SUMMARY OF THE MINERAL PRODUCTION OF THE UNITED STATES IN 1903.

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 1900, 1901, and 1902.

In 1903, for the fourth time, the total value of our mineral production exceeded the enormous sum of $1,000,000,000.

The exact figures for 1903 were $1,419,721,569, as compared with $1,260,509,738 in 1902, with $1,086,552,294 in 1901, with $1,063,678,053 in 1900, and with $972,208,008 in 1899, a gain in 1903 over 1902 of $159,211,831, or 12.63 per cent; a gain in 1903 over 1901 of $333,169,275, or 30.66 per cent; a gain in 1903 over 1900 of $356,043,516, or 33.47 per cent; and a gain in 1903 over 1899 of $447,513,561, or 46.03 per cent. Although this gain is not so great either actually or proportionally as was the gain in 1899, when the gain over 1898 was $273,601,810, or 39.17 per cent, it is sufficient to be worthy of note.

The notable gains and losses of the last two decades are as follows:

The largest actual gain was that of 1899 over 1898, $273,601,810, or 39.17 per cent; next, that of 1902 over 1901, $174,053,760, or 16.02 per cent; next, the gain of 1903 over 1902, $159,211,831, or 12.63 per cent; then the gain of 1895 over 1894, which was $94,215,822, or 17.88 per cent; then that of 1900 over 1899, $91,468,340, or 9.41 per cent; and the gain of 1887 over 1886, $74,927,880, or 16.81 per cent. In other years than those mentioned between 1880 and 1898 the gains were not noteworthy, and in some of the years, notably in 1884, the production decreased $40,451,968, or nearly 9 per cent. During the industrial depression of 1892–1895 the production would have been expected to decline, as it did, going from $648,895,031 in 1892 to $574,464,724 in 1893, and to $527,079,279 in 1894, and then rising to $620,652,170 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 iron in 1903 was $344,350,000; the value of the coal, $503,724,381. The fuels increased from $469,078,842 in 1902

to $634,233,791 in 1903, a gain of $165,154,949, or 35 per cent. Every variety of fuel increased in value. Anthracite coal showed an increase in value from $76,173,586 in 1902 to $152,036,448 in 1903. The average price of anthracite coal per long ton at the mine was $2.50, as against $2.35 in 1902, the highest figure obtained up to that time since 1888, as compared with $2.05 in 1901, with $1.85 in 1900, and with $1.80 in 1899; and the average price per short ton for bituminous coal at the mine was $1.24, as compared with $1.12 in 1902. The increase in value of the bituminous coal output over 1902 was $60,829,450, a combined increase in value of coal of $136,692,312 over 1902.

The gain of $159,211,831 in the total value of our mineral production is due to the large increase in nonmetallic products, the metallic products showing a decrease from $642,258,584 in 1902 to $624,318,008 in 1903, a loss of $17,940,576, and the nonmetallic products showing an increase from $617,251,154 in 1902 to $794,403,561 in 1903, a gain of $177,152,407. To these products should be added estimated unspecified products, including building, molding, and other sands reported to this office, the rare mineral molybdenum, and other mineral products, valued at $1,000,000, making the total mineral production for 1903, $1,419,721,569.

The manufacture of arsenious oxide, noted for the first time in the United States in the report for 1901, was continued in 1903, but in decreased proportions, as compared with 1902.

Tin has been found in commercial quantities in South Carolina, and the mines were actively exploited during the year 1903.

METALS.

Iron and steel.—Twenty-two States produced pig iron in 1903, as against 22 in 1902, 20 in 1901, and 21 in 1900 and 1899. The total production of pig iron in 1903 was 18,009,252 long tons, against 17,821,307 tons in 1902, 15,878,354 tons in 1901, 13,789,242 tons in 1900, 13,620,703 tons in 1899, 11,773,934 tons in 1898, and 9,652,680 tons in 1897. The production of 1903 shows an increase of 187,945 long tons, or about 1.05 per cent in quantity over the production of 1902, and a decrease in value from $372,775,000 to $344,350,000, amounting to $28,425,000, or 7.6 per cent. The average price per long ton of pig iron decreased from $20.90 in 1902 to $19.07 in 1903. The average prices per long ton in recent years have been as follows: 1901, $15.25; 1900, $18.85; 1899, $18; 1897, $9.85; 1896, $10.47; 1895, $11.14; 1894, $9.76.

Iron ores.—The production of iron ores in 1903 amounted to 35,019,308 long tons, as compared with 35,554,135 long tons in 1902, a loss of 534,827 long tons. The value at the mines of the ore mined in 1903 was $66,328,415. As in the five preceding years, the production of iron ores in 1903 has never been equaled by any other country.

Manganese ores.—The production of manganese ores decreased from 11,995 long tons, valued at $116,722, in 1901, to 7,477 long tons, valued at $60,911, in 1902, and to 2,825 long tons, valued at $25,335, in 1903, a decrease in quantity from 1902 of 4,652 tons and in value of $35,576. The average price per ton in 1903 was $8.97, as compared with $8.15 in 1902, with $9.73 in 1901, and with $8.52 in 1900.

Gold.—The production of gold in 1903 amounted to 3,560,000 fine ounces, as compared with 3,870,000 fine ounces in 1902, with 3,805,500 fine ounces in 1901, with 3,829,897 fine ounces in 1900, and with 3,437,210 fine ounces in 1899. The value was $73,591,700, as compared with $80,000,000 in 1902, with $78,666,700 in 1901, with $79,171,000 in 1900, and with $71,053,400 in 1899.

Silver.—The coining value of the silver produced in 1903 was $70,206,060, as compared with $71,757,575 in 1902, with $71,387,800 in 1901, and with $74,533,495 in 1900. The production in 1903 was 54,300,000 fine ounces, as compared with 55,500,000 fine ounces in 1902, with 55,214,000 fine ounces in 1901, and with 57,647,000 fine ounces in 1900. The commercial value of the production in 1903 was $29,322,000, as compared with $29,415,000 in 1902, with $33,128,400 in 1901, and with $35,741,140 in 1900.

Copper.—The production of domestic copper increased from 659,508,644 pounds in 1902 to 698,044,517 pounds in 1903, an increase of 38,535,873 pounds, or about 6 per cent in quantity, and increased in value from $76,568,954 in 1902 to $91,506,006 in 1903, an increase of $14,937,052, or about 20 per cent.

Lead.—The production of lead increased to 280,000 short tons, after having been almost exactly the same for three years, viz, 270,000 short tons in 1902, 270,700 short tons in 1901, and 270,824 short tons in 1900. The value of the production in 1903 was $23,520,000, as compared with $22,140,000 in 1902, with $23,280,200 in 1901, and with $23,561,688 in 1900.

Zinc.—The production of zinc in 1903 showed an increase in quantity, as compared with 1902 and 1901, the production being 159,219 short tons, as compared with 156,927 short tons in 1902, with 140,822 short tons in 1901, and with 123,886 short tons in 1900. The value of the zinc production in 1903 was $16,717,995, as compared with $14,625,596 in 1902, with $11,265,760 in 1901, and with $10,654,196 in 1900.

Aluminum.—The production of aluminum during 1903 was 7,500,000 pounds, valued at $2,284,900, as compared with 7,300,000 pounds valued at $2,284,590, in 1902; with 7,150,000 pounds, valued at $2,238,000, in 1901, and with 7,150,000 pounds, valued at $1,920,000, in 1900.

Quicksilver.—The production of quicksilver during 1903 amounted to 35,620 flasks of 76½ pounds net, as compared with 34,291 flasks in 1902, with 29,727 flasks in 1901, and with 28,317 flasks in 1900. The value

of the quicksilver produced in 1903 was $1,544,934, as compared with $1,467,848 in 1902, with $1,382,305 in 1901, and with $1,302,586 in 1900. California, including Nevada, reported 30,591 flasks, as compared with 28,972 flasks in 1902, and with 26,720 flasks in 1901; and Texas reported 5,029 flasks, as against 5.319 flasks in 1902, and 2,932 flasks in 1901.

Nickel.—The commercial production of metallic nickel in 1903 was 114,200 pounds, as compared with 5,748 pounds in 1902, with 6,700 pounds in 1901, with 9,715 pounds in 1900, and with 22,541 pounds in 1899. The value was $45,900, as compared with $2,701 in 1902, with $3,551 in 1901, with $3,886 in 1900, and with $8,566 in 1899. The imports of nickel in 1903 were valued at $1,493,889, as compared with $1,437,649 in 1902, with $1,849,620 in 1901, and with $1,183,884 in 1900.

Platinum.—The production of platinum from domestic ores in 1903 was 110 ounces, valued at $2,080 (not including $6,000 worth of platinum reported as contained in slimes obtained from the treatment of copper ores from the Rambler mine, Wyoming), as compared with 94 ounces, valued at $1,814, in 1902, with 1,408 ounces, valued at $27,526, in 1901, with 400 ounces, valued at $2,500, in 1900, and with 300 ounces, valued at $1,800, in 1899.

Antimony.—No antimony was obtained from domestic ores during 1903. The antimony obtained from the smelting of foreign imported ores amounted to 570 short tons, valued at $103,341, and the antimony obtained from hard lead produced from foreign and domestic lead ores was 2,558 short tons, valued at $445,092, a total production for 1903 of 3,128 short tons, valued at $548,433, as compared with 3,561 short tons, valued at $634,506, in 1902, and with 2,639 short tons, valued at $539,902, in 1901. The estimated total quantity of antimony available for consumption in 1903 was 5,475 short tons, including 2,347 short tons of imported antimony regulus, as compared with 6,255 short tons, including 2,694 short tons of imported antimony regulus, in 1902, with 4,475 short tons, including 1,837 short tons of imported antimony regulus, in 1901, and with 6,053 short tons, including 1,827 short tons of imported antimony regulus, in 1900.

Bismuth.—There was no marketed production of bismuth ores in the United States during 1903 or 1902; the latest output was 318.6 short tons, of a total estimated value of $2,549, exclusive of freight and treatment charges, in 1901. The ore has been heretofore obtained at the Ballard mine, Colorado, where the metal occurs as a telluride associated with gold and silver ore. One analysis of bismuth ore from this mine, marketed but not obtained from the mine during 1903, was reported to contain 17.8 per cent of bismuth, and 9.8 ounces of gold, and 6.1 ounces of silver per ton. Another ore from the same mine was reported as containing 12.2 per cent of bismuth, and 2.11 ounces

of gold and 24.45 ounces of silver per ton. In all there were 62 tons of ore containing bismuth sold during 1903, but as the ore was smelted for its gold and silver content and the bismuth was allowed to go to waste in the slag, this quantity has not been included in the statement of production. Owing to the conditions that the production of bismuth in the world far exceeds the demand, and that the control of both output and price is in the hands of a combination of interests abroad, there is no incentive to produce the metal in the United States. Moreover, the price of the refined metal is kept so low as to preclude the profitable mining of the domestic ores.

Tin.—There was no production of metallic tin in 1903, but about 19 short tons of high concentrates were shipped from South Carolina to England—value not given.

FUELS.

Coal.—For the second time in the history of the United States the production of coal in 1903 reached a total of over 300,000,000 short tons, showing an actual output of 357,356,416 tons of 2,000 pounds, valued at $503,724,381. Of this total the output of anthracite coal amounted to 66,613,454 long tons (equivalent to 74,607,068 short tons), which, as compared with the production of 36,940,710 long tons in 1902, was an increase of 29,672,744 long tons, or more than 80 per cent. This abnormal increase was due to the suspension of operations by the strike in the anthracite region from May 10 to October 23, 1902, a little over five months. The value of anthracite coal at the mines in 1903 was $152,036,448, as against $76,173,586 in 1902, and against $112,504,020 in 1901. The average value of the marketed coal sold during the year at the mines was $2.50 per long ton, the value having been $2.35 in 1902, and $2.05 in 1901.

The output of bituminous coal (which includes semianthracite and all semibituminous and lignite coals) amounted in 1903 to 282,749,348 short tons, valued at $351,687,933, as against 260,216,844 short tons, valued at $290,858,483, in 1902, and against 225,828,149 short tons, valued at $236,422,049, in 1901. The increase in the production of bituminous coal in 1903 over 1902 was, therefore, 22,532,504 tons in quantity and $60,829,450 in value. The average price per ton at the mines during 1903 was $1.24, the highest price recorded by the Survey, as against $1.12 per ton in 1902.

Coke.—The coke production of the United States in 1903 exceeded that of any year in our history, with the exception of 1902. The production, which includes the output from 1,956 retort or by-product ovens, amounted to 25,262,360 short tons, as compared with 25,401,730 short tons in 1902, with 21,795,883 short tons in 1901, and with 20,533,348 short tons in 1900. The decrease in quantity in 1903 from 1902 was only 139,370 short tons, or about 0.55 of 1 per cent. The increase in

the value of coke was even more noteworthy than in 1902. The average price per ton at the ovens was the highest recorded in a period of twenty-four years, and the total value, in spite of the loss in quantity, reached the high figure of $66,459,623, an increase over 1902 of $3,120,456, or about 5 per cent, and over 1901 of $22,013,700, or 49.5 per cent.

Gas, coke, tar, and ammonia.—The aggregate value of all the products obtained from the distillation of coal in gas works and retort ovens in 1903 was $47,819,555, as compared with $43,869,440 in 1902.

Petroleum.—The total production of crude petroleum in the United States in 1903 was 100,461,337 barrels, as against 88,766,916 barrels in 1902, and 69,389,194 barrels in 1901, an increase of 11,694,421 barrels, or 13.17 per cent, over the production of 1902 and of 44.78 per cent over that of 1901. The greatest portion of the increase in 1903 came from California and Indiana, the gain over 1902 being 10,398,204 barrels, or 74.36 per cent, for California, and 1,705,515 barrels, or 22.80 per cent, for Indiana. Louisiana produced for the second time in 1903, the production being 917,771 barrels, as against 548,617 barrels in 1902. The increase over 1902 in the production of Kansas was 600,465 barrels, or about 181 per cent. Kentucky and Tennessee increased their production in 1903 by 368,955 barrels, or nearly 200 per cent. Indian Territory increased 101,811 barrels, or 274 per cent, as compared with 1902. The largest decrease in production in 1903, as compared with 1902, was in Pennsylvania, where it amounted to 708,724 barrels, or 5.87 per cent, and Ohio showed a decrease of 533,945 barrels, or 2.54 per cent. The decrease in West Virginia was 613,950 barrels, or 4.54 per cent. The percentages of production for fields show a remarkable change from 1900 to 1903. In 1900 the percentages were: Appalachian field, 57; Lima-Indiana field, 34; all other fields, nearly 9. In 1903 the respective percentages were: Appalachian field, 31.41; Lima-Indiana field, 23.97; all other fields, about 44.62. The value of crude petroleum produced during 1903 was $94,694,050, or 94.26 cents per barrel, as compared with $71,178,910, or 80.19 cents per barrel in 1902.

Natural gas.—The value of the natural gas produced in 1903 was $35,815,360, as compared with $30,867,863 in 1902, with $27,067,500 in 1901, with $23,698,674 in 1900, and with $20,074,873 in 1899—a gain of 16 per cent in 1903 over 1902.

STRUCTURAL MATERIALS.

Stone.—The value of all kinds of building stone produced in the United States during 1903 amounted to $67,960,468, as compared with $64,559,099 in 1902, with $55,615,926 in 1901, with $44,321,345 in 1900, and with $44,090,670 in 1899.

Clay products.—The activity in all branches in the clay-working industries noted in the reports as true of 1899, 1900, 1901, and 1902 continued during 1903. The value of all clay products, as reported to this office in 1903, was $130,962,648, as compared with $122,169,531 in 1902, with $110,211,587 in 1901, and with $96,212,345 in 1900. The brick and tile products in 1903 were valued at $105,526,596, as compared with $98,042,078 in 1902, with $87,747,727 in 1901, and with $76,413,775 in 1900. The pottery products were valued in 1903 at $25,436,052, as compared with $24,127,453 in 1902, with $22,463,860 in 1901, and with $19,798,570 in 1900.

The commercial production of clay mined and sold by those not manufacturing the product themselves in 1903 was valued at $2,649,042, as compared with $2,061,072 in 1902, with $2,576,932 in 1901, and with $1,840,377 in 1900. The crude brick clay was valued at $15,000,000.

Cement.—The total production of hydraulic cement in the United States in 1903 was 29,899,140 barrels, valued at $31,931,341, as compared with 25,753,504 barrels, valued at $25,366,380, in 1902, with 20,068,737 barrels, valued at $15,786,789, in 1901, and with 17,231,150 barrels, valued at $13,283,581, in 1900. The Portland cement production in 1903 was 22,342,973 barrels, valued at $27,713,319, as compared with 17,230,644 barrels, valued at $20,864,078, in 1902, with 12,711,225 barrels, valued at $12,532,360, in 1901, and with 8,482,020 barrels, valued at $9,280,525, in 1900—an increase, as compared with 1900, in quantity of about 163 per cent and in value of about 199 per cent. The production of natural-rock cement in 1903 was 7,030,271 barrels, valued at $3,675,520, as compared with 8,044,305 barrels, valued at $4,076,630, in 1902, with 7,084,823 barrels, valued at $3,056,278, in 1901, and with 8,383,519 barrels, valued at $3,728,848, in 1900. The production of slag cement amounted, in 1903, to 525,896 barrels, valued at $542,502, as compared with 478,555 barrels, valued at $425,672, in 1902, with 272,689 barrels, valued at $198,151, in 1901, and with 365,611 barrels, valued at $274,208, in 1900.

ABRASIVE MATERIALS.

Carborundum.—The production of carborundum in 1903 was 4,759,890 pounds, as compared with 3,741,500 pounds produced in 1902, and with 3,838,175 pounds in 1901. The value of the carborundum varies from 8 to 10 cents per pound.

Corundum and emery.—The combined production of corundum and emery in 1903 amounted to 2,542 short tons, valued at $64,102, as compared with 4,251 short tons, valued at $104,605 in 1902, and with 4,305 short tons, valued at $146,040 in 1901.

Crushed steel.—The production of crushed steel in 1903 was 755,000 pounds, as compared with 735,000 pounds in 1902, and with 690,000

pounds in 1901. The average price per pound in 1903 is quoted as about 7 cents.

Crystalline quartz.—In 1903 the production of crystalline quartz included under abrasives amounted to 8,938 short tons, valued at $76,968, as against 15,104 short tons, valued at $84,335, in 1902, and with 14,050 short tons, valued at $41,500, in 1901.

Garnet.—The production of abrasive garnet in the United States during 1903 amounted to 3,950 short tons, valued at $132,500, as against 3,926 short tons, valued at $132,820, in 1902, with 4,444 short tons, valued at $158,100, in 1901, and with 3,185 short tons, valued at $123,475, in 1900. As reported to the Survey, the prices varied from $20 to $60 a ton, the highest price being obtained for the North Carolina garnet. The average price for the 1903 production is reported as $33.54 per ton.

Grindstones.—The total value of all kinds of grindstones produced during 1903 was $721,446, as compared with $667,431 in 1902, and with $580,703 in 1901. The production of 1900, valued at $710,026, was until 1903 the largest on record for any year. It should be remembered, however, that the price has decreased from $15 to $18 per ton to from $8 to $11 per ton, and that therefore the tonnage of grindstones used has correspondingly increased within the last few years. The imports for 1903 amounted in value to $85,705, as compared with $76,906 in 1902, with $88,871 in 1901, and with $92,581 in 1900.

Infusorial earth and tripoli.—In 1903 the production of infusorial earth and tripoli amounted to 9,219 short tons, valued at $76,273, as compared with 5,665 short tons, valued at $53,244, in 1902, and with the production of 4,020 tons, valued at $52,950, in 1901.

Millstones and buhrstones.—The value of the production of millstones and buhrstones in 1903 was $52,552, as against $59,808 in 1902, and against $57,179 in 1901. From 1886 to 1894 there was a very large decrease—from $140,000 to $13,887—in the production of buhrstones. Since 1894 there has been a gradual increase in the production, though there was a decrease of $7,256 in 1903 as compared with 1902.

Oilstones and whetstones.—There was a decided increase in the commercial domestic production of oilstones and whetstones during 1903, the value of which amounted to $366,857, as compared with $221,762 in 1902, and with $158,300 in 1901.

CHEMICAL MATERIALS.

Arsenious oxide.—The domestic production of arsenious oxide (white arsenic) in 1903 was 611 short tons, valued at $36,696, as compared with 1,353 short tons, valued at $81,180, in 1902, and with 300 short tons, valued at $18,000, in 1901. The entire product was made by the

Puget Sound Production Company, at Everett, Wash., which began the manufacture of this important substance in 1901.

Borax.—The reported returns for 1903 gave an aggregate production of crude borax of 34,430 short tons, valued at $661,400, as compared with 17,404 short tons of refined and 2,600 short tons of crude, valued at $2,538,614, in 1902. The production during 1901 was 17,887 short tons of crude borax and 5,344 short tons of refined borax, with a total value of $1,012,118.

Bromine.—The production of bromine in 1903, including the amount of bromine contained in potassium bromide, amounted to 598,500 pounds, valued at $167,580, as compared with 513,890 pounds, valued at $128,472, in 1902, and with 552,043 pounds, valued at $154,572, in 1901. The price per pound during 1903 averaged 28 cents, as compared with 25 cents in 1902, with 28 cents in 1901, and with 29 cents in 1900.

Fluorspar.—The total commercial production of fluorspar in 1903 was 42,523 short tons, valued at $213,617, as compared with 48,018 short tons, valued at $271,832, in 1902, and with 19,586 tons, valued at $113,803, in 1901. This decrease in production was not due to any one State, but there was a large increase in production in Kentucky, and a decrease in Illinois and Arizona. The average price of crude fluorspar in 1903 was reported as $4.28 per ton, as compared with $5.19 in 1902 and with $5 in 1901, and the average price of ground fluorspar in 1903 was $9.99 per ton, as compared with $9.98 in 1902 and with $9.22 in 1901.

Gypsum.—The production of gypsum, particularly for the manufacture of calcined plaster, continues to show a remarkable gain. The output of crude gypsum in 1903 was 1,041,704 short tons, valued in its first marketable condition at $3,792,943, as compared with 816,478 short tons, valued in its first marketable condition at $2,089,341, in 1902, with 633,791 short tons, valued at $1,506,641, in 1901, and with 594,462 short tons, valued at $1,627,203, in 1900. The production in 1899 was 486,235 short tons, and in 1898 it was 291,638 short tons. The greatly increased production of the last five years is attributable to the largely increased use of plaster of Paris in large modern buildings and in the manufacture of staff for temporary buildings.

Marls.—The production of marls in the United States in 1903 was 34,211 short tons, valued at $22,521; in 1902 it was 12,439 short tons, valued at $12,741.

Phosphate rock.—The total commercial production of phosphate rock reported to the Survey in 1903 amounted to 1,581,576 long tons, valued at $5,319,294, as compared with 1,490,314 long tons, valued at $4,693,444, in 1902, and with 1,483,723 long tons, valued at $5,316,403, in 1901, an increase in quantity of 1903 over 1902 of

91,262 tons and in value of $625,850. The total quantity of phosphate rock reported as mined during 1903 was 1,618,799 long tons, as compared with 1,499,617 long tons in 1902, and with 1,440,408 long tons in 1901.

Salt.—The salt product includes salt in the form of brine used in large quantities for the manufacture of soda ash, sodium bicarbonate, caustic soda, and other sodium salts. The domestic production of salt in 1903 amounted to 18,968,089 barrels of 280 pounds, valued at $5,286,988, as compared with 23,849,231 barrels, valued at $5,668,636, in 1902, with 20,566,661 barrels, valued at $6,617,449, in 1901, and with 20,869,342 barrels, valued at $6,944,603, in 1900.

Sulphur and pyrite.—The domestic production of sulphur and of pyrite in 1903 for the manufacture of sulphuric acid amounted to 233,127 long tons, valued at $1,109,818, as compared with 207,874 long tons, valued at $947,089, in 1902, and with a combined production of 241,691 long tons, valued at $1,257,879, in 1901. The greater part of the output of pyrite was derived from Virginia, Georgia, North Carolina, Colorado, and Massachusetts, named in the order of production.

PIGMENTS.

Barytes.—The production of crude barytes in 1903 was 50,397 short tons, valued at $152,150, as compared with 61,668 short tons, valued at $203,154, in 1902, and with 49,070 short tons, valued at $157,844, in 1901.

Cobalt oxide.—The domestic production of cobalt oxide in 1903 was 120,000 pounds, valued at $228,000, not including the value of 60 short tons of cobalt ore, as against 3,730 pounds, valued at $6,714, in 1902, and against 13,360 pounds, valued at $24,048, in 1901. All the cobalt oxide was obtained as a by-product in smelting lead ores at Mine Lamotte, Missouri.

Mineral paints.—The commercial production of mineral paints in 1903 amounted to 62,122 short tons, valued at $646,222, as compared with 73,049 short tons, valued at $944,332, in 1902, and with 61,460 short tons, valued at $789,962, in 1901.

Zinc white.—The production of zinc white in 1902 amounted to 62,962 short tons, valued at $4,801,718, as compared with 52,645 short tons, valued at $4,016,499, in 1902, and with 46,500 short tons, valued at $3,720,000, in 1901.

MISCELLANEOUS.

Asbestos.—The asbestos commercially produced in the United States in 1903 was obtained chiefly from the mines at Sall Mountain, White County, Ga., but a small quantity was mined at Dalton, Berkshire County, Mass., New Hartford, Conn., and Grand Canyon, Ariz. The total commercial production was 887 short tons, valued at $16,760,

as compared with 1,005 short tons, valued at $16,200, in 1902, and with 747 short tons, valued at $13,498, in 1901.

Asphaltum.—Under this title are included the various bitumens or hydrocarbons not discussed under the heading "Petroleum" in the volume on mineral resources. The commercial production in 1903 was 101,255 short tons, valued at $1,005,446, as compared with 105,458 short tons, valued at $765,048, in 1902, and with 63,134 short tons, valued at $555,335, in 1901.

Bauxite.—In 1903 the production of bauxite was 48,087 long tons, valued at $171,306, as compared with 29,222 long tons, valued at $128,206, in 1902, and with 18,905 long tons, valued at $79,914, in 1901. Georgia yielded the greater bulk of the product, the remainder being supplied by Alabama and Arkansas.

Chromic iron ore.—California was the only State producing chromite during 1903, the quantity being 150 long tons, valued at $2,250, as compared with 315 long tons, valued at $4,567, in 1902, and with 368 long tons, valued at $5,790, in 1901.

Feldspar.—The production of feldspar in 1903 was 41,891 short tons, valued at $256,733, as against 45,287 short tons, valued at $250,424, in 1902, and against 34,741 short tons, valued at $220,422, in 1901.

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 makeweight in the manufacture of paper. In 1903 the production was 60,230 short tons, valued at $421,600 as compared with 71,100 short tons, valued at $615,350, in 1902, and with 69,200 short tons, valued at $483,600, in 1901.

Flint.—The production of flint in 1903 was 55,233 short tons, valued at $156,947, as against 36,365 short tons, valued at $144,209, in 1902, and against 34,420 short tons, valued at $149,297, in 1901.

Fuller's earth.—As reported to the Survey, the production of fuller's earth in 1903 was 20,693 short tons, valued at $190,277, as compared with 11,492 short tons, valued at $98,144, in 1902, and with 14,112 short tons, valued at $96,835, in 1901. The largest production of fuller's earth hitherto obtained was in 1897, the output being 17,113 short tons.

Glass sand.—The production of glass sand in 1903 was 823,044 short tons, valued at $855,828, as compared with 943,135 short tons, valued at $807,797 in 1902.

Graphite.—The commercial production of crystalline graphite during 1903 amounted to 4,538,155 pounds, valued at $154,170, as compared with 3,936,824 pounds, valued at $126,144, in 1902, with 3,967,612 pounds, valued at $135,914, in 1901, and with 5,507,855 pounds, valued at $178,761, in 1900. The production of amorphous graphite in 1903 was 16,591 short tons, valued at $71,384, as compared

with 4,739 short tons, valued at $55,964, in 1902, with 809 short tons, valued at $31,800, in 1901, and with 611 short tons, valued at $18,818, in 1900. The production of artificial graphite was 2,620,000 pounds, valued $178,670, the average price being 6.82 cents per pound, as compared with 2,358,828 pounds, valued at $110,700, in 1902, the average price being 4.69 cents per pound, and with 2,500,000 pounds, valued at $119,000, in 1901, the average price being 4.75 cents per pound.

Limestone for iron flux.—The quantity of limestone used for fluxing in blast furnaces in 1903 was 12,029,719 long tons, valued at $5,423,732, as compared with 12,139,248 long tons, valued at $5,271,252, in 1902, with 8,540,168 long tons, valued at $4,659,836, in 1901, and with 7,495,435 long tons, valued at $3,687,394, in 1900.

Lithium.—The production of lithium minerals in 1903 was 1,155 short tons, valued at $23,425 at the railroad, as against 1,245 short tons, valued at $25,750, in 1902. There is an increase in the demand for these minerals from foreign chemical manufacturers.

Magnesite.—The production of magnesite in the United States continues to be limited to California, and during the year 1903 the commercial production reported was 3,744 short tons, valued at $10,595, as compared with 2,830 short tons, valued at $8,490, in 1902.

Mica.—The total production of mica in 1903 was valued at $59,118, as compared with a total value of $118,849 for the production of 1902.

Mineral waters.—The total production of mineral waters in 1903 was 51,242,757 gallons, valued at $9,041,078, as compared with 64,859,451 gallons, valued at $8,793,761, in 1902, and with 55,771,188 gallons, valued at $7,586,962, in 1901.

Molybdenum.—The commercial production of molybdenum in 1903 was 795 short tons of concentrates, valued at $60,865. The value of these molybdenum ores fluctuates very greatly, the highest price quoted being $1,500 per ton and the lowest $100.

Monazite and zircon.—The production of monazite is confined exclusively to North Carolina and South Carolina, by far the larger quantity being obtained from the former State, and in 1903 this amounted to 862,000 pounds, valued at $64,630, and 3,000 pounds of zircon, valued at $570, as compared with 802,000 pounds of monazite, valued at $64,160, in 1902, and with 748,736 pounds, valued at $59,262, in 1901. The price per pound received by the miners for the crude monazite sand produced in 1903 varied from 2½ to 6 cents, according to the percentage of thoria.

Precious stones.—The value of the gems and precious stones found in the United States in 1903 was $321,400, as compared with $328,450 in 1902, with $289,050 in 1901, with $233,170 in 1900, and with $185,770 in 1899. There has been a great advance in the lapidary industry in the United States since 1894. The fact that larger estab-

lishments have been formed, which are able to purchase the rough diamonds in greater quantities, has placed our American diamond cutters in a position equal to that held by the cutters of Amsterdam, Antwerp, and Paris. The cutting of our native gems has also grown to the proportions of an industry, notably in the case of the beryls and the amethysts found in North Carolina and Connecticut; the turquoises from New Mexico, Arizona, Nevada, and California; the fine-colored and deep-blue sapphhires found in Montana; the colored tourmalines of San Joaquin County, Cal.; the chrysoprases from Visalia, Tulare County, Cal.; the garnets of Arizona and New Mexico, and the pale-purple garnets of North Carolina.

Pumice stone.—The production of pumice amounted in 1903 to 885 short tons, valued at $2,665, as against 700 short tons, valued at $2,750 in 1902.

Rutile.—No production of rutile was reported in 1903, the supply on hand being sufficient for the demands of the trade.

Talc and soapstone.—Exclusive of the production of fibrous talc from Gouverneur, N. Y., the production of talc and soapstone in 1903 amounted to 26,671 short tons, valued at $418,460, as compared with 26,854 short tons, valued at $525,157 in 1902, and with 28,643 tons, valued at $424,888 in 1901. The output for 1900 was 27,943 short tons, valued at $383,541, and for 1899 it was 24,765 short tons, valued at $330,805.

Tungsten.—The commercial production of concentrated tungsten ores during 1903 amounted to 292 short tons, valued at $43,639, as against 184 short tons in 1902, of which not more than a few tons were sold. In 1901 the production amounted to 179 tons of concentrated ore, valued at $27,720. The larger part of the production of 1902 was from Colorado.

Uranium and vanadium.—The production of uranium and vanadium minerals in 1903, as reported to the Survey, amounted to 30 short tons of concentrates, equivalent to about 19 short tons of metal, valued at $5,625, as compared with 3,810 short tons, valued at $48,125 in 1902. This, of course, represents the crude ore.