially increased the average value per ton of the total amount mined. The deposits in the Province of Ontario, in Brougham, are now furnishing by far the largest portion of the graphite mined in Canada. The mineral is in a very large body and is of excellent quality.[1] The industry has been steadily increasing since 1895, and is fast becoming one of the large mining industries of this province.

In the table below are given the amount and value of the production of graphite since 1886:

Annual product of graphite in Canada since 1886.

Calendar year.	Tons.	Value.	Calendar year.	Tons.	Value.
1886	500	$4,000	1894 *a*	69	$223
1887	300	2,400	1895	220	6,150
1888	150	1,200	1896	139	9,455
1889	242	3,160	1897	436	16,240
1890	175	5,200	1898	(*b*)	11,098
1891	260	1,560	1899	1,310	24,179
1892	167	3,763	1900	1,922	30,940
1893	None.	None.			

a Exports. *b* Quantity not reported.

ARTIFICIAL GRAPHITE.

Progress is constantly being made in the artificial production of graphite. As was stated in the report for 1899, the Acheson Graphite Company was incorporated during that year, and it has established a plant at Niagara Falls, N. Y., for the manufacture of graphite. In 1899, 405,870 pounds of graphitized carbon in the shape of anodes and electrodes were produced, which were used in the manufacture of alkalies and bleaching powder by electrolysis, for the electric reduction of zinc and other metals, and for use as motor brushes. The company is now equipped for the manufacture of flake and powdered graphite in bulk, which it is producing in quantity and of good quality. About 10,000 pounds of this graphite were produced experimentally in 1899, but in 1900, 860,750 pounds of commercial graphite were produced.

[1] Rept. Bureau of Mines, Ontario, 1900, p. 14.

MINERAL PAINTS.

By Edward W. Parker.

MINERALS USED AS PIGMENTS.

The mineral substances included under this heading are those which are mined and prepared primarily as pigments. They consist of iron ores (red and brown hematites), which are ground and used in the manufacture of metallic paint and which are not included in the production of iron ores for the manufacture of metallic iron; clay, and other earths containing iron used in making yellow and brown pigments, such as ocher, umber, sienna, etc.; barytes or "heavy spar," used as a substitute for, or as an adulterant in, the manufacture of white lead; slate or shale, soapstone, asbestos, and graphite.

PRODUCTION.

As previously stated, and as shown in the following table, the pigments treated in this report as natural mineral paints consist essentially of metallic paint (including mortar colors), ocher, umber, sienna, venetian red, zinc white, and slate. A small amount of soapstone, ground especially for paint, and of graphitic and carbonaceous shales are also included. The aggregate product of these pigments in 1900 amounted to 121,062 short tons, an increase as compared with 103,257 tons in 1899. The value of the product increased over $600,000, from $3,940,069 in 1899 to $4,548,573 in 1900. Most of the increase in value was due to the larger production of zinc white in 1900, this product showing an increase of 8,694 short tons with an increase in value amounting to $455,530. The total increase in the value of the other products was $152,974. The production of metallic paint in 1900 was not materially different from that in 1899, although the value was increased about $12,000. The production of mortar colors increased about 900 tons, with an increase in value of $14,755. The production of ocher increased from 14,124 short tons, valued at $140,168, in 1899, to 17,015 short tons, valued at $186,707, in 1900. The output of venetian red increased from 11,991 short tons to 14,696 short tons, while the value increased from $210,361 to $236,574.

It may be well to state that in considering the variations between product and value allowance must be made for the comparatively wide range in the qualities of the materials and the fact that a larger production of a higher or lower priced article will effect a comparatively larger or smaller increase in the value, as the case may be, and that the rise or fall shown in the average price may be apparent only. Zinc white and venetian red are practically uniform in quality, but the same does not hold with the other pigments. It is evident that the decline in value of metallic paint, notwithstanding an increased tonnage, was due to the displacement in the market of some higher-priced paint by a cheaper article.

The production of mineral paints during the last eight years is shown in the following table:

Production of mineral paints since 1893.

Kind.	1893.		1894.		1895.		1896.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Ocher	10,517	$129,393	9,768	$96,935	12,045	$139,328	14,074	$136,458
Umber	480	7,560	265	3,830	320	4,350	165	2,646
Sienna	150	4,875	160	3,250	275	6,950	395	5,416
Metallic paint } Mortar color	19,960	297,289	15,225	189,922	17,315	212,761	14,805	180,134
Mortar color			10,150	94,961	11,544	106,381	9,660	89,600
Venetian red	3,214	64,400	2,983	73,300	4,595	102,900	4,138	93,866
Zinc white	24,059	1,804,420	19,987	1,399,090	20,710	1,449,700	20,000	1,400,000
Soapstone	100	700	75	525	270	3,200	....	....
Slate *a*	3,253	25,567	3,300	35,370	4,331	45,682	4,795	44,835
Other colors	50	600	....	....	....	....	....	....
Total	61,783	2,334,804	61,913	1,897,183	71,405	2,071,252	68,032	1,952,955

Kind.	1897.		1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Ocher	14,006	$162,764	11,963	$123,832	14,124	$140,168	17,015	$186,707
Umber	*b* 1,080	11,710	*c* 1,177	8,285	473	4,151	1,452	26,927
Sienna	620	10,610	689	11,140	588	8,205	957	14,771
Metallic paint	16,699	187,694	20,972	263,979	23,423	249,945	23,218	261,831
Mortar color	8,237	75,570	7,107	74,894	5,736	65,156	6,689	79,911
Venetian red	13,603	294,744	10,271	160,711	11,991	210,361	14,696	236,574
Zinc white	25,000	1,750,000	33,000	2,310,000	40,146	3,211,680	48,840	3,667,210
Soapstone	2	20	100	800	100	700	100	700
Slate *a*	4,666	46,681	4,571	46,215	4,676	43,703	6,395	53,942
Other colors	2,000	6,000	2,000	6,000	2,000	6,000	1,700	20,000
Total	85,913	2,545,793	91,850	3,004,856	103,257	3,940,069	121,062	4,548,573

a Including mineral black. *b* Includes 600 tons of "Spanish brown."
c Includes 640 tons "Spanish brown."

OCHER, UMBER, AND SIENNA.

PRODUCTION.

Ocher was produced in eleven States during 1900—Alabama, Arkansas, Illinois, Iowa, Texas, Virginia, Wisconsin, California, Georgia, Pennsylvania, and Vermont. Two of these States—Illinois and Wisconsin—did not produce any ocher in 1899, while three States—Massachusetts, Missouri, and New York—reported a production in 1899 and did not report any output in 1900. In only three of these States—Georgia, Pennsylvania, and Vermont—were there more than two producers, and the output of the other States is combined in order not to divulge private and confidential information. Pennsylvania produced a little more than 50 per cent of the total product of ocher in 1899, and 43 per cent of the total in 1900. Georgia's product in 1900 was more than double that of the preceding year, the output having increased from 3,212 tons, valued at $39,505, to 6,828 tons, valued at $73,172. Pennsylvania's product of ocher in 1900 was only 316 tons more than in 1899, but the value increased nearly $27,500. Vermont's production decreased 39 per cent. The total production of ocher increased from 14,124 short tons, valued at $140,168, to 17,015 short tons, valued at $186,707.

Umber was produced in two States in 1900—Illinois and Pennsylvania—and sienna was reported from three States—Illinois, Pennsylvania, and New York.

The following tables show the production of ocher during the last four years, by States, and the total production of umber and sienna since 1896. The variations in value are in many cases due chiefly to an increased or decreased production of different grades of these pigments and not to any notable fluctuations in prices.

Production of ocher in 1897, 1898, 1899, and 1900, by States.

State.	1897.		1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
Georgia	2,608	$36,600	2,858	$30,798	3,212	$39,505	6,828	$73,172
Pennsylvania	6,825	81,325	5,986	61,500	7,285	57,245	7,601	84,661
Vermont	693	7,739	664	6,650	653	6,200	401	3,856
Other States	3,880	37,100	2,455	24,884	2,974	37,218	2,185	25,018
Total	14,006	162,764	11,963	123,832	14,124	140,168	17,015	186,707

Production of umber and sienna in 1896, 1897, 1898, 1899, and 1900.

Year.	Umber.		Sienna.	
	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*	
1896	165	$2,646	395	$5,416
1897	*a* 1,080	11,710	620	10,610
1898	*b* 1,177	8,285	689	11,140
1899	473	4,151	588	8,205
1900	1,452	26,927	957	14,771

a Includes 600 tons Spanish brown from Maryland.
b Includes 640 tons Spanish brown from Maryland.

The combined production of ocher, umber, and sienna for each year since 1884 is shown in the following table:

Annual production of ocher, etc., since 1884.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1884	7,000	$84,000	1893	11,147	$141,828
1885	3,950	43,575	1894	10,193	104,015
1886	6,300	91,850	1895	12,640	150,628
1887	8,000	75,000	1896	14,634	144,520
1888	10,000	120,000	1897	15,706	185,084
1889	15,158	177,472	1898	13,829	143,257
1890	17,555	237,523	1899	15,185	152,524
1891	18,294	233,823	1900	19,424	228,405
1892	14,365	193,074			

IMPORTS.

The following tables show the amount and value of ochers, etc., imported into the United States from 1867 to 1900:

Ocher, etc., imported from 1867 to 1883.

Fiscal year ending June 30—	All ground in oil.		Indian red and Spanish brown.		Mineral French and paris green.		Other, dry, not otherwise specified.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*		*Pounds.*	
1867	11,373	$385	....	$35,374	....	$2,083	1,430,118	$9,923
1868	6,949	333	....	11,165	....	500	3,670,093	32,102
1869	65,344	2,496	2,582,335	31,624	8,369	2,495	5,379,478	39,546
1870	149,240	6,042	3,377,944	41,607	9,618	3,444	3,935,978	32,593
1871	121,080	4,465	2,286,930	40,663	33,488	11,038	2,800,148	24,767
1872	277,617	9,225	2,810,282	38,763	41,422	10,341	5,645,343	56,680
1873	94,245	3,850	135,360	2,506	34,382	8,078	3,940,785	51,318
1874	98,176	4,623	263,389	3,772	102,876	18,153	3,212,988	35,365
1875	280,517	12,352	646,009	9,714	64,910	13,506	3,282,415	37,929
1876	63,916	3,365	2,524,989	19,555	21,222	5,385	3,962,646	47,405
1877	41,718	2,269	2,179,631	24,218	27,687	6,724	3,427,208	32,924
1878	25,674	1,591	2,314,028	23,677	67,655	14,376	3,910,947	33,260
1879	17,649	1,141	2,873,550	26,929	17,598	3,114	3,792,850	42,563
1880	91,293	4,233	3,655,920	32,726	16,154	3,269	4,602,546	52,120
1881	99,431	4,676	3,201,880	30,195	75,465	14,648	3,414,704	46,069
1882	159,281	7,915	3,789,586	34,136	18,293	2,821	5,530,204	68,106
1883 *a*	137,978	6,143	1,549,968	13,788	6,972	885	7,022,615	90,593

a Since 1883 classified as "dry" and "ground in oil."

Imports of ocher of all kinds from 1884 to 1900.

Year ending—	Dry.		Ground in oil.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*		*Pounds.*	
1884	6,164,359	$63,973	108,966	$4,717	6,273,325	$68,690
1885	4,983,701	51,499	79,666	3,616	5,063,363	55,115
Dec. 31—						
1886	4,939,183	53,593	112,784	6,574	5,051,967	60,167
1887	5,957,200	58,162	54,104	7,337	6,011,304	65,499
1888	6,574,608	64,123	43,142	9,690	6,617,750	73,813
1889	5,540,267	52,502	51,063	9,072	5,591,330	61,574
1890					6,471,863	71,953
1891	6,246,890	63,040	52,206	5,272	6,299,096	68,312
1892	8,044,836	97,946	49,714	5,120	8,094,550	103,066
1893	6,225,789	55,074	52,468	3,354	6,278,257	58,428
1894	4,937,738	45,276	22,387	2,100	4,960,125	47,376
1895	7,107,987	56,020	41,153	2,239	7,149,140	58,259
1896	8,954,252	68,196	27,023	1,561	8,981,275	69,757
1897	*a* 7,720,075	59,272	20,123	1,000	7,740,198	60,272
1898	5,898,725	46,571	31,460	1,546	5,930,185	48,117
1899	9,765,616	72,825	14,881	756	9,780,497	73,581
1900	8,449,252	57,342	19,167	1,019	8,468,419	58,361

a Since 1896 classified as "dry—crude and powdered, washed or pulverized."

Imports of umber from 1867 to 1900.

Year ending—	Quantity.	Value.	Year ending—	Quantity.	Value.
June 30—	*Pounds.*		June 30—	*Pounds.*	
1867	2,147,342	$15,946	1885	1,198,000	$8,504
1868	345,173	2,750	Dec. 31—		
1869	570,771	6,159	1886	1,262,930	9,187
1870	708,825	6,313	1887	2,385,281	16,536
1871	470,392	7,064	1888	1,423,800	14,684
1872	1,409,822	18,203	1889	1,555,070	20,887
1873	845,601	8,414	1890	1,556,823	19,329
1874	729,864	6,200	1891	633,291	6,498
1875	513,811	5,596	1892	1,028,038	6,256
1876	681,199	7,527	1893	1,488,849	16,636
1877	1,101,422	10,213	1894	632,995	6,275
1878	1,038,880	8,302	1895	*a* 1,560,786	13,075
1879	986,105	6,959	1896	*b* 689,075	8,360
1880	1,877,645	17,271	1897	*c* 1,447,889	14,479
1881	1,475,835	11,126	1898	*d* 1,123,079	9,051
1882	1,923,648	20,494	1899	*e* 1,739,036	13,326
1883	785,794	8,419	1900	*f* 1,703,256	11,862
1884	2,946,675	20,654			

a Includes 6,137 pounds "ground in oil" and 1,554,649 pounds "dry."

b Includes 5,292 pounds "ground in oil" and 683,783 pounds "dry."

c Includes 14,471 pounds "ground in oil" and 1,433,418 pounds "dry—crude or powdered."

d Includes 4,608 pounds "ground in oil" and 1,118,471 pounds "dry—crude and powdered, washed or pulverized."

e Includes 4,849 pounds "ground in oil" and 1,734,187 pounds "dry—crude and powdered, washed or pulverized."

f Includes 11,653 pounds "ground in oil" and 1,691,603 pounds "dry—crude and powdered, washed or pulverized."

Imports of sienna since 1893.

Year ending Dec. 31—	Dry.		Ground in oil.		Year ending Dec. 31—	Dry.		Ground in oil.	
	Quantity.	Value.	Quantity.	Value.		Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*			*Pounds.*		*Pounds.*	
1893	1,626,536	$138,889	5,857	$610	1897	580,468	$12,340	7,058	$481
1894	337,909	9,424	18,877	895	1898	544,713	11,451	4,008	280
1895	456,861	11,021	6,576	501	1899	798,691	14,470	6,484	492
1896	668,461	10,857	10,848	877	1900	796,534	14,912	6,335	495

PRODUCTION IN PRINCIPAL PRODUCING COUNTRIES.

The following table exhibits the output of ocher in some of the principal producing countries of the world for such years as statistics are available. France leads in amount, with Great Britain second, and the United States third. The production in France has each year amounted to more than that of the United States and Great Britain combined, although the value of the French product was little more than that of the United States. The German Empire stands fourth, with a production averaging about 25 per cent of that of France.

Production of ocher in principal producing countries from 1893 to 1900.

Year.	United States.		United Kingdom.		France.		German Empire.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
1893	11,147	$141,828	11,798	$67,318	....	....	....	....
1894	10,193	104,015	9,538	68,094	....	....	....	....
1895	12,640	150,628	8,540	82,397	36,456	$142,756	9,911	$25,297
1896	14,634	144,520	11,078	99,737	30,304	125,164	9,918	26,227
1897	15,706	185,084	16,153	63,165	35,594	150,714	9,660	25,242
1898	13,829	143,257	22,206	63,065	37,236	152,002	9,642	31,737
1899	14,124	140,168	18,272	66,082	36,090	155,821	10,234	31,750
1900	17,015	186,707	17,024	61,627	....	....	....	....

Year.	Canada.		Belgium.		Spain.		Cyprus.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
1893	1,070	$17,710	1,408	$1,351	1,135	$685	....	....
1894	611	8,690	400	965	132	232	1,714	$3,822
1895	1,339	14,600	800	1,930	224	760	1,500	3,293
1896	2,362	16,045	1,120	2,702	234	820	3,240	6,955
1897	3,905	23,560	560	1,400	220	772	1,721	3,776
1898	2,340	18,531	320	1,138	220	800	3,206	4,656
1899	3,919	19,900	330	1,158	110	400	1,098	2,443
1900	1,966	15,398	....	....	....	....	....	....

METALLIC PAINT.

Metallic paint is obtained by grinding hematite iron ore of certain qualities. Some of the ores are roasted before grinding in order to improve their color and durability. Considering the profusion of iron ore which exists in the United States, the amount of material suitable for making a good quality of metallic paint is small and the localities are comparatively rare. Among the localities from which good paint ore is to be obtained are Oneida, Rensselaer, Cattaraugus, and Washington counties, N. Y.; Lehigh, Carbon, and Mercer counties, Pa.; Hamilton and James counties, Tenn., and Dodge County, Wis. It is also produced in smaller quantities in Maryland, Arkansas, California, Illinois, Iowa, Vermont, Missouri, Ohio, and Wyoming. Part of the ore ground for paint is used as a coloring matter in mortar making. It is not always possible to separate exactly the amount used for mortar colors; the manufacturers, having sold it as dry ground paint, do not always know how it is consumed after leaving their hands. The separation given in this report is the best that could be made. It is not claimed that it is absolutely correct.

The production of metallic paint in 1900, exclusive of mortar colors, amounted to 23,218 short tons, as against 23,423 short tons in 1899, a decrease of 205 tons. The value increased $11,886, from $249,945 in 1899 to $261,831 in 1900. The production of mortar colors increased from 5,736 short tons, valued at $65,186, in 1899 to 6,689 short tons, valued at $79,911, in 1900, an increase of 953 short tons in amount and $14,755 in value.

The statistics of production in 1899 and 1900 are shown in the following table:

Production of metallic paint and mortar colors in 1899 and 1900.

State.	1899.				1900.			
	Metallic paint.		Mortar colors.		Metallic paint.		Mortar colors.	
	Product.	Value.	Product.	Value.	Product.	Value.	Product.	Value.
	Short tons.		*Short tons.*		*Short tons.*		*Short tons.*	
New York	4,938	$46,994	1,450	$14,000	2,550	$26,900	2,350	$25,050
Pennsylvania	9,062	128,734	1,500	18,010	11,376	152,310	1,160	17,220
Tennessee	5,983	40,050	1,022	11,242	....	....	....	....
Other States	3,440	34,167	1,764	21,904	9,292	82,621	3,179	37,641
Total	23,423	249,945	5,736	65,156	23,218	261,831	6,689	79,911

The annual product of metallic paint and mortar colors for the last twelve years has been as follows:

Production of metallic paint and mortar colors since 1889.

Year.	Metallic paint. *a*		Mortar colors.		Year.	Metallic paint. *a*		Mortar colors.	
	Short tons.	Value.	Short tons.	Value.		Short tons.	Value.	Short tons.	Value.
1889	21,026	$286,294	....	....	1895	17,315	$212,761	11,544	$106,381
1890	24,177	340,369	....	....	1896	14,805	180,134	9,660	89,600
1891	25,142	334,455	....	....	1897	16,699	187,694	8,237	75,570
1892	25,711	362,966	....	....	1898	20,972	263,979	7,107	74,894
1893	19,960	297,289	....	....	1899	23,423	249,945	5,736	65,156
1894	15,225	189,922	10,150	$94,961	1900	23,218	261,831	6,689	79,911

a Includes mortar colors from 1889 to 1893, inclusive.

VENETIAN RED.

Venetian red is a bright-red pigment, obtained by roasting iron sulphate or green vitriol. The sulphur is driven off, leaving iron oxide of a brighter red than that found native. The amount of iron so consumed is comparatively small when considered with the total iron product, and the venetian-red product is accordingly included in the output of mineral paints.

The production of venetian red in the last four years has averaged about 12,600 tons annually. In 1900 it amounted to 14,696 tons, as against 11,991 tons in 1899. Accompanying this increase in amount was an increase value from $210,361 to $236,574. The annual production since 1890 has been as follows:

Production of venetian red since 1890.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1890	4,000	$84,100	1896	4,138	$93,866
1891	4,191	90,000	1897	13,603	294,744
1892	4,900	106,800	1898	10,271	160,711
1893	3,214	64,400	1899	11,991	210,361
1894	2,983	73,300	1900	14,696	236,574
1895	4,595	102,900			

SLATE GROUND FOR PIGMENT.

Including "mineral black," the amount of slate and shale ground for paint in 1900 was 6,395 short tons, valued at $53,942, as compared with 4,676 short tons, valued at $43,703, in 1899. The increased output and value in 1900 are due partly to the inclusion of a special pigment to which the name of "carbon black" has been given.

The annual product of pigments made from slate and shale since 1880 has been as follows:

Amount and value of slate and shale ground for pigment since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	1,120	$10,000	1891	2,240	$20,000
1881	1,120	10,000	1892	3,787	23,523
1882	2,240	24,000	1893	3,253	25,567
1883	2,240	24,000	1894	3,300	35,370
1884	2,240	20,000	1895	4,331	45,682
1885	2,212	24,687	1896	4,795	44,835
1886	3,360	30,000	1897	4,666	46,681
1887	2,240	20,000	1898	4,571	46,215
1888	2,800	25,100	1899	4,676	43,703
1889	2,240	20,000	1900 *a*	6,395	53,942
1890	2,240	20,000			

a Includes mineral and carbon black.

WHITE LEAD, ETC.

The returns to the Geological Survey for 1900 indicate that there was a general falling off in the production of lead pigments in that year. The production of white lead in oil decreased from 170,214,565 pounds in 1899 to 151,874,933 pounds in 1900. Dry white lead decreased from 50,178,486 pounds in 1899 to 44,544,971 pounds in 1900. The production of red lead decreased from 22,157,694 pounds to 21,486,825 pounds; litharge, from 21,937,704 pounds to 18,984,145 pounds, and orange mineral from 2,024,302 pounds to 1,973,016 pounds. In the cases of red lead and orange mineral these decreases were offset by advances in values. The statistics of imports of lead oxides show that the drease in domestic production was not due to any increased use of foreign material. The imports of white lead in 1900 were the smallest on record. Red lead imports fell off nearly 30 per cent. Litharge imports increased in amount but decreased in value. Orange mineral decreased in amount but increased in value.

The production of white lead, red lead, litharge, and orange mineral in 1898, 1899, and 1900 was as follows:

Production of white lead, etc., in 1898, 1899, and 1900.

	1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
White lead:	*Pounds.*		*Pounds.*		*Pounds.*	
In oil....	153,036,302	$7,740,345	170,214,565	$8,977,268	151,874,933	$8,430,996
Dry................	39,058,581	1,660,277	50,178,486	2,340,689	44,544,971	2,226,960
Red lead	18,435,016	917,521	22,157,694	1,192,927	21,486,825	1,198,008
Litharge................	18,176,591	834,965	21,937,704	1,159,698	18,984,145	990,391
Orange mineral	1,462,715	97,873	2,024,302	146,720	1,973,016	149,288

The annual production of white lead since 1884 has been as follows:

Production of white lead in the United States since 1884.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1884........................	65,000	$6,500,000	1893........................	72,172	$7,695,130
1885........................	60,000	6,300,000	1894........................	76,343	6,623,071
1886........................	60,000	7,200,000	1895........................	90,513	8,723,632
1887........................	70,000	7,560,000	1896........................	88,608	8,371,588
1888........................	84,000	10,080,000	1897........................	95,658	9,676,815
1889........................	80,000	9,600,000	1898........................	96,047	9,400,622
1890........................	77,636	9,382,967	1899........................	110,197	11,317,957
1891........................	78,018	10,454,029	1900........................	98,210	10,657,956
1892........................	74,485	8,733,620			

IMPORTS.

The following table shows the imports of white lead, red lead, litharge, and orange mineral since 1867:

Red lead, white lead, litharge, and orange mineral imported from 1867 to 1900.

Year ending—	Red lead.		White lead.		Litharge.		Orange mineral.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*		*Pounds.*		*Pounds.*	
1867	926,843	$53,087	6,636,508	$430,805	230,382	$8,941		
1868	1,201,144	76,773	7,533,225	455,698	250,615	12,225		
1869	808,686	46,481	8,948,642	515,783	187,333	7,767		
1870	1,042,813	54,626	6,228,285	365,706	97,398	4,442		
1871	1,295,616	78,410	8,337,842	483,392	70,889	3,870		
1872	1,513,794	85,644	7,153,978	431,477	66,544	3,396		
1873	1,583,039	99,891	6,331,373	408,986	40,799	2,379		
1874	756,644	56,305	4,771,509	323,926	25,687	1,450		
1875	1,048,713	73,131	4,354,131	295,642	15,767	950		
1876	749,918	54,884	2,546,776	175,776	47,054	2,562		
1877	387,260	28,747	2,644,184	174,844	40,331	2,347		
1878	170,608	9,364	1,759,608	113,638	28,190	1,499		
1879	143,237	7,237	1,274,196	76,061	38,495	1,667		
1880	217,033	10,397	1,906,931	107,104	27,389	1,222		
1881	212,423	10,009	1,068,030	60,132	63,058	2,568		
1882	288,946	12,207	1,161,889	64,493	54,592	2,191		
1883	249,145	10,503	1,044,478	58,588	34,850	1,312		
1884	265,693	10,589	902,281	67,918	54,183	1,797		
1885	216,449	7,641	705,535	40,437	35,283	1,091		
Dec. 31—								
1886	597,247	23,038	785,554	57,340	51,409	1,831		
1887	371,299	16,056	804,320	58,602	35,908	1,302		
1888	529,665	23,684	627,900	49,903	62,211	2,248		
1889	522,026	24,400	661,694	56,875	41,230	1,412		
1890	450,402	20,718	742,196	57,659	48,283	2,146		
1891	651,577	23,807	718,228	40,773	94,586	3,108		
1892	812,703	28,443	744,838	40,032	56,737	1,811	1,409,601	$64,133
1893	854,982	27,349	686,490	34,145	42,582	1,310	1,385,828	61,360
1894	947,873	29,064	796,480	40,939	38,595	1,064	1,386,464	58,614
1895	1,764,274	53,139	1,897,892	79,887	97,667	2,812	1,689,367	66,492
1896	1,543,262	47,450	1,183,538	52,409	51,050	1,615	1,359,651	51,077
1897	1,386,070	46,992	1,101,829	48,988	60,984	1,931	1,486,042	67,549
1898	682,449	25,780	506,739	24,334	56,417	2,021	795,116	37,745
1899	776,197	30,479	583,409	30,212	55,127	3,614	1,141,387	58,142
1900	549,551	25,532	456,872	28,366	77,314	2,852	1,068,793	61,885

PRICES.

The following table is of interest, as it shows the average yearly market prices of corroding pig lead and the net price of white lead in oil (both at New York) and the difference between the two since 1874:

Average yearly net prices, at New York, of pig lead and white lead in oil since 1874.

[Per 100 pounds.]

Year.	Pig lead, in New York.	White lead in oil, in New York.	Difference.	Year.	Pig lead, in New York.	White lead in oil, in New York.	Difference.
1874	$6.00	$11.25	$5.25	1888	$4.41	$5.75	$1.34
1875	5.95	10.50	4.55	1889	3.80	6.00	2.20
1876	6.05	10.00	3.95	1890	4.33	6.25	1.92
1877	5.43	9.00	3.57	1891	4.33	6.37	2.05
1878	3.58	7.25	3.67	1892	4.05	6.39	2.34
1879	4.18	7.00	2.82	1893	3.73	6.03	2.30
1880	5.05	7.60	2.55	1894	3.28	5.26	1.98
1881	4.80	7.25	2.45	1895	3.28	5.05	1.77
1882	4.90	7.00	2.10	1896	3.03	4.90	1.87
1883	4.32	6.88	2.56	1897	3.64	5.00	1.36
1884	3.73	5.90	2.17	1898	3.79	5.08	1.29
1885	3.95	6.00	2.05	1899	4.53	5.35	.82
1886	4.63	6.25	1.62	1900	4.55	5.57	1.02
1887	4.47	5.75	1.28				

It will be observed from the foregoing table that the difference in price betwen white lead in oil and pig lead in New York in 1900 was $1.02, as against a difference of 82 cents in 1899. Against this must be set the difference in the price of linseed oil, which varied from 50 to 67 cents in 1900 and sold as low as 37 cents in 1899. The price of linseed oil at the beginning of 1899 was 41 cents per gallon; it sold as low as 37 cents in August, and reached the highest point of the year, 50 cents, in December. Beginning with 50 cents in January of 1900, the price advanced until it reached 67 cents during the summer, and then declined until 60 cents was reached in December. The market price for pig lead in New York opened at 4.85 cents and closed at 4.52½ cents. The extreme prices were 4.85 cents and 3.90 cents, the latter price being touched on June 13.

The fluctuations in price of linseed oil during the last seven years are shown in the following table:

Price of linseed oil at New York since 1894.

[In cents per gallon.]

Year.	Highest.	Lowest.	Year.	Highest.	Lowest.
1894	56	50	1898	46	34
1895	59	42	1899	50	37
1896	41	31	1900	67	50
1897	43	30			

ZINC WHITE.

Against the decreased production of white lead in 1900 must be set an increased production of zinc white, the output of which increased from 40,146 short tons to 48,840 short tons. From this, the production of zinc white is seen to have increased 8,694 short tons. The production of white lead (dry and in oil) decreased 11,737 short tons.

The following table shows the production of zinc oxide from 1880 to 1900:

Production of zinc white since 1880.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1880	10,107	$763,738	1891	23,700	$1,600,000
1881	10,000	700,000	1892	27,500	2,200,000
1882	10,000	700,000	1893	24,059	1,804,420
1883	12,000	840,000	1894	19,987	1,399,090
1884	13,000	910,000	1895	20,710	1,449,700
1885	15,000	1,050,000	1896	20,000	1,400,000
1886	18,000	1,440,000	1897	25,000	1,750,000
1887	18,000	1,440,000	1898	33,000	2,310,000
1888	20,000	1,600,000	1899	40,146	3,211,680
1889	16,970	1,357,600	1900	48,840	3,667,210
1890	....	1,600,000			

IMPORTS.

The imports of zinc white in 1900 were less than in any year since 1888, showing that the domestic product has displaced a considerable quantity of the foreign material in the home markets. The imports of white in 1900 were only about 40 per cent of the amount imported zinc in 1897, three years before.

The following table exhibits the amount of zinc white imported into the United States since 1885:

Imports of zinc oxide from 1885 to 1900, inclusive.

Year ending—	Dry.	In oil.	Year ending—	Dry.	In oil.	Total value.
	Pounds.	*Pounds.*		*Pounds.*	*Pounds.*	
June 30, 1885	2,233,128	98,566	Dec. 31—			
Dec. 31—			1893	3,900,749	254,807	....
1886	3,526,289	79,788	1894	3,371,292	59,291	$122,690
1887	4,961,080	123,216	1895	4,546,049	129,343	153,641
1888	1,401,342	51,985	1896	4,572,781	311,023	161,188
1889	2,686,861	66,240	1897	5,564,763	502,357	206,636
1890	2,631,458	102,298	1898	3,342,235	27,050	130,039
1891	2,839,351	128,140	1899	3,012,709	41,699	172,359
1892	2,442,014	111,190	1900	2,618,808	38,706	142,395

BARYTES.

By Edward W. Parker.

PRODUCTION.

There was a considerable increase in the production of crude barytes, or heavy spar, in 1900, as compared with any preceding year, the output amounting to 67,680 short tons, valued at $188,089, against with 41,894 short tons, valued at $139,528, in 1899, and 31,306 short tons, valued at $108,339, in 1898. As the production in 1898 was the largest up to that time, it is seen from this that the output in 1900 was more than double that of any preceding year. The increased production in 1900 was largely due to the development of properties in Tennessee, although there was also a considerable increase in the production in Missouri. The average price per ton has declined from $3.50 in 1898 to $3.33 in 1899 and $2.78 in 1900, this decline being attributed chiefly to the larger production of low-grade material.

During the last year a number of inquiries have been received by the Geological Survey for information regarding deposits of witherite, or carbonate of barium, in the United States. Producers of barium sulphate, or barytes, have been requested to report any witherite occurring with barytes, but these requests have failed to result in the location of any witherite deposits of economic importance in the United States.

In the following table is shown the annual output of crude barytes in the United States since 1882:

Production of crude barytes from 1882 to 1900.

Year.	Quantity.	Value.	Average price per ton.
	Short tons.		
1882	22,400	$80,000	$3.57
1883	30,240	108,000	3.57
1884	28,000	100,000	3.57
1885	16,800	75,000	4.46
1886	11,200	50,000	4.46
1887	16,800	110,000	*a* 6.55
1888	22,400	75,000	3.35
1889	21,460	106,313	*b* 4.95
1890	21,911	86,505	3.95
1891	31,069	118,363	3.81
1892	32,108	$130,025	$4.05
1893	28,970	88,506	3.06
1894	23,335	86,983	3.73
1895	21,529	68,321	3.17
1896	17,068	46,513	2.7[illegible]
1897	26,042	58,295	2.2
1898	31,306	108,339	3.50
1899	41,894	139,528	3.33
1900	67,680	188,089	2.78

a Value at St. Louis and includes some floated barytes.
b Value includes floated barytes when sold first in that form.

IMPORTS.

The following table shows the imports of barytes into the United States from 1867 to 1900:

Imports of barytes from 1867 to 1900.

Year ending—	Manufactured.		Unmanufactured.	
	Quantity.	Value.	Quantity.	Value.
June 30—	*Pounds.*		*Pounds.*	
1867	14,968,181	$141,273	....	....
1868	2,755,547	26,739	....	....
1869	1,117,335	8,565	....	....
1870	1,684,916	12,917	....	....
1871	1,385,004	9,769	....	....
1872	5,804,098	43,521	....	....
1873	6,939,425	53,759	....	....
1874	4,788,966	42,235	....	....
1875	2,117,854	17,995	....	....
1876	2,655,349	25,325	....	....
1877	2,388,373	19,273	....	....
1878	1,366,857	10,340	....	....
1879	453,333	3,496	....	....
1880	4,924,423	37,374	....	....
1881	1,518,322	11,471	....	....
1882	562,300	3,856	....	....
1883	411,666	2,489	....	....
1884	3,884,516	24,671	5,800,816	$8,044
1885	4,095,287	20,606	7,841,715	13,567
December 31—				
1886	3,476,691	18,338	6,588,872	8,862
1887	4,057,831	19,769	10,190,848	13,290
1888	3,821,842	17,135	6,504,975	9,037
1889	3,601,506	22,458	13,571,206	7,660
1890	*a* 1,563	16,453	*a* 4,815	13,133
1891	2,149	22,041	2,900	8,816
1892	1,389	15,419	2,789	7,418
1893	1,032	11,457	2,983	7,612
1894	836	10,556	1,884	5,270
1895	1,629	17,112	2,551	7,561
1896	2,467	23,345	509	1,274
1897	1,300	13,822	502	579
1898	687	8,678	1,022	2,678
1899	2,111	22,919	1,739	5,488
1900	2,454	24,160	2,568	8,301

a Tons since 1890.

FULLER'S EARTH.

PRODUCTION.

The marketed product of fuller's earth in 1900 amounted to 9,698 short tons, valued at $67,535, as compared with 12,381 short tons, valued at $79,644 in 1899. The production has decreased annually since 1897, the output in 1900 being not more than half of what it was three years before. There was also a decrease in the amount of fuller's earth imported into the United States in 1900, the amount imported having decreased from 10,320 long tons in 1899 to 9,173 long tons in 1900.

Production of fuller's earth in the United States from 1895 to 1900.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			*Short tons.*	
1895	6,900	$41,400	1898	14,860	$106,500
1896	9,872	59,360	1899	12,381	79,644
1897	17,113	112,272	1900	9,698	67,535

IMPORTS.

The amount and value of the fuller's earth imported into the United States in 1897, 1898, 1899, and 1900 are shown in the following table:

Fuller's earth imported into the United States during 1897, 1898, 1899, and 1900.

Class.	1897.a		1898.		1899.		1900.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Long tons.		*Long tons.*		*Long tons.*		*Long tons.*	
Unwrought or unmanufactured	2,308	$14,283	2,038	$15,921	3,743	$23,194	2,431	$14,750
Wrought or manufactured	2,138	20,037	6,315	55,123	6,577	46,446	5,742	50,047
Total	4,446	34,320	8,353	71,044	10,320	69,640	8,173	64,797

a July to December only.

In the following table is shown the amount and value of the fuller's earth imported from 1867 to 1883, by fiscal years. The wrought and unwrought earths were not classified separately during this period. From July 1, 1883, to June 30, 1897, fuller's earth was not reported separately in the custom-house returns to the Treasury Department, but was included with other minerals "not elsewhere specified."

Imports of fuller's earth from 1867 to 1883.

Year ending June 30—	Quantity.	Value.	Year ending June 30—	Quantity.	Value.
	Long tons.			*Long tons.*	
1867	280	$3,113	1876	246	$3,097
1868	211	2,522	1877	400	4,460
1869	324	3,587	1878	335	4,095
1870	239	2,619	1879	361	4,269
1871	290	3,383	1880	578	6,925
1872	274	3,358	1881	268	3,207
1873	251	2,978	1882	908	11,444
1874	277	3,440	1883	1,241	14,309
1875	300	3,694			

FLINT AND FELDSPAR.

PRODUCTION.

The production of flint and feldspar in 1900 showed a decrease from 1899, the flint mined amounting to 32,495 short tons, valued at $179,351, while the amount of feldspar mined was 21,353 short tons, valued at $173,659.

New feldspar quarries were reported from Marriotsville, Md., and Lancaster County, Pa. New flint quarries were opened at Westminster, Md., and Marietta, Pa.

The production of the ground and the crude feldspar, and also the flint, are given separately for 1900, since the output of both was large. The value given is that at the mines.

Production of flint in the United States in 1900.

State.	Ground.		Crude.	
	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*	
Connecticut			9,444	$17,400
Maryland	3,344	$18,500	1,904	2,975
Pennsylvania	1,820	5,858	4,460	10,172
Wisconsin and New Jersey	8,720	20,440		
New York and Maine			2,803	4,006
Total	13,884	44,798	18,611	134,553

Production of feldspar in the United States in 1900.

State.	Ground.		Crude.	
	Quantity.	Value.	Quantity.	Value.
	Short tons.		*Short tons.*	
Connecticut and New York	8,006	$61,500	1,584	$6,800
Pennsylvania	11,560	104,900		
Maine and Maryland			203	459
Total	19,566	166,400	1,787	7,259

The above figures do not show the entire amount of spar and flint consumed in the United States annually, for some flint is imported from England and some feldspar from Canada.

The product of both flint and feldspar is utilized chiefly in the manufacture of pottery and tiles, but much is also employed in the manufacture of wood filler, scouring soaps, and glass manufacture.

CHROMITE, OR CHROMIC IRON ORE.

By Joseph Hyde Pratt.

VALUE OF CHROME ORE.

The value of the chrome ore depends upon its percentage of chromic oxide, Cr_2O_3. The standard ore contains 50 per cent of Cr_2O_3, and for every unit above 50 there is an increase in value per ton of 75 cents to $1; but below 50 per cent there is a much greater deduction per unit. Ores that are low in silica are more valuable, and even when they are as low as 45 per cent of Cr_2O_3 they find a ready market if they are very low in silica.

PRODUCTION.

The production of chromite, the source of chromium alloys and salts, has practically ceased in the United States. Occasionally there are a few tons of ore obtained from California and Maryland. This does not mean that the deposits of chromite in the United States are exhausted, but that on account of their location they can not be profitably mined in competition with the ore from Turkey. Then, again, the deposits of California have not been thoroughly investigated, and many of these would probably make profitable mining, especially if works for the reduction of the ore were established on the Pacific coast.

In the following table is given the production of chromite in the United States since 1885:

Production of chromite in the United States from 1885 to 1896.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Long tons.			*Long tons.*	
1885	2,700	$40,000	1891	1,372	$20,580
1886	2,000	30,000	1892	1,500	25,000
1887	3,000	40,000	1893	1,450	21,750
1888	1,500	20,000	1894	3,680	53,231
1889	2,000	30,000	1895	1,740	16,795
1890	3,599	53,985	1896	786	6,667

Since 1896 there has been no production of chromite in the United States beyond a ton or two that has been mined as samples, except in 1900, when 140 tons, worth $1,400, were mined.

IMPORTS.

Most of the chrome ore (chromite) that is imported into the United States comes from Turkey, but the Newfoundland ore is beginning to find a market in this country, especially in the manufacture of chrome brick, as it is cheaper than the ore from Turkey. Up to 1884 there was little or no chrome ore imported, but the chromate and bichromate of potash and chromic acid were imported on a large scale. Since then the importation of chrome ore has increased, until now it far exceeds in value the amount of chromium salts imported.

The following table shows the amount and value of chrome ore, chromate and bichromate of potash, and chromic acid imported and entered for consumption into the United States since 1867:

Chromate and bichromate of potash, chromic acid, and chrome ore imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Year ending—	Chromate and bichromate of potash.		Chromic acid.		Chrome ore.		Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
June 30—	Pounds.		Pounds.		Long tons.		
1867	875,205	$88,787					$88,787
1868	777,855	68,634					68,634
1869	877,432	78,288		$3			78,291
1870	1,235,946	127,333		8			127,341
1871	2,170,473	223,529		5			223,534
1872	1,174,274	220,111	514	49			220,160
1873	1,121,357	178,472	922	276			178,748
1874	1,387,051	218,517	44	13			218,530
1875	1,417,812	183,424	45	22			183,446
1876	1,665,011	175,795	120	45			175,840
1877	2,471,669	264,392	13	10			264,402
1878	1,929,670	211,136	32	35			211,171
1879	2,624,403	221,151					221,151
1880	3,505,740	350,279	5	3			350,282
1881	4,404,237	402,088	124	89			402,177
1882	2,449,875	261,006	52	42			261,048
1883	1,990,140	208,681	290	338			209,019
1884	2,593,115	210,677		120	2,677	$73,586	284,383
1885	1,448,539	92,556		39	12	239	92,834
December 31—							
1886	1,985,809	139,117		101	3,356	43,721	182,939
1887	1,722,465	120,305		5,571	1,404	20,812	146,688
1888	1,755,489	143,312		281	4,440	46,735	190,328
1889	1,580,385	137,263		2,974	5,474	50,782	191,019
1890	1,304,185	113,613		634	4,353	57,111	171,358
1891	755,254	55,897	634	203	4,459	108,764	164,864
1892	496,972	94,055	772	204	4,930	55,579	149,838
1893	976,706	78,981	3,708	641	6,354	58,629	138,251
1894	1,483,762	125,796	5,680	837	3,470	38,364	164,997
1895	2,045,910	181,242	2,083	414	5,230	82,845	264,501
1896	952,794	80,538	2,429	387	8,669	187,400	268,325
1897	1,329,473	108,497	71,220	4,557	11,570	187,439	301,393
1898	1,160,710	86,134	5,329	1,758	16,304	272,234	360,126
1899	1,130,965	73,510	33,134	6,360	15,793	284,825	364,695
1900	111,761	7,758	35,452	7,232	17,542	305,001	319,991

MINERAL WATERS.

By A. C. Peale.

PRODUCTION.

The number of springs on the list for 1900 is larger than for any previous year, and yet the net increase over the number for 1899 is only 20. There have been added to the list 37 springs, and 17 have been dropped. The total number for 1900 is 561, as compared with 541 for 1899. The number of springs actually reporting sales is 491, which is greater by 12 than the same number for 1899. There are 70 springs not represented in this report by any figures. Of these, 29 report that no sales were made during the year, and the remainder are estimated for in the totals. Including this estimate, the figures for 1900 show a gain of 7,996,648 gallons over the corresponding figures of 1899, and a loss of $702,858 in the value of the product.

In all but one section there has been an increase in the number of gallons reported as sold, but only two report an increased value for the product put upon the market. This is due mainly to a decrease in the price per gallon, which has fallen from 17.5 cents in 1899 to about 12.5 cents in 1900.

Confining comparisons to the springs actually reporting sales in 1900, numbering 491, it is seen that the increase in the number of gallons sold over that of 1899 is 8,255,456, with an increase in the value of the product of $307,111.

In the North Atlantic there is a net gain of 9 springs, 13 having been added to the list, while 4 have been dropped. This leaves the total for the section 194, as compared with 185 for 1899. Of these, 173 report sales amounting to 13,344,708 gallons with a valuation of $2,001,606, a decrease of 330,056 gallons and a decrease in value of $1,782. The 13 springs new to the list are the following:

Maine: Forest springs.

Massachusetts: Diamond spring, McKnight's Glen spring, Pepperell mineral spring, Pequot spring.

New Hampshire: Monadnock Mineral Spring.

New Jersey: Beacon Mountain Spring, Nearpass Spring.

New York: Fishers Mineral Spring, Lebanon Mineral Spring, Red Jacket Mineral Spring, Remeho Spring.

Pennsylvania: Bedford Chalybeate Spring.

The South Atlantic States have a net loss of 3 springs, 5 having been dropped for the section, while only 2 have been added. The total for 1900 is 89, as compared with 92 for 1899. Reports of sales have been received from 75, their figures showing a production of 2,373,607 gallons, with a value of $439,905. This is an increase in production of 547,064 gallons and a decrease in value of $29,674. The 2 springs not on the list of 1899 are:

South Carolina: Glowing Spring.

Virginia: Berry Hill Mineral Spring.

While the North Central States gain 12 new springs they lose 7, so that the total number for the section is 153, as compared with 148 for 1899. Of these, 137 report sales for 1900, which is 13 more than reported for the previous year. The total production in 1900 for the section is reported as 19,679,499 gallons, which is an increase of 6,182,776 gallons over that of 1899. The total value of the product is $2,239,261, which is an increase of $504,534 over that of 1899. The springs new to the list are the 12 following:

Illinois: Aqua Vitæ Mineral Springs, Spouting Mineral Well.

Kansas: Abilena Mineral Wells.

Michigan: Clementine Spring, Harringtons Mineral Spring, Victory Spring, Welcome Island Lithia Springs, Crystal Spring.

Minnesota: Highland Spring.

Missouri: Akesion or Healing Spring.

Wisconsin: Glen Rock Spring, Hygeia Spring No. 2.

The total number of springs on the list for the South Central States remains at 46, as for 1899, the 1 spring added balancing the 1 spring that has been dropped. Sales for 1900 are reported from 41 springs, the same number as for 1899. The total number of gallons reported sold in 1900 is 6,548,662, at a value of $389,513. This is an increase of 949,510 gallons and an increase in value of $78,125 over the figures for the year 1899.

The 1 spring added to the list is the following:

Arkansas: Arsenic Spring.

In the Western States and Territories 9 springs are added to the list, bringing the total up to 79, that of 1899 being 70. Sales for 1900 are reported from 65, which is 1 more than were heard from in 1899. The total number of gallons sold in 1900 is reported as 3,330,519, which is an increase of 906,162 gallons over the figures of 1899. The value of the product is $721,520, a loss of $244,092 from 1899. The 9 springs new to the list are the following:

California: Astorg Springs, Burton Mound Mineral Springs, Eden Hot Springs, Phillips Napa Spring, Marysville Deep Well.

Nevada: Steamboat Springs.

New Mexico: American Carlsbad Spring.

Washington: Olympian Hygeian Spring.

Wyoming: Saragota Hot Springs.

Production of mineral waters in 1900, by States and Territories.

State or Territory.	Springs reporting.	Product.	Value.
		Gallons.	
Alabama	3	7,900	$22,122
Arkansas	6	123,000	38,235
California	38	2,498,894	512,310
Colorado	10	414,825	62,500
Connecticut	12	432,568	69,389
District of Columbia	2	187,500	10,800
Florida	2	25,600	13,620
Georgia	5	148,500	28,200
Illinois	18	738,300	59,670
Indiana	12	184,025	46,331
Iowa	3	124,000	12,400
Kansas	6	52,475	3,487
Kentucky	4	272,000	10,250
Maine	22	795,912	104,190
Maryland	9	373,320	36,849
Massachusetts	40	4,898,246	240,524
Michigan	28	3,398,996	411,935
Minnesota	5	2,462,170	58,043
Mississippi	6	282,228	48,617
Missouri	13	647,364	138,820
New Hampshire	6	544,400	189,395
New Jersey	9	525,500	207,135
New Mexico	4	29,000	3,325
New York	49	4,624,938	929,038
North Carolina	7	125,295	29,799
Ohio	15	2,061,158	184,964
Oregon	3	49,300	11,960
Pennsylvania	27	1,292,950	233,647
Rhode Island	3	162,350	8,835
South Carolina	6	352,208	37,046
South Dakota	2	429,450	62,189
Tennessee	6	196,900	44,343
Texas	15	5,438,700	209,991
Utah	2	8,500	2,125
Vermont	5	67,844	19,453
Virginia	38	1,141,859	272,868
Washington	4	62,500	8,200
West Virginia	6	19,325	10,723
Wisconsin	34	9,581,061	1,261,312
Other States *a*	6	495,934	137,165
Total	491	45,276,995	5,791,805
Estimated production of springs not reporting sales	70	2,281,789	453,367
Grand total	561	47,558,784	6,245,172

a The States in which only one spring for each has made a report are included here. These States are Idaho, Louisiana, Montana, Nebraska, Nevada and Wyoming.

Production of natural mineral waters from 1883 to 1900.

Year.	Springs reporting.	Quantity sold.	Value.
		Gallons.	
1883	189	7,529,423	$1,119,603
1884	189	10,215,328	1,459,143
1885	224	9,148,401	1,312,845
1886	225	8,950,317	1,284,070
1887	215	8,259,609	1,261,463
1888	198	9,578,648	1,679,302
1889	258	12,780,471	1,748,458
1890	273	13,907,418	2,600,750
1891	288	18,392,732	2,996,259
1892	283	21,876,604	4,905,970
1893	330	23,544,495	4,246,734
1894	357	21,569,608	3,741,846
1895	370	21,463,543	4,254,237
1896	377	25,795,312	4,136,192
1897	441	23,255,911	4,599,106
1898	484	28,853,464	8,051,833
1899	541	39,562,136	6,948,030
1900	561	47,558,784	6,245,172

Summary of reports of mineral springs for 1900.

State or Territory.	Springs reporting.	Springs not reporting.	Total used commercially.
NORTH ATLANTIC STATES.			
Maine	22	4	26
New Hampshire	6	1	7
Vermont	5	3	8
Massachusetts	40	4	44
Rhode Island	3	2	5
Connecticut	12	1	13
New York	49	3	52
New Jersey	9	0	9
Pennsylvania	27	3	30
SOUTH ATLANTIC STATES.			
Delaware	0	0	0
Maryland	9	0	9
District of Columbia	2	0	2
Virginia	38	9	47
West Virginia	6	2	8
North Carolina	7	1	8
South Carolina	6	1	7
Georgia	5	1	6
Florida	2	0	2
SOUTH CENTRAL STATES.			
Kentucky	4	1	5
Tennessee	6	0	6
Alabama	3	1	4
Mississippi	6	0	6
Louisiana	1	0	1
Texas	15	2	17
Indian Territory	0	0	0
Arkansas	6	1	7
Oklahoma	0	0	0

Summary of reports of mineral springs for 1900—Continued.

State or Territory.	Springs reporting.	Springs not reporting.	Total used commercially.
NORTH CENTRAL STATES.			
Ohio	15	2	17
Indiana	12	3	15
Illinois	18	3	21
Michigan	28	0	28
Wisconsin	34	3	37
Minnesota	5	1	6
Iowa	3	1	4
Missouri	13	1	14
North Dakota	0	0	0
South Dakota	2	0	2
Nebraska	1	0	1
Kansas	6	2	8
WESTERN STATES AND TERRITORIES.			
Alaska	0	0	0
Wyoming	1	0	1
Montana	1	1	2
Colorado	10	3	13
New Mexico	4	2	6
Arizona	0	0	0
Utah	2	1	3
Nevada	1	0	1
Idaho	1	0	1
Washington	4	0	4
Oregon	3	0	3
California	38	7	45
Total	491	70	561

IMPORTS.

The following tables show the imports of mineral waters from 1867 to 1900, inclusive:

Mineral waters imported and entered for consumption in the United States, 1867 to 1900, inclusive.

Fiscal year ending June 30—	In bottles of 1 quart or less.		In bottles in excess of 1 quart.		Not in bottles.		All not artificial.		Total value.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	Bottles.		*Quarts.*		*Gallons.*		*Gallons.*		
1867	370,610	$24,913	3,792	$360	....	$137	....	....	$25,410
1868	241,702	18,438	22,819	2,052	554	104	....	....	20,594
1869	344,691	25,635	9,739	802	1,042	245	....	....	26,682
1870	433,212	30,680	18,025	1,743	2,063	508	....	....	32,931
1871	470,947	34,604	2,320	174	1,336	141	....	....	34,919
1872	392,913	67,951	....	....	639	116	....	....	68,067
1873	35,508	2,326	....	....	355	75	394,423	$98,151	100,552
1874	7,238	691	....	....	95	16	199,035	79,789	80,496
1875	4,174	471	....	....	5	2	395,956	101,640	102,113
1876	25,758	1,899	....	....	....	....	447,646	134,889	136,788
1877	12,965	1,328	....	....	....	22	520,751	167,458	168,808
1878	8,229	815	....	....	....	....	883,674	350,912	351,727
1879	28,440	2,352	....	....	3	4	798,107	282,153	284,509
1880	207,554	19,731	....	....	....	....	927,759	285,798	305,529
1881	150,326	11,850	....	....	55	26	1,225,462	383,616	395,492
1882	152,277	17,010	....	....	....	....	1,542,905	410,105	427,115
1883	88,497	7,054	....	....	....	....	1,714,085	441,439	448,493

Year ending—	Artificial mineral waters.		Natural mineral waters.	
	Quantity.	Value.	Quantity.	Value.
June 30—	*Gallons.*		*Gallons.*	
1884	29,366	$4,591	1,505,298	$362,651
1885	7,972	2,157	1,660,072	397,875
Dec. 31—				
1886	62,464	16,815	1,618,960	354,242
1887	13,885	4,851	1,915,511	385,906
1888	12,752	4,411	1,716,461	341,695
1889	36,494	8,771	1,558,968	368,661
1890	22,328	7,133	2,322,008	433,281
1891	26,700	8,700	2,019,833	392,894
1892	16,052	9,089	2,266,123	497,660
1893	6,086	2,992	2,321,081	506,866
1894	7,753	3,047	1,891,964	417,500
1895	101,115	19,151	2,104,811	506,384
1896	51,108	11,739	2,273,393	551,097
1897	....	....	*a*2,942,200	*a*501,684
1898	....	....	*a*1,955,723	*a*526,071
1899	....	....	*a*2,382,410	*a*663,803
1900	....	....	*a*2,485,042	*a*687,874

a Including artificial.

Prior to the year 1873, as the foregoing tables show, the records of the United States Treasury Department did not distinguish natural from artificial mineral waters. From 1873 to 1883, inclusive, the distinction was made, and artificial mineral waters were classified according to the receptacles in which they were imported. For the period including the years 1884 to 1896 this classification seems to have been dropped, but the artificial waters were still kept separate from the natural waters. Since 1896, however, they have not been differentiated. The number of gallons imported has not varied greatly in the last six years, although for four years the value has slightly increased.

EXPORTS.

No record of the exports of domestic natural mineral waters seems to have been kept by the Treasury Department since 1883, and, as shown by the table below, the exports from 1875 to 1883 were comparatively insignificant.

Exports of natural mineral waters of domestic production from the United States.

Fiscal year ending June 30—	Value.	Fiscal year ending June 30—	Value.
1875	$162	1881	$1,029
1876	80	1882	421
1879	1,529	1883	*a* 459
1880	1,486		

a None reported since 1883.

INDEX.

B.

D.

E.

H.

I.

J.

K.

Y.

Z.

O

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

[Mineral Resources, 1900.]

The serial publications of the United States Geological Survey consist of (1) Annual Reports, (2) Monographs, (3) Bulletins, (4) Mineral Resources, (5) Water-Supply and Irrigation Papers, (6) Topographic Atlas of the United States—folios and separate sheets thereof, (7) Geologic Atlas of the United States—folios thereof. A circular giving complete lists may be had on application. The list of reports on mineral resources follows:

MINERAL RESOURCES.

Mineral Resources of the United States, 1882, Albert Williams, jr., chief of division. 1883. 8°. xvii, 813 pp. Price, 50 cents. Out of stock.

Mineral Resources of the United States, 1883 and 1884, Albert Williams, jr., chief of division. 1885. 8°. xiv, 1016 pp. Price, 60 cents. Out of stock.

Mineral Resources of the United States, 1885. Division of Mining Statistics and Technology. 1886. 8°. vii, 576 pp. Price, 40 cents.

Mineral Resources of the United States, 1886, David T. Day, chief of division. 1887. 8°. viii, 813 pp. Price, 50 cents.

Mineral Resources of the United States, 1887, David T. Day, chief of division. 1888. 8°. vii, 832 pp. Price, 50 cents. Out of stock.

Mineral Resources of the United States, 1888, David T. Day, chief of division. 1890. 8°. vii, 652 pp. Price, 50 cents.

Mineral Resources of the United States, 1889 and 1890, David T. Day, chief of division. 1892. 8°. viii, 671 pp. Price, 50 cents.

Mineral Resources of the United States, 1891, David T. Day, chief of division. 1893. 8°. vii, 630 pp. Price, 50 cents.

Mineral Resources of the United States, 1892, David T. Day, chief of division. 1893. 8°. vii, 850 pp. Price, 50 cents.

Mineral Resources of the United States, 1893, David T. Day, chief of division. 1894. 8°. viii, 810 pp. Price, 50 cents.

On March 2, 1895, the following provision was included in an act of Congress:

"*Provided*, That hereafter the report of the mineral resources of the United States shall be issued as a part of the report of the Director of the Geological Survey."

In compliance with this legislation the following reports have been published:

Mineral Resources of the United States, 1894, David T. Day, chief of division. 1895. 8°. xv, 646 pp., 23 pls.; xix, 735 pp., 6 pls. Being Parts III and IV of the Sixteenth Annual Report, Out of stock.

Mineral Resources of the United States, 1895, David T. Day, chief of division. 1896. 8°. xxiii, 542 pp., 8 pls. and maps; iii, 543–1058 pp., 9–13 pls. Being Part III (in 2 vols.) of the Seventeenth Annual Report. Out of stock.

Mineral Resources of the United States, 1896, David T. Day, chief of division. 1897. 8°. xii, 642 pp., 1 pl.; 643–1400 pp. Being Part V (in 2 vols.) of the Eighteenth Annual Report. Out of stock.

Mineral Resources of the United States, 1897, David T. Day, chief of division. 1898. 8°. viii, 651 pp., 11 pls.; viii, 706 pp. Being Part VI (in 2 vols.) of the Nineteenth Annual Report. Out of stock.

Mineral Resources of the United States, 1898, David T. Day, chief of division. 1899. 8°. viii, 616 pp.; ix, 804 pp., 1 pl. Being Part VI (in 2 vols.) of the Twentieth Annual Report. Out of stock.

Mineral Resources of the United States, 1899, David T. Day, chief of division. 1901. 8°. viii, 656 pp.; viii, 634 pp. Being Part VI (in 2 vols.) of the Twenty-first Annual Report.

By act of Congress approved March 3, 1901, the report on mineral resources was again made a distinct publication.

In compliance with this legislation the following report has been published:

Mineral Resources of the United States, 1900, David T. Day, chief of division. 1901. 8°. 927 pp.

All remittances must be by MONEY ORDER, made payable to the Director of the United States Geological Survey, or in CURRENCY—the exact amount. Checks, drafts, and postage stamps can not be accepted. Correspondence should be addressed to—

THE DIRECTOR,
UNITED STATES GEOLOGICAL SURVEY,
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