U. S. DEPARTMENT OF COMMERCE
BUREAU OF MINES

SUMMARIZED DATA OF SILVER PRODUCTION

ECONOMIC PAPER 8

Economic Paper 8

U. S. DEPARTMENT OF COMMERCE
R. P. LAMONT, Secretary
BUREAU OF MINES
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SUMMARIZED DATA OF SILVER PRODUCTION

BY

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1930

For sale by the Superintendent of Documents, Washington, D. C. - - - - Price 20 cents

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INTRODUCTION

Silver was widely known and highly prized before the dawn of history, and its production is one of the oldest of the metal industries. Among the six earliest metals, gold, silver, copper, tin, lead, and iron, silver appears to have been valued next to gold as a medium of exchange. To this its relative scarcity contributed, although it was far more abundant than gold and must have been the more familiar, possibly the more useful, of the two in primitive trade. In the arts

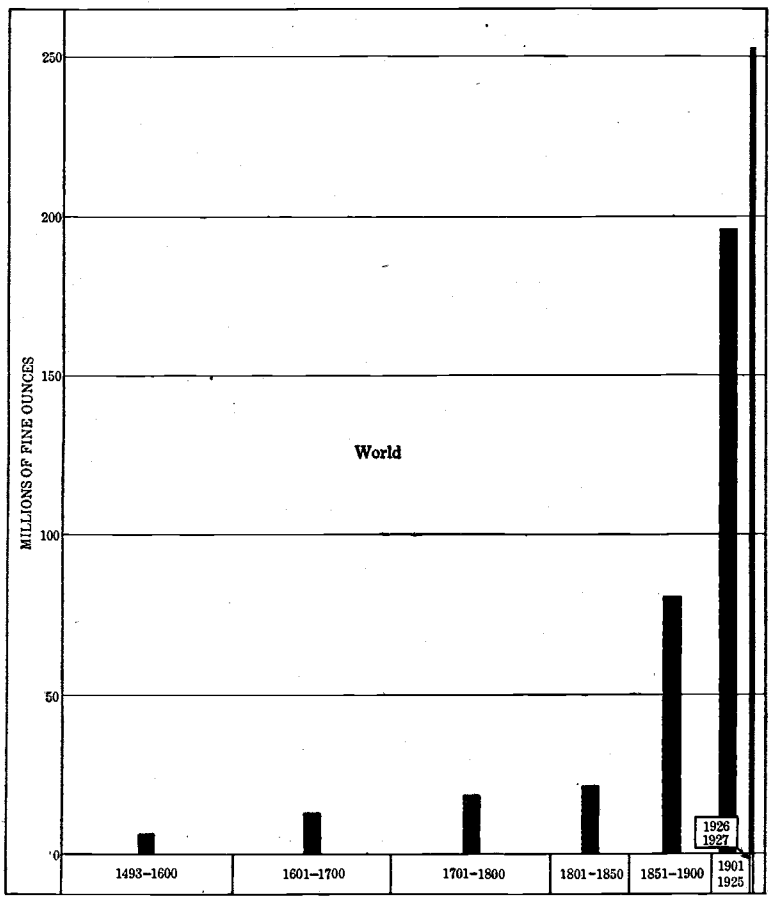

FIGURE 1.—Annual average world mine production of silver by various periods, 1493 to 1927

the beauty and workability of silver rendered it important. Desire for its possession has inspired conquest and exploration; the hope of creating it from base metals was an incentive to the alchemists from whose experiments the science of chemistry has been developed.

Ancient slag dumps near many of the silver-lead deposits of the Mediterranean Basin indicate that much of the silver produced in

ancient times was smelted by workmen skilled in the metallurgical separation of silver from lead. The dumps at Laurium, Greece, which accumulated between 600 and 300 B. C., are so large that production of silver from the famous mines near by must have been more than 250,000,000 ounces. Students of ancient Greece believe that this wealth, flowing from Laurium, was an important foundation of Athenian power and culture, so that the slag dumps of Laurium might be regarded as monuments to "the glory that was Greece," hardly less significant, though less famous and less sightly, than the Parthenon and the Theseum.

During the Middle Ages the production of metals other than iron nearly ceased until the revival of trade and consumption that marked the beginning of the Renaissance. Then followed the voyage of Columbus that opened the treasure chests of two great silver-producing continents. Silver production statistics of this paper commence with the year following that discovery.

During the 108 years from 1493 to 1600 world production of silver was 750,000,000 ounces (see fig. 1), 73 per cent from the Western Hemisphere, 24 per cent from Europe, and the remaining 3 per cent from Asia. Since then the center of silver production has shifted from the bonanzas of Bolivia and Peru to the great deposits of Mexico, the United States, and Canada; but the net result has been an ever increasing proportion of silver produced by the New World until, during the 27 years of this century, 84 per cent of the world output was mined therein.

World production of silver for the entire period from 1493 to 1927, inclusive, has been over 14,000,000,000 ounces, or about fourteen times the weight of gold produced in the same period. It would make a cube measuring 114½ feet on an edge; or it would pave Broadway, New York, 6 inches deep, from the Battery to Central Park at Columbus Circle, a distance of over 4 miles.

The silver production of the world for various periods of the 435 years since the discovery of America may be summarized briefly as follows:

TABLE 1.—*World production of silver for various periods since the discovery of America (round numbers)*

Period	Length of period, years	Total production, fine ounces	Per cent of total production, 1493–1927	Average annual production, fine ounces
1493–1600 (sixteenth century)	108	747, 000, 000	5.2	7, 000, 000
1601–1700 (seventeenth century)	100	1, 272, 000, 000	8.9	13, 000, 000
1701–1800 (eighteenth century)	100	1, 833, 000, 000	12.8	18, 000, 000
1801–1900 (nineteenth century)	100	5, 099, 000, 000	35.5	51, 000, 000
1901–1927 (twentieth century)	27	5, 406, 000, 000	37.6	200, 000, 000
1493–1888	396	7, 067, 000, 000	49.2	18, 000, 000
1889–1927	39	7, 289, 000, 000	50.8	187, 000, 000
1493–1800	308	3, 852, 000, 000	26.9	13, 000, 000
1801–1850	50	1, 064, 000, 000	7.4	21, 000, 000
1851–1875	25	1, 036, 000, 000	7.2	41, 000, 000
1876–1900	25	2, 999, 000, 000	20.9	120, 000, 000
1851–1900	50	4, 035, 000, 000	28.1	81, 000, 000
1901–1910	10	1, 830, 000, 000	12.7	183, 000, 000
1911–1920	10	1, 958, 000, 000	13.6	196. 000, 000
1921–1925	5	1, 113, 000, 000	7.8	223, 000, 000
1901–1925	25	4, 901, 000, 000	34.1	196, 000, 000
1926–1927	2	505, 000, 000	3.5	253, 000, 000
1493–1927	435	14, 357, 000, 000	100.0	33, 000, 000

One-half of all the output of silver since 1493 was produced in the 39 years between 1889 and 1927; but in spite of this great increase, its rate has been much less than that of gold, copper, lead, and zinc. The lower rate of increase in silver production results from the fact that the silver-mining industry was developed on a basis of large-scale production earlier than the mining of other metals and from the lower price commanded by silver since it was demonetized in most countries. The rejection of silver as a basis of monetary systems in conjunction with gold terminated an association that had lasted for centuries.

Demonetization became possible through the enormous increase in gold production that followed invention of the cyanide process in 1887 and development of the gold fields of South Africa, yet a number of countries still retain the silver-gold standard. Most orientals use silver as a medium of exchange almost to the exclusion of gold. Silver may thus be regarded as a second line of defense for the maintenance of the metallic foundation of monetary systems, but the future of its production will be influenced largely by the course of gold production.

In conclusion it is of interest to note that, although the value of gold to silver now stands at a ratio of about 40 to 1 and was formerly fixed in the bimetallic monetary standard at 16 to 1, the ratio of production of silver to gold in the whole period since the discovery of America has been about 14 to 1.

SUMMARIZED DATA OF SILVER PRODUCTION[1]

By CHARLES WHITE MERRILL[2] and the STAFF OF THE COMMON METALS DIVISION

SOURCES AND SIGNIFICANCE OF PRODUCTION DATA

The production data on metals have great importance because, together with statistics on consumption and price, they are the foundation of most studies in mineral economics. Moreover, production over extensive periods nearly represents the consumption.

This paper is the fifth of a series that has summarized in turn the production data for copper,[3] zinc,[4] lead,[5] and gold.[6] The mines that produce the major portion of these four metals depend very largely on one metal for their revenue, but silver differs from them in respect to source of production. The major portion of the silver produced is a by-product of mining carried on chiefly for some other metal or metals. Mines where silver shares equal importance with one or more metals constitute another important source of production. The more important combinations are silver-lead, silver-gold, silver-copper, silver-zinc, and silver-lead-zinc. Others are more complex. Mines that derive over three-quarters of their revenue from the sale of silver alone stand relatively low in production. The production of silver is therefore a rough index of conditions in the general nonferrous metal-mining industry. When the base metals mined with silver are selling at high prices the production of silver rises, and often its price is depressed to an extent that stops production from mines that depend solely or largely on silver for their revenue.

The period covered in this study begins with the year after the discovery of America by Columbus, which is particularly significant in the history of silver production. Since 1493 the Americas have produced 84 per cent of the world's silver. Although the production of silver dates back to prehistoric times, before the mining industry was developed in the Western Hemisphere it was so small as to seem unimportant in comparison with the current figure. Some authorities believe that the production of gold during these early years was very high and for certain periods even comparable with modern figures. Even granting the accuracy of these estimates, no such claims can be made for silver. Silver was not found in placers and seldom native, so any production of silver required mining, smelting, and ordinarily refining, but placer gold required only washing and possibly refining.

The greatest silver-mining enterprise of early times was probably that of the Greeks at Laurium. From the size of the slag dumps and the average tenor of the ore of the district it has been estimated that during the producing period of 300 years—600 to 300 B. C.—the yield was 273,000,000 ounces, a production rate of 900,000 ounces a

[1] Work on manuscript completed November, 1929.
[2] Associate mineral economist, Bureau of Mines.
[3] Julihn, C. E., Summarized Data of Copper Production: Econ. Paper 1, Bureau of Mines, 1928, 32 pp.
[4] Pehrson, Elmer W., Summarized Data of Zinc Production: Econ. Paper 2, Bureau of Mines, 1929, 47 pp.
[5] Smith, Lewis A., Summarized Data of Lead Production: Econ. Paper 5, Bureau of Mines, 1929, 44 pp.
[6] Ridgway, Robert H., Summarized Data of Gold Production: Econ. Paper 6, Bureau of Mines, 1929, 63 pp.

year. This estimated production for the 300 years is little more than the world production for the single year 1927. In 23 years the Cobalt district of Canada surpassed this production by over 100,000,000 ounces. The relative difficulty of obtaining these two precious metals in former times is indicated by a silver-gold ratio of value of about 12 to 1 in the Roman Empire, a ratio of about 10 to 1 in Rome during the three centuries just preceding the Christian era, and ratios placing still higher values on silver in Rome before that time and in other parts of the world both before and after that date.

Table 46, which follows page 58, and is the source of all other tables in this paper, was compiled from the easily available published figures on silver production. In cases of disagreement between the various sources of data the following precedence has in general been observed: Reports of the Director of the Mint, official publications of foreign countries, and compilations and estimates by private authors. The reports of the Director of the Mint give figures for most countries by years since 1877. Where figures are missing in the mint's compilations these have usually been supplied from official foreign publications. Of these publications the official British yearly reports, "Mines and Quarries" and "Imperial Mineral Resources," have proved the most useful. The production figures for the periods prior to 1877 have been largely taken from the various works of Dr. Adolf Soetbeer. Soetbeer's figures have been supplemented with figures taken from official publications and from the writings of other students of silver production. When short periods were found for which no figures were available these gaps were filled by estimates to afford continuity and permit the striking of period and continental totals.

The only unit of weight used in this paper is the troy ounce, 1,000 fine, which is hereafter referred to as the fine ounce. Periods of time are measured in calendar years and multiples thereof.

ACKNOWLEDGMENTS

The senior author acknowledges his appreciation for invaluable advice and criticism by C. E. Julihn, chief engineer of the common metals division; for extensive assistance in compiling and presenting data by Elmer W. Pehrson and Robert H. Ridgway; and for the cooperation of the other members of the common metals division.

Only through the cooperation of all those interested in this subject can such data as these be perfected. Suggestions and criticisms are therefore cordially welcomed.

WORLD PRODUCTION—AMOUNTS, INCREASES, AND RATES OF INCREASE

Production of silver is an ancient world industry. It can be traced back into the prehistoric era, and in historic times silver has been an important factor in conquest, trade, monetary systems, and the arts. The Roman Empire found silver indispensable in carrying on its vast commerce and its tax and tribute levying system. Most of the silver deposits now known to lie within the farthest limits of what was once the Roman Empire were known to the Romans. The Atlantic and Pacific Oceans, however, protected the world's greatest silver treasure house from European civilization until Columbus landed in America. With the close of 1492—the beginning of the period of discovery—this paper's statistics begin.

TABLE 2.—*Mine production of silver for various periods, 1493–1927*

Period	Number of years	World	North America		South America		Europe	
		Quantity, fine ounces	Quantity, fine ounces,	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
1493–1600	108	746, 932, 166	90, 410, 000	12. 10	453, 820, 000	60. 76	177, 702, 166	23. 79
1601–1700	100	1, 271, 922, 450	306, 650, 000	24. 11	800, 570, 000	62. 94	89, 702, 450	7. 05
1701–1800	100	1, 832, 768, 759	1, 044, 510, 000	57. 00	598, 040, 000	32. 63	189, 218, 759	10. 32
1801–1850	50	1, 064, 261, 495	605, 475, 600	56. 89	304, 680, 000	28. 63	153, 605, 895	14. 43
1851–1900	50	4, 034, 289, 688	2, 646, 679, 759	65. 60	692, 474, 639	17. 16	496, 072, 827	12. 30
1901–1925	25	4, 901, 347, 412	3, 665, 881, 929	74. 79	415, 522, 057	8. 48	311, 476, 259	6. 36
1926–1927	2	505, 202, 941	377, 570, 434	74. 73	57, 327, 033	11. 35	22, 933, 223	4. 54

Period	Number of years	Asia		Africa		Australasia		Various	
		Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
1493–1600	108	25, 000, 000	3. 35						
1601–1700	100	75, 000, 000	5. 90						
1701–1800	100	1, 000, 000	. 05						
1801–1850	50	500, 000	. 05						
1851–1900	50	38, 955, 723	. 97	2, 495, 131	0. 06	157, 611, 709	3. 91		
1901–1925	25	171, 316, 187	3. 49	30, 184, 751	. 62	306, 950, 891	6. 26	15, 338	0. 00
1926–1927	2	26, 277, 597	5. 20	2, 554, 656	. 51	18, 539, 998	3. 67		

Figure 1 (p. V) illustrates graphically the ever-increasing silver production. The first period of 108 years, 1493 to 1600, had a total world production of 747,000,000 fine ounces or 7,000,000 ounces a year. During the next century, 1601 to 1700, the production rose to 1,272,000,000 ounces, or 13,000,000 ounces a year—an increase of 84 per cent in average annual output. The production during the eighteenth century totaled 1,833,000,000 ounces, an annual average of 18,000,000 ounces and an increase of 44 per cent over the preceding century. During the nineteenth century 5,100,000,000 ounces was produced, an annual average of 51,000,000 ounces and an increase of 178 per cent over the preceding century. The first half of the nineteenth century followed the general trend of the preceding periods with a production of 1,064,000,000 ounces, an annual average of 21,000,000 ounces and an increase of 16 per cent over the annual average of the preceding century. The modern trend starts with the second half of the nineteenth century, with a total of 4,034,000,000 ounces, an annual average of 81,000,000 ounces and an increase of 279 per cent over the preceding half century. The production of the first quarter of the twentieth century nearly equaled that for all of the nineteenth. So great has been the increase in output in recent years that the production from 1889 to 1927 (39 years) exceeds that from 1493 to 1888 (396 years); that is, the annual average production of the later period is over 10 times that of the earlier.

Table 3 gives the world production of silver by decades from 1801 to 1920, and Figure 2 is a graphic representation of the average annual productions during these periods. During the first decade of the nineteenth century Spanish colonial possessions produced over 91 per cent of the total world output. In 1810 a priest, Miguel Hidalgo of Guanajuato, Mexico, led a revolution against the Spanish Government, marking the beginning of a period of civil strife that eventually freed not only Mexico but also all the continental possessions of Spain and Portugal in the Western Hemisphere. The overthrowing of the colonial governments and the developing of native governments greatly demoralized the whole mining industry of the Americas for several decades. The second decade of the century shows a decline of almost 40 per cent, followed in the third decade with a further

decline of over 11 per cent. The production from 1821 to 1830 was little over half that from 1801 to 1810. The fourth decade marks the turning point in the world production of silver. Freedom had been gained by the great Spanish-speaking silver producers of the Americas, and an influx of European capital and operators commenced to rebuild the silver-mining industry. Every decade since has shown further increase over its predecessor. The increase was regular but rather slow for the next four decades (fourth decade, 29 per cent increase; fifth, 28 per cent; sixth, 19 per cent; and seventh, 33 per cent).

TABLE 3.—*World mine production of silver by 10-year periods, 1801–1920*

Period	Production		Increase in annual average		
	Quantity, fine ounces	Annual average, fine ounces	Quantity, fine ounces	Per cent	
1801–1810	286, 614, 899	28, 661, 490			
1811–1820	173, 378, 899	17, 337, 890	−11, 323, 600	−39. 51	
1821–1830	153, 553, 520	15, 355, 352	−1, 982, 538	−11. 43	
1831–1840	197, 348, 711	19, 734, 871	4, 379, 519	28. 52	
1841–1850	253, 365, 466	25, 336, 547	5, 601, 676	28. 38	
1851–1860	300, 570, 784	30, 057, 078	4, 720, 531	18. 63	23. 45
1861–1870	400, 649, 066	40, 064, 907	10, 007, 829	33. 30	
1871–1880	710, 441, 372	71, 044, 137	30, 979, 230	77. 32	
1881–1890	1, 000, 681, 145	100, 068, 115	29, 023, 978	40. 85	
1891–1900	1, 621, 947, 321	162, 194, 732	62, 126, 617	62. 08	
1901–1910	1, 830, 225, 117	183, 022, 512	20, 827, 780	12. 84	
1911–1920	1, 958, 476, 661	195, 847, 666	12, 825, 154	7. 01	

Beginning with the seventh decade, 1861 to 1870, the entrance of the United States as a producer began to show in the rate of increase. The increase for the eighth decade was 77 per cent, followed by an increase for the ninth decade of 41 per cent and a further increase of 62 per cent for the decade that closed the nineteenth century. The United States, Canada, and Australia were the outstanding new producers whose production helped bring about this rapid increase. The ninth 10-year period, 1881 to 1890, was the first billion-ounce decade.

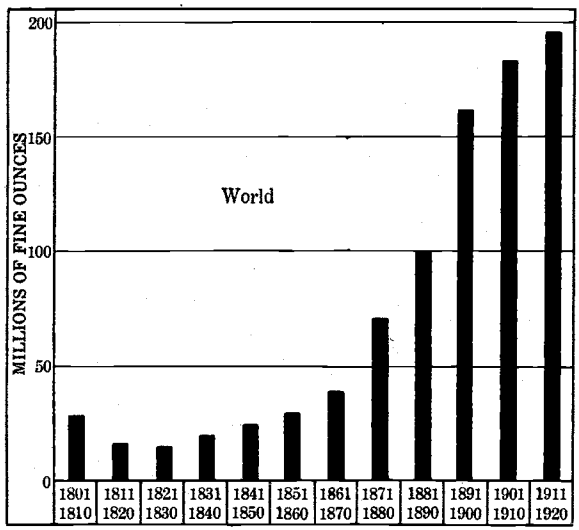

FIGURE 2.—Annual average world mine production of silver by decades, 1801 to 1920

Since the close of the nineteenth century the increase has continued at a much slower rate. The first decade of the twentieth century shows an increase of 13 per cent over the preceding decade, and the second decade exceeds the first by only 7 per cent.

TABLE 4.—*World mine production of silver by 5-year periods, 1851–1925*

Period	Production		Increase in annual average		
	Quantity, fine ounces	Annual average, fine ounces	Quantity, fine ounces	Per cent	
1851–1855	154, 988, 259	30, 997, 652			
1856–1860	145, 582, 525	29, 116, 505	−1, 881, 147	−6. 07	
1861–1865	178, 863, 296	35, 772, 659	6, 565, 154	22. 86	
1866–1870	221, 785, 770	44, 357, 154	8, 584, 495	24. 00	
1871–1875	334, 264, 202	66, 852, 840	22, 495, 686	50. 71	
1876–1880	376, 177, 170	75, 235, 434	8, 382, 594	12. 54	
1881–1885	437, 023, 764	87, 404. 753	12, 169, 319	16. 17	
1886–1890	563, 657, 381	112, 731, 476	25, 326, 723	28. 98	16. 32
1891–1895	791, 828, 618	158, 365, 724	45, 634, 248	40. 48	
1896–1900	830, 118, 703	166, 023, 741	7, 658, 017	4. 84	
1901–1905	840, 518, 663	168, 103. 733	2, 079, 992	1. 25	
1906–1910	989, 706, 454	197, 941, 291	29, 837, 558	17. 75	
1911–1915	1, 047, 248, 755	209, 449, 751	11, 508, 460	5. 81	
1916–1920	911, 227, 906	182, 245, 581	−27, 204, 170	−12. 99	
1921–1925	1, 112, 645, 634	222, 529, 127	40, 283, 546	22. 10	

Table 4 gives the world production in 5-year steps from 1851 to 1925, with the average annual production and increase from period

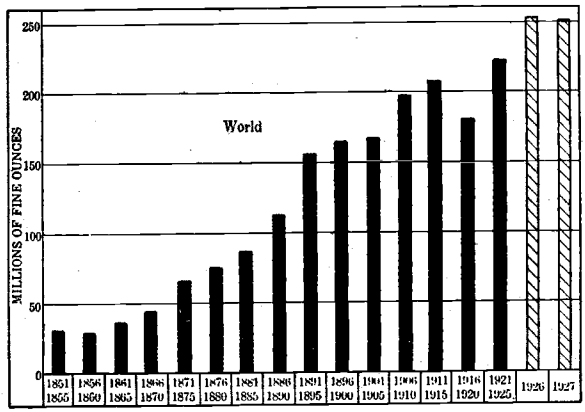

FIGURE 3.—Average annual world mine production of silver by 5-year periods, 1851 to 1925, and for 1926 and 1926

to period. Figure 3 illustrates the average annual production. These shorter periods bring to light minor fluctuations not seen in the decade table and graph, including the recession from 1856 to 1860, which occurred just before the first great mining operations of western United States began to produce important quantities of silver. It may also be noted that the period 1891 to 1895 was the last of those in which great percentage increases are shown. During this period the price of silver reacted most sharply to the advancing adoption of the gold standard in Europe and America. Not until the 5-year period 1906 to 1910 did the increasing silver requirements of the Far East and of industry permit an increase in world production. The influence of the Mexican revolution and the World War is evidenced by the small increase from 1911 to 1915 and the decrease of 13 per cent for 1916 to 1920. The period from 1911 to 1915 is the first of the billion-ounce 5-year periods and was not repeated or exceeded until 1921 to 1925.

TABLE 5.—*World mine production of silver by years, 1876–1927 (fine ounces)*

Year	Quantity	Year	Quantity	Year	Quantity	Year	Quantity
1876	66, 932, 201	1889	126, 564, 054	1902	162, 936, 273	1915	189, 454, 264
1877	74, 174, 990	1890	134, 429, 165	1903	167, 814, 265	1916	174, 632, 240
1878	78, 291, 041	1891	138, 283, 427	1904	164, 274, 497	1917	179, 890, 233
1879	78, 876, 244	1892	154, 377. 339	1905	172, 393, 042	1918	203, 428, 269
1880	77, 902, 694	1893	166, 594, 198	1906	165, 998, 018	1919	179, 931, 884
1881	84, 487, 883	1894	164, 829. 094	1907	184, 784, 361	1920	173, 345, 280
1882	88, 274, 154	1895	167, 744, 560	1908	204, 103, 994	1921	171, 580, 712
1883	89, 956, 458	1896	157, 321, 170	1909	213, 391, 989	1922	209, 828, 662
1884	82, 307, 566	1897	160, 765, 331	1910	221, 428, 092	1923	246. 275, 858
1885	91, 997, 703	1898	169, 537, 121	1911	227, 128, 987	1924	239, 680, 209
1886	95, 484, 904	1899	168, 806, 306	1912	225, 899, 157	1925	245, 280, 193
1887	97, 148, 513	1900	173, 688, 775	1913	227, 519, 787	1926	253, 806, 386
1888	110, 030, 745	1901	173, 100, 586	1914	177, 246, 560	1927	251, 396, 555

Table 5 and Figure 4 give the world production of silver from 1876 to 1927 by years. This yearly record began only a few years after the rapid increase that marks the closing third of the nineteenth century. The increase was rapid from 1876 to 1887 and even more rapid from 1887 to 1893. From 1893 until 1906 the annual production fluctuated between 157,000,000 and 174,000,000 ounces, the production in both 1893 and 1906 being approximately the same—166,000,000 ounces. An era of rapid increase followed, culminating in the 3-year period 1911 to 1913, in which the yearly production stood just over the level of 225,000,000 ounces. The year 1914 was very disastrous to the silver output of many countries. In Mexico there was a decrease of 43,000,000 ounces, due to the demoralizing effects of the revolution. This decrease in Mexico accounted for all but 7,000,000 ounces of the world decrease of 50,000,000 ounces. World War conditions in Europe and the European colonies accounted largely for the 7,000,000-ounce loss. Until 1923 the world production continued at a level well below the 225,000,000-ounce level of the period 1911 to 1913. In 1923, however, world production passed all previous records and fell just short of a quarter of a billion ounces. In 1924 and 1925 the amount was almost the same, and in 1926 and 1927 topped the quarter-billion-ounce mark for the first time in history. Credit for this recent increase must go largely to Mexico, where the production of 105,000,000 ounces in 1927 was over four and one-half times that of 1916, the low point since 1884. If the present political tranquillity of Mexico continues the annual world production of silver may be maintained above one-fourth of a billion ounces, with strong possibility of a rather slow but steady yearly increase in future if the world consumption of silver should require such an increase.

WORLD PRODUCTION BY CONTINENTS AND COUNTRIES

Table 6 and Figures 5 and 6 give the production of silver by continents and by countries for various periods from 1493 to 1927. During the first period, 1493 to 1600 (108 years), South America produced 61 per cent of the world total, followed in order by Europe with 24 per cent, North America with 12 per cent, and Asia with 3 per cent. Africa and Australasia had no production during this period. In South America all but a fraction of 1 per cent of the world production was supplied by the mines and treasure hoards of Bolivia and Peru. The principal producers of Europe were Austria and Germany. All of North America's production came from the mines of Mexico, and Asia's only silver producer was Japan.

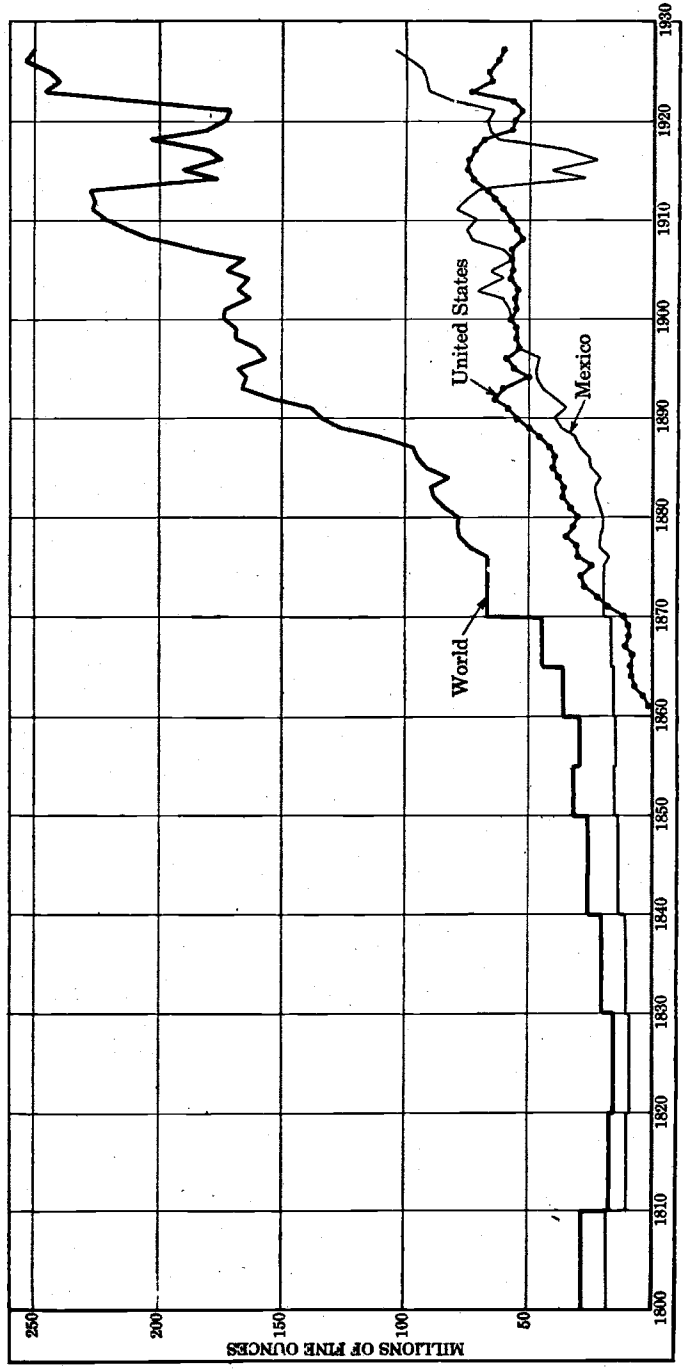

FIGURE 4.—Mine production of silver in the world, the United States, and Mexico by years, 1876 to 1927

TABLE 6.—*Mine production of silver by countries and continents for various periods, 1493–1927*

Country	1493–1927		Sixteenth century—1493–1600			Seventeenth century—1601–1700			Eighteenth century—1701–1800		
	Quantity, fine ounces	Per cent of total	Quantity, fine ounces	Annual average, fine ounces	Per cent of total	Quantity, fine ounces	Annual average, fine ounces	Per cent of total	Quantity, fine ounces	Annual average, fine ounces	Per cent of total
North America:											
United States	2,995,643,236	20.87									
Mexico	5,123,242,279	35.68	90,410,000	837,130	12.10	306,650,000	3,066,500	24.11	1,044,510,000	10,445,100	57.00
Canada	539,449,516	3.76									
Central America	78,842,691	.55									
Total, North America	8,737,177,722	60.86	90,410,000	837,130	12.10	306,650,000	3,066,500	24.11	1,044,510,000	10,445,100	57.00
South America:											
Argentina	11,179,079	.08									
Bolivia	1,567,624,166	10.92	355,360,000	3,290,371	47.58	456,860,000	4,568,600	35.92	213,550,000	2,135,500	11.66
Brazil	4,077,788	.03				50,000	500		2,700,000	27,000	.15
Chile	294,944,645	2.05				20,000	200		6,470,000	64,700	.35
Colombia	92,506,002	.64	4,100,000	37,963	.55	11,200,000	112,000	.88	15,100,000	151,000	.82
Ecuador	1,048,670	.01									
Peru	1,349,052,029	9.40	94,360,000	873,704	12.63	332,440,000	3,324,400	26.14	360,220,000	3,602,200	19.65
Guianas, Uruguay, and others	888,285	.01									
Venezuela	1,113,065	.01									
Total, South America	3,322,433,729	23.15	453,820,000	4,207,038	60.76	800,570,000	8,005,700	62.94	598,040,000	5,980,400	32.63
Europe:											
Austria [1]	325,098,355	2.26	87,770,000	812,685	11.75	30,220,000	302,200	2.38	62,050,000	620,500	3.39
Czechoslovakia	7,051,624	.05									
France	71,242,890	.50									
Germany	496,917,138	3.46	50,300,000	465,741	6.73	26,560,000	265,600	2.09	66,620,000	666,200	3.63
Greece	45,428,112	.32									
Italy	40,477,651	.28									
Norway	45,859,643	.32				10,970,000	109,700	.86	14,250,000	142,500	.78
Poland	1,266,320	.01									
Rumania	606,734										
Russia	93,404,949	.65							31,125,000	311,250	1.70
Spain [2]	200,990,531	1.40									
Sweden	11,378,346	.08	3,632,166	33,631	.49	1,952,450	19,525	.15	1,173,759	11,738	.06
United Kingdom	31,465,655	.22							1,000,000	10,000	.05

Yugoslavia [3]	523,631									
Undistributed Europe	69,000,000	.48	36,000,000	333,333	4.82	20,000,000	200,000	1.57	13,000,000	130,000	.71
Total, Europe	1,440,711,579	10.03	177,702,166	1,645,390	23.79	89,702,450	897,025	7.05	189,218,759	1,892,188	10.32
Asia:										
China	1,098,785	.01								
Chosen	462,029									
India	46,071,382	.32								
Indo-China	28,345									
Japan	243,176,024	1.69	25,000,000	231,481	3.35	75,000,000	750,000	5.90	1,000,000	10,000	.05
Netherland East Indies	22,094,035	.15								
Philippine Islands	351,316									
Taiwan	737,028	.01								
Turkey	24,030,463	.17								
Total, Asia	338,049,407	2.35	25,000,000	231,481	3.35	75,000,000	750,000	5.90	1,000,000	10,000	.05
Africa:										
Algeria	2,630,695	.02								
Belgian Congo	125,198									
German Southwest Africa [4]	3,022,486	.02								
Rhodesia	4,301,567	.03								
Union of South Africa [5]	24,691,096	.18								
Other Africa	463,496									
Total, Africa	35,234,538	.25								
Australasia:										
Australia	458,099,584	3.19								
New Zealand	25,003,014	.17								
Total, Australasia	483,102,598	3.36								
Various	15,338									
World total	14,356,724,911	100.00	746,932,166	6,916,039	100.00	1,271,922,450	12,719,225	100.00	1,832,768,759	18,327,688	100.00

[1] Austria-Hungary prior to 1918.
[2] Includes Portugal.
[3] Serbia from 1876 to 1918 and included under Turkey prior to 1876.
[4] Included under Union of South Africa since 1915.
[5] Includes Swaziland, Tanganyika, and Bechuanaland and Southwest Africa since 1915.

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TABLE 6.—*Mine production of silver by countries and continents for various periods, 1493–1927*—Continued

Country	First half, nineteenth century—1801–1850			Second half, nineteenth century—1851–1900			First quarter, twentieth century—1901–1925			1926		1927	
	Quantity, fine ounces	Annual average, fine ounces	Per cent of total	Quantity, fine ounces	Annual average, fine ounces	Per cent of total	Quantity, fine ounces	Annual average, fine ounces	Per cent of total	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
North America:													
United States	425,600	8,492	0.04	1,337,727,544	26,754,551	33.15	1,534,422,940	61,376,918	31.31	62,672,953	24.69	60,394,199	24.03
Mexico	605,050,000	12,101,000	56.85	1,259,034,854	25,180,697	31.21	1,614,722,340	64,588,893	32.94	98,291,166	38.73	104,573,919	41.60
Canada				30,184,476	603,690	.75	464,279,982	18,571,199	9.47	22,371,924	8.81	22,613,134	8.99
Central America				19,732,885	394,658	.49	52,456,667	2,098,267	1.07	3,499,118	1.38	3,154,021	1.25
Total, North America	605,475,600	12,109,492	56.89	2,646,679,759	52,933,596	65.60	3,665,881,929	146,635,277	74.79	186,835,161	73.61	190,735,273	75.87
South America:													
Argentina				9,438,534	188,771	.23	1,710,545	68,422	.03	15,000	.01	15,000	.01
Bolivia	101,310,000	2,026,200	9.52	320,297,515	6,405,950	7.93	109,009,808	4,360,392	2.22	5,834,003	2.30	5,402,840	2.15
Brazil	420,000	8,400	.04	301,333	6,027	.01	565,783	22,631	.01	20,672	.01	20,000	.01
Chile	38,010,000	760,200	3.57	197,119,747	3,942,395	4.89	47,547,987	1,901,919	.97	2,876,911	1.13	2,900,000	1.15
Colombia	5,700,000	114,000	.54	39,941,378	798,828	.99	16,207,254	648,290	.33	125,953	.05	131,417	.05
Ecuador				77,322	1,546		803,747	32,150	.02	80,000	.03	87,601	.03
Peru	159,240,000	3,184,800	14.96	125,297,367	2,505,947	3.11	237,699,456	9,507,979	4.86	21,499,798	8.47	18,295,408	7.29
Guianas, Uruguay, and others				1,443	29		870,842	34,834	.02	8,000		8,000	
Venezuela							1,106,635	44,265	.02	3,215		3,215	
Total, South America	304,680,000	6,093,600	28.63	692,474,639	13,849,493	17.16	415,522,057	16,620,882	8.48	30,463,552	12.00	26,863,481	10.69
Europe:													
Austria [1]	40,550,000	811,000	3.81	73,579,861	1,471,597	1.82	30,904,767	1,236,191	.63	14,050	.01	9,677	
Czechoslovakia							5,536,133	221,445	.11	765,491	.30	750,000	.30
France	2,342,374	46,847	.22	58,201,688	1,164,034	1.44	10,128,358	405,134	.21	261,830	.10	308,640	.12
Germany	44,560,000	891,200	4.18	174,719,723	3,494,395	4.34	123,298,557	4,931,943	2.52	5,358,858	2.11	5,500,000	2.18
Greece				30,418,311	608,366	.75	14,514,402	580,576	.30	254,274	.10	241,125	.10
Italy	50,000	1,000		25,177,852	503,557	.62	14,193,350	567,734	.29	519,351	.20	537,098	.21
Norway	5,485,996	109,720	.52	7,492,291	149,846	.19	7,030,895	281,236	.14	308,640	.12	321,821	.13
Poland							694,620	27,785	.01	271,700	.11	300,000	.12
Rumania							372,361	14,894	.01	93,685	.04	140,688	.06
Russia	34,177,000	683,540	3.21	21,258,212	425,164	.53	6,273,237	250,929	.13	250,000	.10	321,500	.13
Spain [2]	20,490,000	409,800	1.93	79,600,412	1,592,008	1.97	94,842,898	3,793,716	1.94	3,000,656	1.18	3,056,565	1.22
Sweden	1,050,525	21,011	.10	2,692,672	53,853	.07	716,024	28,641	.01	80,375	.03	80,375	.03
United Kingdom	4,900,000	98,000	.46	22,858,517	457,170	.57	2,619,079	104,763	.05	41,345	.02	46,714	.02

Yugoslavia [3]				73,288	1,466		351,578	14,063	.01	45,010	.02	53,755	.02
Undistributed, Europe													
Total, Europe	153,605,895	3,072,118	14.43	496,072,827	9,921,456	12.30	311,476,259	12,459,050	6.36	11,265,265	4.44	11,667,958	4.64
Asia:													
China							863,785	34,551	.02	135,000	.05	100,000	.04
Chosen							358,102	14,324	.01	51,927	.02	52,000	.02
India				223,000	4,460	.01	34,698,614	1,387,945	.71	5,124,962	2.02	6,024,806	2.40
Indo-China							16,966	679		1,220		10,159	
Japan	500,000	10,000	.05	30,402,038	608,040	.76	101,697,876	4,067,914	2.07	4,776,110	1.88	4,800,000	1.91
Netherland East Indies				80,659	1,613		17,363,746	694,550	.35	2,363,829	.93	2,285,801	.91
Philippine Islands							278,947	11,158	.01	44,013	.02	28,356	.01
Taiwan							707,714	28,309	.01	14,314	.01	15,000	.01
Turkey				8,249,926	164,999	.20	15,330,437	613,217	.31	225,050	.09	225,050	.09
Total, Asia	500,000	10,000	.05	38,955,623	779,112	.97	171,316,187	6,852,647	3.49	12,736,425	5.02	13,541,172	5.39
Africa:													
Algeria				42,084	842		2,301,383	92,055	.05	169,141	.07	118,087	.05
Belgian Congo							104,589	4,184		10,000		10,609	
German Southwest Africa [4]							3,022,486	120,899	.06				
Rhodesia				951	19		4,051,268	162,051	.08	117,763	.05	131,585	.05
Union of South Africa [5]				2,258,000	45,160	.06	20,437,432	817,497	.42	982,594	.39	1,013,070	.40
Other Africa				194,096	3,882		267,593	10,704	.01	1,125		682	
Total, Africa				2,495,131	49,903	.06	30,184,751	1,207,390	.62	1,280,623	.51	1,274,033	.50
Australasia:													
Australia				156,005,312	3,120,106	3.87	284,406,919	11,376,277	5.80	10,800,073	4.25	6,887,280	2.74
New Zealand				1,606,397	32,128	.04	22,543,972	901,759	.46	425,287	.17	427,358	.17
Total, Australasia				157,611,709	3,152,234	3.91	306,950,891	12,278,036	6.26	11,225,360	4.42	7,314,638	2.91
Various							15,338	614					
World total	1,064,261,495	21,285,210	100.00	4,034,289,688	80,685,794	100.00	4,901,347,412	196,053,896	100.00	253,806,386	100.00	251,396,555	100.00

[1] Austria-Hungary prior to 1918.
[2] Includes Portugal.
[3] Serbia from 1876 to 1918 and included under Turkey prior to 1876.
[4] Included under Union of South Africa since 1915.
[5] Includes Swaziland, Tanganyika, and Bechuanaland and Southwest Africa since 1915.

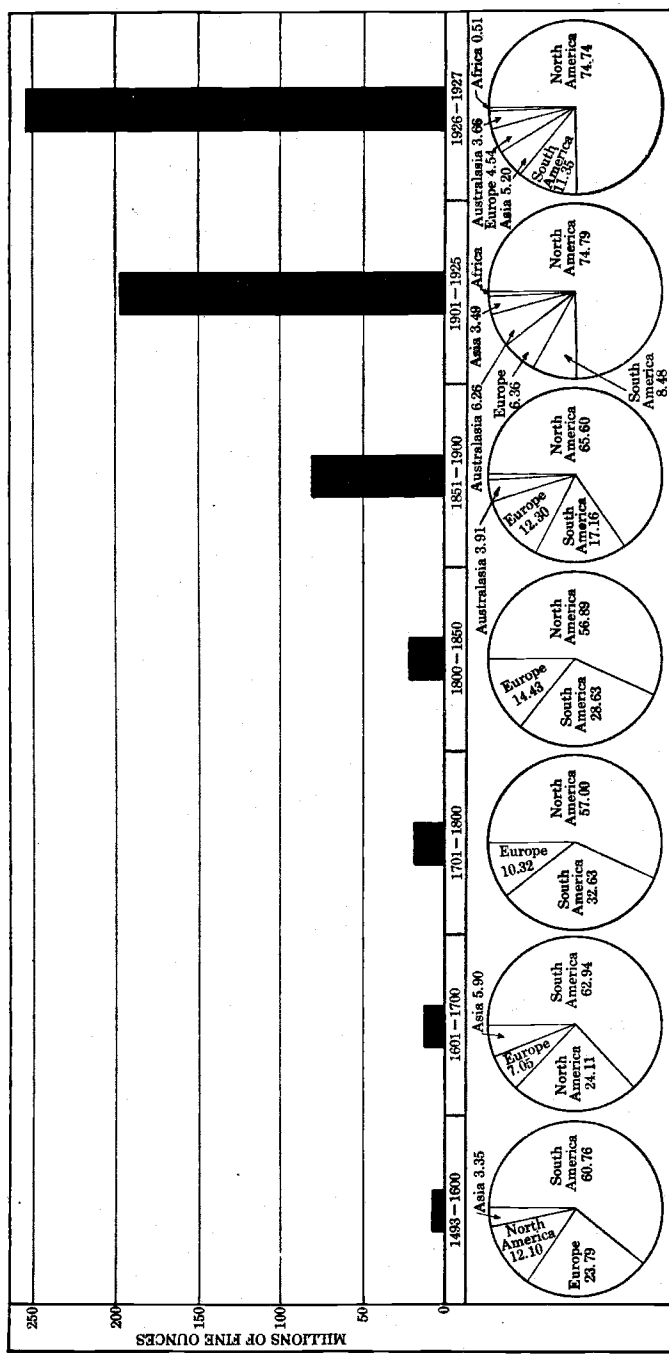

FIGURE 5.—Distribution of average annual mine production of silver by continents for various periods, 1493 to 1927

The next period, the century 1601 to 1700, had much the same distribution as the first 108 years, except that Europe exchanged places with North America. South America increased its proportion of the total from 61 to 63 per cent; the production continued to come almost entirely from Bolivia and Peru. Mexico continued as the only producer of North America, with just double its proportion of

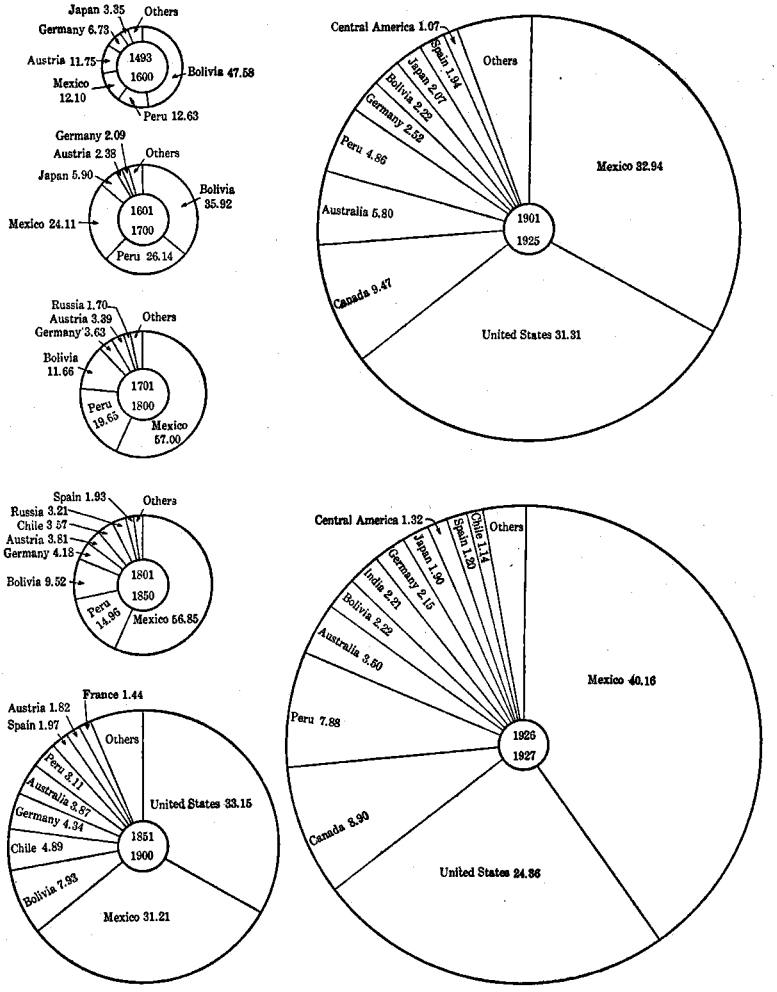

FIGURE 6.—Distribution of average annual mine production of silver by countries for various periods, 1493 to 1927

world production of the preceding period or 24 per cent of the world total. Europe, still producing most of its silver from the mines of Austria and Germany, produced only 7 per cent, and Japan contributed all of Asia's 6 per cent.

The eighteenth century was the first period in which North America produced over one-half of the world's silver, a position that has since been maintained by an even larger margin. Again Mexico was the only producer and contributed 57 per cent of the world total. South

America, still represented by Peru and Bolivia, produced 33 per cent and Europe 10 per cent of the total from the mines of Germany, Austria, and Russia.

North America held its position by continuing to produce 57 per cent of the world total for the 50-year period 1801 to 1850. The United States made its first appearance as a silver producer during this period, but Mexico produced all but four-hundredths of 1 per cent of the world production from North America. South America continued in second place with 29 per cent of the world total. Peru and Bolivia continued as the principal producers, but there was a small production from Chile. Europe produced virtually all of the remaining silver, most of it coming from Germany, Austria, Russia, and Spain.

During the next 50-year period, 1851 to 1900, North America a little more than quadrupled its production and accounted for 66 per cent of the total world production for that period. Mexico more than doubled its production of the preceding 50 years, and the United States increased its production to an amount exceeding that of Mexico. Canada and Central America made their first contributions to the North American total. South America more than doubled its output but produced only 17 per cent of the world total. This silver again came largely from the mines of Bolivia, Chile, and Peru. Europe also increased its output, but its proportion decreased slightly to 12 per cent of the world production. Germany, Spain, Austria, and France were the chief contributors. Australasia was a producer for the first time, contributing 4 per cent, which was almost entirely mined in Australia; Asia increased its production to 1 per cent; and Africa made its first appearance in world statistics with a production of six-hundredths of 1 per cent of the total.

North America produced three-fourths of the world's silver during the first quarter of the twentieth century. The United States and Mexico exchanged places, but their combined output was about the same proportion of the world total as in the preceding half century. The increase in North America was due almost entirely to the extremely rapid development of Canada's silver resources. South America and Europe continued to hold second and third places, respectively, although in each instance their proportions of the world total dropped to half that of the preceding 50 years. Australasia, Asia, and Africa also continued to hold fourth, fifth, and sixth places, respectively, but in each instance there was a substantial increase in the proportion of world production contributed by each. Peru with 5 per cent and Bolivia with 2 per cent were the only important producers in South America. In Europe, Germany and Spain were the only countries to produce over 1 per cent of the world output. Australia with 6 per cent and Japan with 2 per cent were the chief producers in their respective continents.

During the final period of two years, 1926 and 1927, North America continued to produce three-fourths of the world's silver. Mexico, with a large increase in production, supplied more than half of the North American total and produced over 40 per cent of the world's silver—more than the total of all production outside of Mexico and the United States. The United States maintained its output at about the same rate as in the previous period but declined about one-fourth in relative importance. Canada increased in rate of produc-

tion but decreased slightly in relation to the world total. South America continued in second place, with 11 per cent. Asia advanced to third place, thus forcing Europe and Australasia into fourth and fifth places, respectively. Africa continued in sixth place, never having produced as much as 1 per cent of the world total. In South America Peru increased its production to 8 per cent of the world total, and Bolivia and Chile made important contributions. India and Japan with 2 per cent each were the principal Asiatic producers. Germany and Spain, with 2 and 1 per cent, respectively, accounted for the major portion of the European production. Australia was again the only important producer in Australasia, but its output had decreased materially.

PRINCIPAL SILVER-PRODUCING COUNTRIES

The following pages are devoted to tables, figures, and summaries for the principal silver-producing countries of the world.

NORTH AMERICA

Since the first recorded production of silver in Mexico in 1521 North America has grown increasingly important as a silver producer. Since the beginning of the eighteenth century North America has never failed to produce one-half or more of the world's silver.

UNITED STATES

Production of silver in the United States before the Comstock lode was discovered in Nevada in 1859 was very small. In colonial times there were several attempts to mine silver-bearing ores, but none of these operations proved successful for any length of time. Before 1834 there is no record of production. From 1834 to 1858 approximately 750,000 ounces was produced. Most of this came from the bullion produced in the Southern Appalachian gold districts and, after 1848, from the gold bullion of California. Early in 1859, O'Reilly and McLaughlin, two prospectors, discovered the Comstock lode. Work was begun immediately, and for the 5-year period 1861 to 1865 the Comstock lode was almost entirely responsible for raising the output of the United States from an insignificant amount to second place in world production. The invention on the Comstock of the Washoe process of pan amalgamation in 1860 and the square-set method of mining in 1861 not only helped make possible rapid exploitation of the Comstock lode but also increased production elsewhere, as they were introduced throughout the world.

TABLE 7.—*Mine production of silver in the United States by decades, 1834–1920*

Period	Quantity, fine ounces	Per cent of world total	Average annual production, fine ounces	Increase in annual average	
				Quantity, fine ounces	Per cent
1834–1840	119,132		17,019		
1841–1850	306,468	0.12	30,647	13,628	80.08
1851–1860	502,900	.17	50,290	19,643	64.09
1861–1870	77,923,800	19.45	7,792,380	7,742,090	15,394.89
1871–1880	278,763,800	39.24	27,876,380	20,084,000	257.74
1881–1890	413,923,764	41.36	41,392,376	13,515,996	48.49
1891–1900	566,613,280	34.93	56,661,328	15,268,952	36.89
1901–1910	556,125,000	30.39	55,612,500	1,048,828	1.85
1911–1920	664,290,064	33.92	66,429,006	9,816,506	17.65

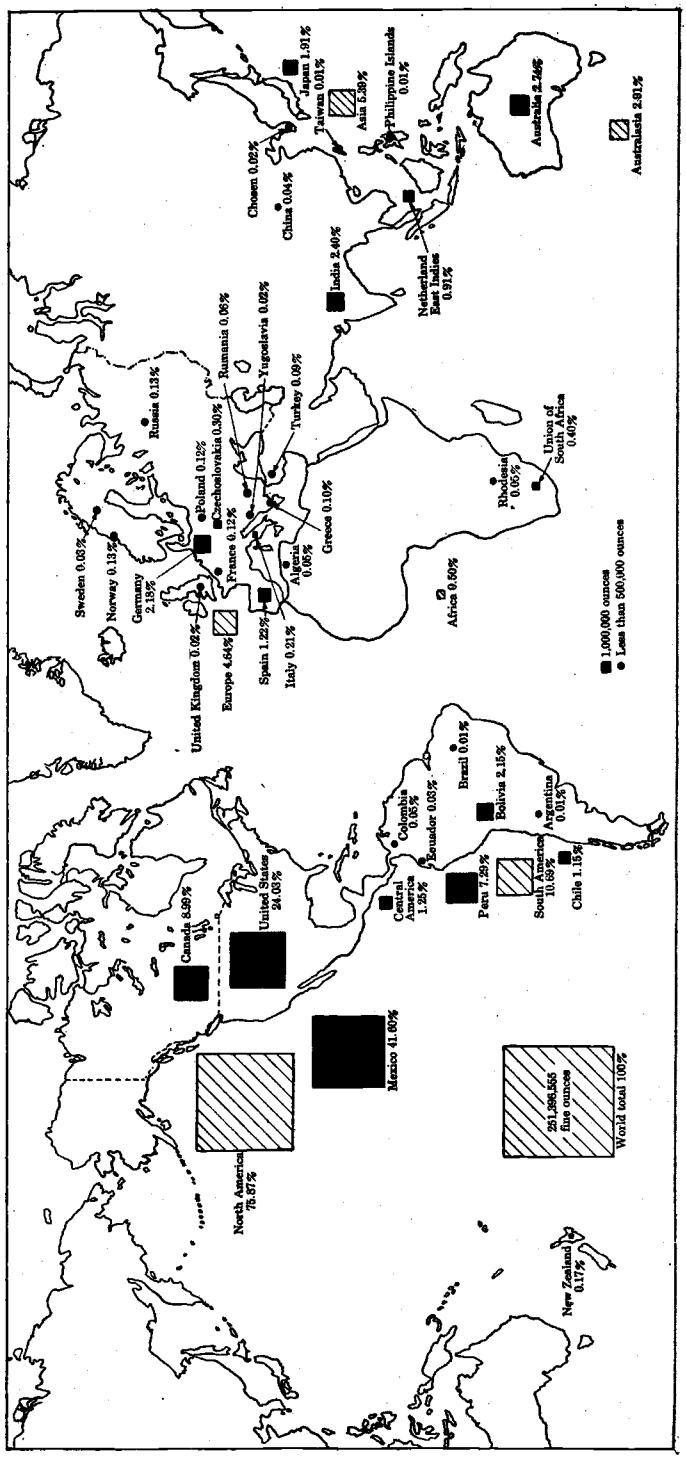

FIGURE 7.—Geographical distribution of world mine production of silver in 1927

Tables 7, 8, and 9 give the production of silver in the United States by decades, 5-year periods, and years, respectively. During the decade 1861 to 1870 the United States produced 78,000,000 ounces, or 19 per cent of the world total. The production for the succeeding decade, 1871 to 1880, showed an increase of 258 per cent to 279,000,000 ounces, or 39 per cent of the world production. Between 1881 and 1890 the United States raised its production to 414,000,000 ounces,

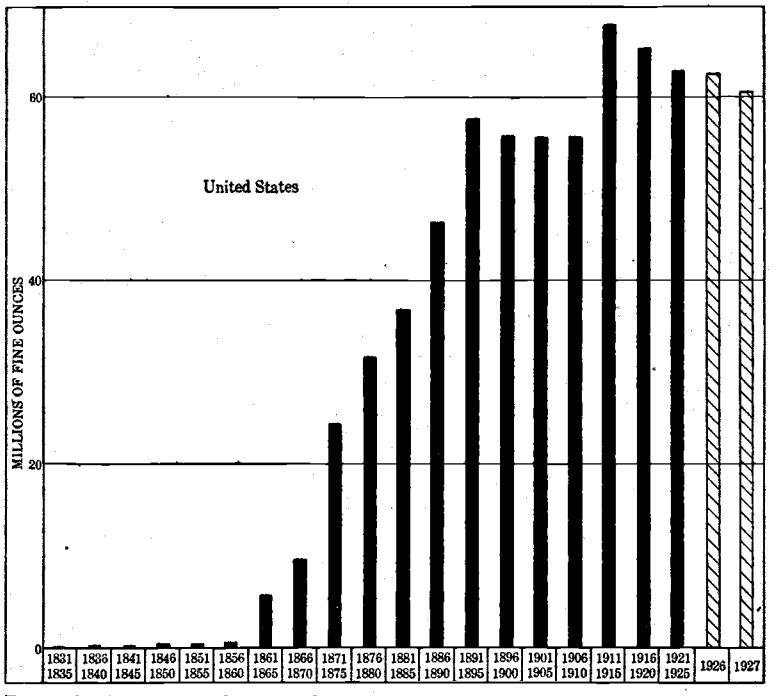

FIGURE 8.—Average annual mine production of silver in the United States by 5-year periods, 1851 to 1925, and for 1926 and 1927

an increase of 48 per cent and equivalent to 41 per cent of the world production. Since 1890 production has increased in the United States, but its proportion of the world total has declined. During the closing decade of the nineteenth century (1891 to 1900) production increased to 567,000,000 ounces, or 37 per cent over the preceding decade, but the proportion of the world output produced by this country dropped to 35 per cent. In the first decade of the twentieth century production declined a half million ounces, but the proportion of the world output fell to 30 per cent. An increase of 17 per cent raised the production of the United States to 664,000,000 ounces, or 34 per cent of the world total for the second decade of the twentieth century.

TABLE 8.—*Mine production of silver in the United States by 5-year periods, 1834–1925*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1834–1835	26, 297	13, 149	----------	1881–1885	182, 878, 629	36, 575, 726	41. 85
1836–1840	92, 835	18, 567	----------	1886–1890	231, 045, 135	46, 209, 027	40. 99
1841–1845	112, 968	22, 594	----------	1891–1895	287, 068, 980	57, 413, 796	36. 25
1846–1850	193, 500	38, 700	----------	1896–1900	279, 544, 300	55, 908, 860	33, 68
1851–1855	193, 500	38, 700	0, 12	1901–1905	278, 798, 400	55, 759, 680	33. 17
1856–1860	309, 400	61, 880	, 21	1906–1910	277, 326, 600	55, 465, 320	28. 03
1861–1865	28, 810, 600	5, 762, 120	16, 11	1911–1915	338, 337, 073	67, 667, 415	32. 31
1866–1870	49, 113, 200	9, 822, 640	22. 14	1916–1920	325, 952, 991	65, 190, 598	35. 77
1871–1875	121, 083, 300	24, 216, 660	36. 22	1921–1925	314, 007, 876	62, 801, 575	28. 22
1876–1880	157, 680, 500	31, 536, 100	41, 91				

Table 8 and Figure 8, which show the production of the United States by 5-year periods, indicate much the same trend as the table for decades. From the beginning of production in 1834 to the end of the five years from 1891 to 1895 each succeeding period showed a substantial increase over its predecessor. Following the five years from 1896 to 1900, in which production decreased to 280,000,000 ounces, or over 7,000,000 ounces, there were decreases of a million ounces each five years until the period 1911 to 1915. During this latter interval there was a sharp rise from 277,000,000 to 338,000,000 ounces, followed by a steady decline to 314,000,000 ounces, or 28 per cent of the world total, in the period 1921 to 1925.

TABLE 9.—*Mine production of silver in the United States by years, 1834–1927 (fine ounces)*

Year	Quantity	Year	Quantity	Year	Quantity	Year	Quantity
1834	7, 730	1858	38, 700	1882	36, 204, 404	1906	56, 517, 900
1835	18, 567	1859	77, 300	1883	35, 740, 244	1907	56, 514, 600
1836	18, 567	1860	116, 000	1884	37, 751, 594	1908	52, 439, 500
1837	18, 567	1861	1, 546. 900	1885	39, 917, 654	1909	54, 718, 500
1838	18, 567	1862	3, 480, 500	1886	39, 453, 494	1910	57, 136, 100
1839	18, 567	1863	6, 574, 200	1887	41, 276, 891	1911	60, 396. 017
1840	18, 567	1864	8, 507, 800	1888	45, 793, 138	1912	63, 759, 679
1841	18, 567	1865	8, 701, 200	1889	50, 010, 029	1913	66, 790, 650
1842	18, 567	1866	7, 734, 400	1890	54, 511, 583	1914	72, 444. 800
1843	18, 567	1867	10, 441, 400	1891	58, 342, 087	1915	74, 945, 927
1844	18, 567	1868	9, 281, 200	1892	63, 499, 992	1916	74, 397, 157
1845	38, 700	1869	9, 281, 200	1893	59, 999, 956	1917	71, 736, 381
1846	38, 700	1870	12, 375, 000	1894	49, 500, 000	1918	67, 805, 962
1847	38, 700	1871	17, 789, 100	1895	55, 726, 945	1919	56, 674, 036
1848	38, 700	1872	22, 236, 300	1896	58, 834, 800	1920	55, 339, 455
1849	38, 700	1873	27, 650, 000	1897	53, 860, 000	1921	53, 026, 250
1850	38, 700	1874	28, 868, 200	1898	54, 438, 000	1922	56, 212, 054
1851	38, 700	1875	24, 539. 300	1899	54, 764, 500	1923	73, 295, 810
1852	38, 700	1876	29, 996, 200	1900	57, 647, 000	1924	65, 366, 840
1853	38, 700	1877	30, 777, 800	1901	55. 214, 000	1925	66, 106, 922
1854	38, 700	1878	35, 022, 300	1902	55, 500, 000	1926	62, 672, 953
1855	38, 700	1879	31, 565, 500	1903	54, 300, 000	1927	60, 394, 199
1856	38, 700	1880	30, 318, 700	1904	57, 682, 800		
1857	38, 700	1881	33, 264, 733	1905	56, 101, 600		

Table 9 and Figure 4 show the production by years from 1834 to 1927. The rapid increase that began in 1860 was the result of exploitation of the Comstock lode. A long series of discoveries in the Western States followed discovery of the Comstock. The Reese River (Austin) district of Nevada was found in 1862, then the Little Cottonwood and Bingham Canyon districts, Utah, and the Eureka district, Nevada, in 1863; the Pioche district, Nevada, in 1864; the Phillipsburg district, Montana, in 1865; and the White Pine district, Nevada, and Eureka district, Utah, in 1867; the Butte district, Montana, (copper-silver ore), and the Cerro Gordo district, California, in 1869; the Georgetown district, New Mexico, and the Park City district, Utah, in 1872; the Pinal Range (Globe-Miami) district, Arizona, and the Leadville district, Colorado, in 1874; the Frisco district, Utah, in 1876; the Silver Cliff district, Colorado, in 1877; the Tombstone district, Arizona, in 1878; the Aspen district, Colorado, in 1879; the Lake Valley district, New Mexico, and the Calico district, California, in 1881; the Coeur d'Alene district, Idaho, in 1884; the Creede district, Colorado, in 1891; the Randsburg district, California, in 1895; the Tonopah district, Nevada, in 1900; and the Goldfield district, Nevada, in 1902. Since 1902 most of the discoveries have been made within established districts. The output has been augmented by employing new mining and milling methods in the older camps, which already had exhausted their high-grade ores.

The production of silver increased without important recessions from 1860 until 1893. In 1890 began a sharp decline in price which carried the London price from $1.05 an ounce in 1890 to $0.63 in 1894. From this date until 1917 the price ranged between a maximum of $0.68 and a minimum of $0.507 an ounce. Use of the cyanide process, invented in 1887, greatly increased the silver production from many silver deposits and consequently largely offset the decreases caused by the decline in the price of silver. From 1893 to 1908 the production of silver remained at about the same level. In 1908 a steady increase began, which culminated in 1915 with an output of 75,000,000 ounces, the high point of United States production to date. This period of increase was largely the result of the rapidly expanding yield of copper, lead, and zinc. These metals and, more particularly, gold felt the effects of World War inflation, so that in spite of high prices for silver production of that metal fell rapidly from 1915 until 1921. The years 1922 and 1923 witnessed rapid recovery from postwar depression, but since the discontinuance during 1923 of purchases of silver at $1 an ounce by the United States Treasury Department, under the Pittman Act, production has fallen regularly until it reached its 1927 level of 60,000,000 ounces.

Records have been kept of the silver production of the various States and Territories since 1877. Table 10 gives the output of all States and Territories that have contributed 1 per cent or more of the United States total for any one year since 1877. Alaska, Arizona, California, Colorado, Idaho, Michigan, Montana, Nevada, New Mexico, Texas, Utah, and Washington are the 12 States falling within this classification. Table 11 shows the classes of ores from which silver was obtained in these States from 1906 to 1927.

TABLE 10.—*Mine production of silver in the United States, by States, 1877–1927*

Period	Total [1]		Alaska		Arizona		California		Colorado		Idaho		Michigan	
	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
1877	30,126.073		(2)		386,728		773,455		3,480,548		193,364		154,691	
1878	36,140,702		(2)		2,320,365		1,835,710		4,172,743		154,691		77,346	
1879	31,566,246		(2)		2,745,765		1,856,292		9,049,424		502,746		603,295	
1880	30,319,437		(2)		1,546,910		850,801		13,148,734		348,055		(3)	
1877–1880	128,152,458	100.00			6,999,768	5.46	5,316,258	4.15	29,851,449	23.29	1,198,856	0.94	835,332	0.65
1881	33,258,566		(2)		5,646,222		580,091		13,272,488		1,005,492		(2)	
1882	36,197,695		(2)		5,800,913		653,569		12,762,009		1,546,910		(2)	
1883	35,733,622		(2)		4,021,966		1,129,244		13,434,913		1,624,256		(2)	
1884	37,744,605		(2)		3,480,548		2,320,365		12,375,281		2,103,798		(2)	
1885	39,910,279		1,547		2,939,129		1,933,638		12,220,588		2,707,093		(3)	
1881–1885	182,844,767	100.00	1,547		21,888,778	11.97	6,616,907	3.62	64,065,279	35.03	8,987,549	4.92		
1886	39,694,872		1,547		2,629,747		1,082,837		12,375,281		2,784,438		(2)	
1887	41,721,592		232		2,939,129		1,160,183		11,601,825		2,320,365		27,080	
1888	45,792,682		2,320		2,320,313		1,082,812		14,695,313		2,320,313		64,969	
1889	50,094,571		8,000		1,500,000		800,000		16,000,000		3,400,000		60,000	
1890	54,516,300		7,500		1,000,000		900,000		18,800,000		3,700,000		55,000	
1886–1890	231,820,017	100.00	19,599	0.01	10,389,189	4.48	5,025,832	2.17	73,472,419	31.68	14,525,116	6.27	207,049	.09
1891	58,330,000		8,000		1,480,000		750,000		21,160,000		4,035,000		73,000	
1892	63,500,000		8,400		1,161,900		392,200		26,632,300		3,461,200		65,600	
1893	60,000,000		9,600		2,935,700		470,100		25,838,600		3,910,700		43,500	
1894	49,500,000		22,261		1,147,204		717,368		23,281,399		3,288,548		35,122	
1895	55,726,945		67,200		986,900		653,700		23,398,500		3,110,600		37,300	
1891–1895	287,056,945	100.00	115,461	.04	7,711,704	2.69	2,983,368	1.04	120,310,799	41.92	17,806,048	6.20	254,522	.09
1896	58,834,800		145,300		1,913,000		600,600		22,573,000		5,149,900		59,000	
1897	53,860,000		116,400		2,239,900		474,400		21,636,400		4,901,200		60,300	
1898	54,438,000		92,400		2,246,800		642,300		22,815,600		5,073,800		32,400	
1899	54,764,500		140,100		1,578,300		824,300		22,662,900		3,851,800		112,800	
1900	57,647,000		73,300		2,995,500		941,400		20,483,900		6,429,100		102,000	
1896–1900	279,544,300	100.00	567,500	.20	10,973,500	3.93	3,483,000	1.25	110,171,800	39.40	25,405,800	9.09	366,500	.13
1901	55,214,000		47,900		2,812,400		925,600		18,437,800		5,542,900		81,000	
1902	55,500,000		92,000		3,043,100		900,800		15,676,000		5,854,800		110,800	
1903	54,300,000		143,600		3,387,100		931,500		12,990,200		6,507,400		50,000	

1904	57,682,800		198,700		2,744,100		1,441,300		14,331,600		7,810,200		127,800	
1905	56,101,600		169,200		2,605,700		1,082,000		12,942,800		8,125,600		253,000	
1901–1905	278,798,400	100.00	651,400	.23	14,592,400	5.23	5,281,200	1.89	74,378,400	26.68	33,840,900	12.14	622,600	.22
1906	56,517,900		203,500		2,969,200		1,517,500		12,447,400		8,836,200		186,100	
1907	56,514,600		179,300		2,903,100		1,590,000		11,495,400		7,888,400		331,300	
1908	52,439,500		204,600		2,900,000		1,703,700		10,150,200		7,558,300		294,100	
1909	54,718,500		198,600		2,523,600		2,304,900		8,846,300		6,755,900		217,600	
1910	57,136,100		153,900		2,655,700		1,791,600		8,523,000		7,027,000		262,200	
1906–1910	277,326,600	100.00	939,900	.34	13,951,600	5.03	8,907,700	3.21	51,462,300	18.65	38,065,800	13.73	1,291,300	.47
1911	60,396,200		468,300		3,228,900		1,270,900		7,331,200		8,184,900		507,700	
1912	63,761,000		539,700		3,445,500		1,384,800		7,933,100		7,862,900		543,500	
1913	66,795,200		366,700		3,912,000		1,421,500		8,989,700		9,477,100		333,700	
1914	72,444,800		865,900		4,439,500		2,020,800		8,804,400		12,573,800		415,500	
1915	74,945,927		1,054,634		5,665,672		1,689,924		7,199,745		13,042,466		581,874	
1911–1915	338,343,127	100.00	3,295,234	.97	20,691,572	6.12	7,787,924	2.30	40,258,145	11.90	51,141,166	15.12	2,382,274	.70
1916	74,397,159		1,266,317		6,680,252		1,936,910		7,551,761		11,570,399		759,068	
1917	71,727,647		1,207,164		6,962,257		2,107,107		7,291,495		11,402,542		684,225	
1918	67,797,139		802,743		6,831,465		1,432,812		6,900,266		9,396,009		516,294	
1919	56,666,730		690,151		5,702,911		1,153,614		5,966,606		5,933,076		425,610	
1920	55,339,455		822,410		5,431,637		1,654,653		5,166,873		7,364,785		511,664	
1916–1920	325,928,130	100.00	4,788,785	1.47	31,608,522	9.70	8,285,096	2.54	32,877,001	10.09	45,666,811	14.01	2,896,861	.89
1921	53,026,049		753,999		2,519,200		3,606,708		6,310,694		7,200,319		316,551	
1922	56,212,054		770,232		4,627,738		3,095,480		6,018,781		5,791,413		360,811	
1923	73,295,626		816,177		7,376,832		3,689,856		5,529,121		8,019,977		253,705	
1924	65,366,829		690,781		6,390,684		3,598,733		3,549,903		8,036,358		155,372	
1925	66,106,727		766,096		7,371,358		3,240,400		4,434,890		7,663,437		135,921	
1921–1925	314,007,285	100.00	3,797,285	1.21	28,285,812	9.01	17,231,177	5.47	25,843,389	8.23	36,711,504	11.69	1,222,360	.39
1926	62,672,953	100.00	707,454	1.13	7,516,708	11.99	1,977,956	3.16	5,037,574	8.04	7,563,644	12.07	107,094	.17
1927	60,394,199	100.00	606,129	1.00	6,601,467	10.93	1,557,812	2.58	3,941,351	6.53	8,928,619	14.78	51,742	.09

[1] These totals are computed in a different manner from those shown elsewhere for the United States and therefore do not agree exactly.
[2] Included in "Others" column.

TABLE 10.—*Mine production of silver in the United States, by States, 1877–1927*—Continued

Period	Montana		Nevada		New Mexico		Texas		Utah		Washington		Others	
	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
1877	580,091		20,109,829		386,728		(1)		3,925,284		38,673		96,682	
1878	1,291,388		21,757,559		386,728		(1)		4,028,154		19,336		96,682	
1879	1,720,937		9,714,595		464,073		(1)		4,834,094		15,469		59,556	
1880	1,933,638		8,430,660		328,718		(1)		3,666,177		(1)		65,744	
1877–1880	5,526,054	4.31	60,012,643	46.83	1,566,247	1.22			16,453,709	12.84	73,478	0.06	318,664	0.25
1881	2,034,187		5,460,592		212,700		(1)		4,950,112		(1)		96,682	
1882	3,379,998		5,220,821		1,392,219		(1)		5,259,494		(1)		181,762	
1883	4,640,730		4,199,861		2,200,480		(1)		4,346,817		387		134,968	
1884	5,414,185		4,331,348		2,320,365		(1)		5,259,494		773		138,448	
1885	7,780,958		4,640,730		2,320,365		(1)		5,220,821		54,142		91,268	
1881–1885	23,250,058	12.72	23,853,352	13.05	8,446,129	4.62			25,036,738	13.69	55,302	.03	643,128	.35
1886	9,590,842		3,867,275		1,778,947		154,691		5,027,458		61,876		339,933	
1887	11,988,553		3,789,930		1,778,947		193,364		5,414,185		77,346		430,453	
1888	13,148,437		5,414,062		928,125		232,031		5,414,062		77,344		92,581	
1889	15,000,000		4,800,000		1,130,000		232,031		7,000,000		80,000		84,540	
1890	15,750,000		4,450,000		1,300,000		300,000		8,000,000		70,000		183,800	
1886–1890	65,477,832	28.25	22,321,267	9.63	6,916,019	2.98	1,112,117	0.48	30,855,705	13.31	366,566	.16	1,131,307	.49
1891	16,350,000		3,520,000		1,325,000		375,000		8,750,000		165,000		339,000	
1892	19,038,800		2,454,500		1,176,700		328,100		8,490,800		165,700		123,800	
1893	16,906,400		1,561,300		458,400		349,400		7,196,300		152,700		167,300	
1894	12,820,081		1,035,151		632,183		429,314		5,891,901		113,160		86,308	
1895	17,569,100		956,200		694,800		450,000		7,468,100		122,700		211,845	
1891–1895	82,684,381	28.80	9,527,151	3.32	4,287,083	1.49	1,931,814	.67	37,797,101	13.17	719,260	.25	928,253	.32
1896	16,737,500		1,048,700		687,800		525,400		8,827,600		274,900		292,100	
1897	15,667,900		1,228,900		539,500		404,700		6,265,600		106,900		217,900	
1898	14,807,200		805,000		425,300		472,900		6,485,900		254,400		284,000	
1899	16,096,000		843,400		503,300		520,000		7,093,300		256,000		282,300	
1900	14,195,400		1,358,700		434,300		477,400		9,267,600		224,500		663,900	
1896–1900	77,504,000	27.73	5,284,700	1.89	2,590,200	.93	2,400,400	.86	37,940,000	13.57	1,116,700	.40	1,740,200	.62
1901	13,131,700		1,812,500		563,400		472,400		10,760,800		344,400		281,200	
1902	13,243,800		3,746,200		457,200		446,200		10,831,700		619,000		478,400	
1903	12,642,300		5,050,500		180,700		454,400		11,196,800		294,500		471,000	

1904	14,608,100		2,695,100		214,600		469,600		12,484,300		149,900		407,500	
1905	13,454,700		5,863,500		354,900		417,200		10,319,800		119,400		393,800	
1901–1905	67,080,600	24.06	19,167,800	6.88	1,770,800	.64	2,259,800	.81	55,593,400	19.94	1,527,200	.55	2,031,900	.73
1906	12,540,300		5,207,600		453,400		277,400		11,508,000		42,100		329,200	
1907	11,129,600		8,280,500		599,500		305,300		11,406,900		84,000		321,300	
1908	10,356,200		9,508,500		400,900		447,000		8,451,300		86,800		377,900	
1909	12,034,500		10,119,200		324,200		408,100		10,551,100		75,200		359,300	
1910	12,282,900		12,366,000		779,000		364,400		10,445,900		204,900		279,600	
1906–1910	58,343,500	21.04	45,481,800	16.30	2,557,000	.92	1,802,200	.65	52,363,200	18.88	493,000	.18	1,667,300	.60
1911	12,163,900		13,185,900		1,341,400		444,200		11,630,600		230,300		408,000	
1912	12,524,000		13,851,400		1,460,800		379,800		13,076,700		350,800		408,000	
1913	12,540,300		15,657,400		1,666,900		429,800		11,282,300		218,700		499,100	
1914	12,536,700		15,877,200		1,771,300		574,700		11,722,000		341,300		501,700	
1915	14,423,173		14,453,085		2,337,064		724,580		13,073,471		213,877		486,362	
1911–1915	64,188,073	18.97	73,024,985	21.58	8,577,464	2.54	2,553,080	.75	60,785,071	17.97	1,354,977	.40	2,303,162	.68
1916	14,046,054		13,682,067		1,729,917		664,319		13,545,802		294,516		669,777	
1917	14,555,034		11,217,654		1,535,807		587,945		13,360,905		266,112		549,400	
1918	16,378,263		9,931,969		773,662		579,158		13,492,555		300,000		461,943	
1919	15,012,258		7,045,395		851,821		539,483		12,542,623		258,270		544,912	
1920	13,263,356		7,481,866		699,745		522,818		11,755,411		177,758		486,479	
1916–1920	73,254,965	22.47	49,358,951	15.14	5,590,952	1.72	2,893,723	.89	64,697,296	19.85	1,296,656	.40	2,712,511	.83
1921	9,677,020		6,998,774		579,374		548,827		14,028,661		147,584		338,338	
1922	9,682,304		8,287,704		764,031		653,657		15,465,202		219,398		475,303	
1923	14,226,272		10,640,656		737,863		825,267		20,479,550		240,712		459,638	
1924	13,688,728		9,333,197		834,933		718,425		17,821,716		219,372		328,627	
1925	12,596,609		6,846,806		799,673		555,173		21,240,515		165,565		290,284	
1921–1925	59,870,933	19.09	42,107,137	13.41	3,715,874	1.18	3,301,349	1.05	89,035,644	28.35	992,631	.32	1,892,190	.60
1926	11,974,257	19.11	6,450,224	10.29	496,634	.79	463,611	.74	19,936,032	31.80	155,952	.25	285,813	.46
1927	11,809,765	19.55	5,372,900	8.90	754,878	1.25	942,971	1.56	19,353,758	32.04	161,643	.27	311,164	.52

[1] Included in "Others" column.

TABLE 11.—*Average annual mine production of silver in the 12 leading States, by classes of ores, by 5-year periods, 1906–1925; and for 1926 and 1927*

State and period	Total production		Placer		Dry and siliceous ore		Copper ore		Lead ore		Zinc ore		Copper-lead and copper-lead-zinc ores		Lead-zinc ore	
	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
Alaska:																
1906–1910	151,465	100.00	91,131	60.17	27,842	18.38	32,492	21.45								
1911–1915	560,913	100.00	87,494	15.60	43,203	7.70	430,216	76.70								
1916–1920	1,009,873	100.00	44,590	4.42	137,272	13.59	827,352	81.92	74	0.01			585	0.06		
1921–1925	734,716	100.00	23,546	3.20	73,960	10.07	610,494	83.10	25,237	3.43			1,479	.20		
1926	690,000	100.00	24,870	3.60	59,940	8.69	597,818	86.64	7,372	1.07						
1927	627,800	100.00	23,300	3.71	79,400	12.65	525,100	83.64								
Arizona:																
1906–1910	2,702,895	100.00	249	.01	659,036	24.38	1,736,819	64.25	262,906	9.73	16,057	0.60	27,828	1.03		
1911–1915	4,148,413	100.00	272	.01	661,762	15.95	2,802,942	67.57	523,920	12.63	50,384	1.21	20,933	.50	88,200	2.13
1916–1920	6,300,802	100.00	96	.00	969,402	15.39	4,667,443	74.08	483,603	7.67	42,601	.68	60,559	.96	77,098	1.22
1921–1925	5,650,429	100.00	65	.00	935,504	16.56	3,834,801	67.87	839,310	14.85	278	.00	38,904	.69	1,567	.03
1926	7,381,027	100.00	56	.00	460,826	6.24	5,984,415	81.08	716,945	9.71	33,932	.46	145,989	1.98	38,864	.53
1927	6,847,680	100.00	43	.00	461,321	6.74	5,702,270	83.27	609,718	8.91	4,434	.06	57,036	.83	12,858	.19
California:																
1906–1910	1,589,023	100.00	46,639	2.93	396,982	24.98	1,059,744	66.69	76,080	4.79	6,000	.38	446	.03	3,132	.20
1911–1915	1,419,919	100.00	36,663	2.58	316,799	22.31	850,090	59.87	188,096	13.25	28,271	1.99				
1916–1920	1,716,202	100.00	28,920	1.69	467,707	27.25	810,241	47.21	385,020	22.43	21,750	1.27	2,564	.15		
1921–1925	3,379,656	100.00	22,763	.67	2,639,351	78.10	487,598	14.43	207,756	6.15	14,862	.44	2,141	.06	5,185	.15
1926	2,022,460	100.00	19,362	.96	1,252,514	61.92	397,174	19.64	128,027	6.33	150,053	7.42	5,022	.25	70,308	3.48
1927	1,620,242	100.00	20,903	1.29	1,032,589	63.73	393,533	24.29	72,644	4.48	71,074	4.39	3,383	.21	26,116	1.61
Colorado:																
1906–1910	9,952,854	100.00	3,275	.03	6,229,908	62.59	429,779	4.32	1,894,838	19.04	30,278	.31	313,514	3.15	1,051,262	10.56
1911–1915	8,138,306	100.00	5,866	.07	5,708,862	70.15	233,629	2.87	1,375,775	16.90	46,832	.58	230,229	2.83	537,113	6.60
1916–1920	6,638,359	100.00	7,600	.11	4,610,368	69.45	150,787	2.27	1,138,590	17.15	54,247	.82	64,247	.97	612,520	9.23
1921–1925	4,916,673	100.00	3,929	.08	3,734,627	75.96	120,621	2.45	510,161	10.38	11,330	.23	29,392	.60	506,613	10.30
1926	4,704,122	100.00	569	.01	2,798,387	59.49	43,312	.92	626,986	13.33	230	.01	2,628	.05	1,232,010	26.19
1927	3,784,605	100.00	1,136	.03	2,409,501	63.67	14,888	.39	244,788	6.47			8,284	.22	1,106,008	29.22
Idaho:																
1906–1910	7,863,120	100.00	3,037	.04	727,275	9.25	561,217	7.14	6,504,805	82.72	4,452	.06	919	.01	61,415	.78
1911–1915	10,145,744	100.00	6,489	.06	160,954	1.59	306,334	3.02	8,088,311	79.72	36,077	.36	703	.01	1,546,876	15.24
1916–1920	9,281,680	100.00	2,442	.03	86,850	.94	202,688	2.18	7,035,446	75.80	10,952	.12	45,707	.49	1,897,595	20.44
1921–1925	7,074,530	100.00	3,464	.05	75,951	1.07	271,860	3.84	5,447,072	77.00	886	.01	413,398	5.84	861,899	12.19
1926	7,556,444	100.00	2,029	.03	24,335	.32	429,343	5.68	4,575,490	60.55			445,520	5.90	2,079,727	27.52
1927	8,901,409	100.00	2,306	.03	23,420	.26	49,623	.56	5,609,605	63.02			1,079,747	12.13	2,136,708	24.00

Michigan:																
1906–1910	275,994	100.00					275,994	100.00								
1911–1915	464,068	100.00					464,068	100.00								
1916–1920	565,255	100.00					565,255	100.00								
1921–1925	236,319	100.00					236,319	100.00								
1926	105,242	100.00					105,242	100.00								
1927	97,193	100.00					97,193	100.00								
Montana:																
1906–1910	11,239,216	100.00	3,581	.03	1,695,961	15.09	8,970,752	79.82	280,776	2.50	190,167	1.69	97,794	.87	185	.00
1911–1915	12,986,186	100.00	6,283	.05	1,430,427	11.02	9,480,016	73.00	348,464	2.68	339,011	2.61	39,108	.30	1,342,877	10.34
1916–1920	14,308,069	100.00	3,316	.02	1,373,185	9.60	8,606,194	60.15	565,122	3.95	511,114	3.57	71,477	.50	3,177,661	22.21
1921–1925	11,771,044	100.00	639	.01	1,312,680	11.15	6,246,320	53.07	651,368	5.53	782,883	6.65	408,538	3.47	2,368,616	20.12
1926	12,769,092	100.00	162	.00	345,456	2.71	7,762,190	60.78	514,628	4.03	123,437	.97	668,986	5.24	3,354,233	26.27
1927	11,200,077	100.00	197	.00	427,105	3.81	6,201,827	55.37	314,100	2.81	1,607,188	14.35	559,918	5.00	2,089,742	18.66
Nevada:																
1906–1910	9,364,722	100.00	2,069	.02	8,620,641	92.06	66,840	.71	607,678	6.49	2,590	.03	54,557	.58	10,347	.11
1911–1915	14,711,816	100.00	5,554	.04	13,948,885	94.81	190,630	1.30	373,470	2.54	22,265	.15	47,321	.32	123,691	.84
1916–1920	9,943,353	100.00	4,320	.04	9,065,433	91.17	229,421	2.31	465,139	4.68	7,016	.07	40,538	.41	131,486	1.32
1921–1925	8,565,186	100.00	3,256	.04	7,339,537	85.69	70,622	.82	977,888	11.42	1,685	.02	8,090	.09	164,108	1.92
1926	6,518,983	100.00	1,494	.02	4,509,178	69.17	142,316	2.18	1,395,285	21.41	627	.01	147,470	2.26	322,613	4.95
1927	5,397,179	100.00	740	.01	3,419,940	63.37	183,525	3.40	1,405,418	26.04			280,713	5.20	106,843	1.98
New Mexico:																
1906–1910	568,697	100.00	211	.04	448,846	78.93	68,437	12.03	35,730	6.28	3	.00	943	.17	14,527	2.55
1911–1915	1,661,098	100.00	155	.01	1,312,946	79.04	280,518	16.89	45,128	2.72	233	.01	6,309	.38	15,809	.95
1916–1920	1,109,704	100.00	48	.01	785,885	70.82	228,276	20.56	72,320	6.52	3,185	.29	17,761	1.60	2,229	.20
1921–1925	720,292	100.00	34	.01	549,959	76.35	119,223	16.55	45,034	6.25	26	.00	4,550	.63	1,466	.21
1926	450,934	100.00	45	.01	142,735	31.65	164,460	36.47	80,127	17.77	4,108	.91	84	.02	59,375	13.17
1927	890,083	100.00	32	.00	61,810	6.94	122,093	13.72	54,104	6.08	934	.11	13,600	1.53	637,510	71.62
Texas:																
1906–1910	360,912	100.00			358,787	99.41	17	.01	2,048	.57			60	.01		
1911–1915	492,861	100.00			484,147	98.23	4,048	.82	1,925	.39					2,741	.56
1916–1920	575,170	100.00			566,752	98.54	6,136	1.07	2,266	.39			16	.00		
1921–1925	616,930	100.00			612,577	99.29	428	.07	3,925	.64						
1926	447,237	100.00			446,903	99.93	62	.01	272	.06						
1927	1,034,866	100.00			1,034,705	99.98			161	.02						
Utah:																
1906–1910	10,635,238	100.00	53	.00	271,461	2.55	2,527,737	23.77	6,059,494	56.98	10,206	.10	1,402,078	13.18	364,209	3.42
1911–1915	12,572,529	100.00	21	.00	2,087,267	16.60	2,205,313	17.54	6,988,703	55.59	9,508	.08	90,412	.72	1,191,305	9.47
1916–1920	12,988,941	100.00	5	.00	3,016,656	23.22	1,468,682	11.31	7,368,173	56.73	626	.00	111,290	.86	1,023,509	7.88
1921–1925	17,438,190	100.00	2	.00	6,024,067	34.55	683,558	3.92	8,996,292	51.59	11	.00	19,325	.11	1,714,935	9.83
1926	19,358,581	100.00	1	.00	3,365,644	17.39	1,281,767	6.62	7,307,599	37.75	732	.00			7,402,838	38.24
1927	18,606,950	100.00			2,577,357	13.85	1,138,014	6.12	7,214,271	38.77			169,111	.91	7,508,197	40.35
Washington:																
1906–1910	94,978	100.00	181	.19	80,180	84.42	9,783	10.30	4,834	5.09						
1911–1915	301,851	100.00	71	.02	177,799	58.90	117,331	38.87	6,330	2.10					320	.11
1916–1920	277,319	100.00	54	.02	116,557	42.03	154,144	55.58	5,285	1.91			997	.36	282	.10
1921–1925	190,970	100.00	29	.02	83,104	43.52	55,213	28.91	50,379	26.38	167	.09	502	.26	1,576	.82
1926	171,649	100.00	456	.27	56,556	32.95	18,456	10.75	82,733	48.20					13,448	7.83
1927	155,850	100.00	5	.00	115,684	74.23	35,926	23.05	1,939	1.24	2,134	1.37			162	.11

Arizona.—Arizona produced 5 per cent of the United States total during the 4-year period 1877 to 1880 and 12 per cent during the 5-year period 1881 to 1885. The mines of the Tombstone district were the leading silver producers. Arizona's importance as a silver producer declined until from 1891 to 1895 less than 3 per cent of the United States silver came from this State. There has since been a steady growth of Arizona's proportion of the United States silver production to 9 per cent of the total in 1921 to 1925 and 11 per cent in 1927. In recent years the silver obtained as a by-product of copper mining has been the chief source of Arizona's output.

California.—California produced 4 per cent of the total silver for this country during the 4-year period 1877 to 1880. After that date there was a decline until the low point of the 1891 to 1895 period, when California's proportion was only 1 per cent. From 1895 until 1920 there was little change in California's position. The dry and siliceous and copper ores furnished the major portion of this production. The revival of the Randsburg district from 1921 to 1925 doubled production and gave California over 5 per cent of the United States total, but by 1927 the annual output had decreased to about half of the average for 1921 to 1925.

Colorado.—Colorado produced 23 per cent of this country's silver during the 4-year period 1877 to 1880, with an average annual production of 7,500,000 ounces. This increased rapidly to a maximum of 26,500,000 ounces in 1892, but there has been a steady decline since that date. Colorado produced 42 per cent of the United States total for the period 1891 to 1895. In 1927 less than 4,000,000 ounces—only 2½ per cent of the total for the country—was produced. The San Juan, Aspen, Leadville, and Clear Creek districts have been the leading producers in Colorado. Dry and siliceous ores have always been the principal source of silver. Formerly lead ore ranked second, but in recent years it has declined in importance. Lead-zinc ore has been an important source of silver and has shown a marked increase during the past few years.

Idaho.—The production of silver in Idaho increased steadily from less than 1 per cent of the country's total in the 4-year period 1877 to 1880 to a maximum of 15 per cent in the period 1911 to 1915. Since 1915 there has been a substantial decrease in output but only a slight decline in the importance of Idaho's contribution to the United States total. The Coeur d'Alene district has supplied virtually all of the silver production of Idaho. The major portion of the yield is from lead ores, but lead-zinc, copper-lead-zinc, copper and dry and siliceous ores have made important contributions to Idaho's total.

Montana.—Silver production increased rapidly in Montana from 1877 until during the period 1891 to 1895, 29 per cent of the total output of the United States came from this State. Since 1895 production has fluctuated between 10,000,000 and 17,000,000 ounces a

year, and there has been a slow decline in Montana's proportion of the country's total. The 1921 to 1925 period shows a production of 19 per cent of the United States total. The copper ores of Butte have supplied the major part of Montana's silver. Butte has also been responsible for the major portion of the silver produced from lead-zinc, lead, zinc, and complex ores. Dry and siliceous ores, which formerly stood second to copper ores in silver-yielding importance, have been produced in large quantities in the Philipsburg and Jefferson County districts.

Nevada.—During the 4-year period 1877 to 1880, the last years of the "Big Bonanza" of the Comstock lode, Nevada produced 47 per cent of the total for the United States. Production then dropped rapidly until 1896 to 1900, when less than 2 per cent of the silver output of the United States came from this State. From that period on there was a rapid increase to 22 per cent for the period 1911 to 1915, followed by a decrease to 13 per cent for 1921 to 1925. Exhaustion of the bonanzas of Virginia City, Reese River district, Eureka district, Pioche district, and White Pine district caused the silver output of Nevada to drop from 20,000,000 ounces in 1877 to less than 1,000,000 ounces in 1898. A general recovery then followed, and the production of Tonopah and Goldfield was added to that of the older districts. By 1915 the yearly output had increased to nearly 16,000,000 ounces; but since then production has again fallen off, owing largely to the decline of Goldfield and Tonopah. Virtually all of Nevada's production has come from dry and siliceous ores. In recent years lead ores have become more important.

Utah.—The silver production of Utah has increased with remarkable regularity since 1877. For the 4-year period 1877 to 1880 Utah produced 13 per cent of the country's silver, and this same proportion was maintained until 1900. The production for the 5-year period 1901 to 1905 rose to 20 per cent, a position held until a further rise to 28 per cent in the 1921 to 1925 period. The Bingham Canyon, Park City, and Tintic districts have been the principal silver-producing areas in Utah. The several sources of silver in order of their importance have been lead ore, dry and siliceous ore, copper ore, and lead-zinc ore.

Other States.—Alaska, Michigan, New Mexico, Texas, and Washington are the only other States that have contributed over 1 per cent to production of silver in the United States for any one year since 1877. Copper ores, largely from the Copper River district, have been the most important source of silver in Alaska. The copper ores of the Keweenaw Peninsula have been the only source of silver in Michigan. Dry and siliceous ores and copper ores have produced most of New Mexico's silver. Dry and siliceous ores of the Shafter district have been responsible for most of the Texas silver production. The dry and siliceous ores of Ferry County and the copper ores of Stevens County have accounted for the major part of the production in Washington.

TABLE 12.—*Mine production of silver in the United States, by sources, 1906–1927*

Year	Total production		Placer		Dry and siliceous ore		Copper ore		Lead ore		Zinc ore		Copper-lead and copper-lead-zinc ores		Lead-zinc ore	
	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent	Quantity, fine ounces	Per cent
1906	57,362,453		171,058		16,792,799		15,880,870		15,328,653		98,423		6,815,678		2,274,972	
1907	52,497,066		126,808		19,038,042		13,955,436		17,318,811		93,419		489,625		1,474,725	
1908	50,875,787		159,285		19,862,038		14,945,189		14,049,481		37,605		1,099,283		722,906	
1909	57,312,677		152,040		10,862,890		18,300,705		17,027,737		313,948		549,923		1,141,434	
1910	57,596,709		159,381		23,125,042		16,024,543		15,028,076		755,369		535,987		1,968,311	
1906–1910	275,644,692	100.00	768,572	0.28	98,644,811	35.79	79,106,743	28.70	78,752,758	28.57	1,298,764	0.47	9,490,696	3.44	7,582,348	2.75
1911	61,107,840		170,084		25,205,749		16,759,638		15,596,638		630,573		285,006		2,460,152	
1912	66,034,385		163,955		26,363,436		18,744,661		16,632,377		664,421		654,596		2,810,939	
1913	71,187,228		123,739		28,010,875		18,250,253		18,629,246		86,432		752,563		5,334,120	
1914	69,623,249		152,128		27,812,335		14,829,828		19,302,081		145,264		248,866		7,132,747	
1915	72,353,730		154,968		25,709,505		18,781,365		19,828,533		1,136,220		234,047		6,509,092	
1911–1915	340,306,432	100.00	764,874	.22	133,101,900	39.12	87,365,745	25.67	89,988,875	26.44	2,662,910	.78	2,175,078	.64	24,247,050	7.13
1916	78,857,533		126,351		24,593,656		24,541,234		19,216,586		1,274,292		533,273		8,572,141	
1917	70,661,512		118,604		21,489,465		20,314,233		19,096,474		549,656		448,042		8,645,038	
1918	68,058,952		89,494		21,564,982		20,462,597		18,291,243		135,676		224,580		7,290,380	
1919	51,899,460		78,401		19,043,515		12,880,624		14,351,293		39,480		232,157		5,273,990	
1920	56,536,904		73,383		20,477,612		12,151,424		17,069,506		1,258,341		669,503		4,837,135	
1916–1920	326,014,361	100.00	486,233	.15	107,169,230	32.87	90,350,112	27.71	88,025,102	27.00	3,257,445	1.00	2,107,555	.65	34,618,684	10.62
1921	46,332,956		81,375		24,117,251		4,782,538		14,912,990		6,163		449,417		1,983,222	
1922	61,207,989		60,769		28,631,579		10,376,123		16,756,835		1,676,967		669,809		3,035,907	
1923	70,355,674		57,752		27,636,947		14,684,333		20,139,928		2,171,186		1,348,025		4,317,503	
1924	64,070,744		51,251		20,388,065		16,335,433		18,858,782		24,431		1,194,323		7,218,459	
1925	66,710,080		50,303		17,099,876		18,051,937		18,777,853		181,886		970,370		11,577,855	
1921–1925	308,677,443	100.00	301,450	.10	117,873,718	38.18	64,230,364	20.81	89,446,388	28.98	4,060,633	1.32	4,631,944	1.50	28,132,946	9.11
1926	62,487,219	100.00	49,890	.08	13,567,095	21.71	17,039,546	27.27	15,528,454	24.85	313,119	.50	1,415,699	2.27	14,573,416	23.32
1927	59,625,682	100.00	49,829	.08	11,775,384	19.75	14,556,572	24.41	15,762,197	26.44	1,685,764	2.83	2,171,792	3.64	13,624,144	22.85

MEXICO

Since 1521 Mexico has produced over 5,000,000,000 ounces of silver, or almost 36 per cent of the total production of the world since 1493. Mexico's nearest rivals, the United States, Bolivia, Peru, and Canada, have produced 21, 11, 9, and 4 per cent, respectively. Hernando Cortes conquered Mexico in 1521 and probably discovered the mines of Tasco and Pachuca that year. These districts had been worked by the Aztecs for many years before the arrival of the Spaniards. The first recorded shipment of silver from Mexico to Spain, in 1522, was taken from the mines of Tasco. In 1540 the Spaniards began mining at Zacatecas. Guanajuato was discovered in 1548, and work was begun at Sombrerete, Zacatecas, in 1555. During the 80-year period 1521 to 1600 the Spaniards produced over 90,000,000 ounces of silver in Mexico. The invention of the patio process of silver amalgamation by Bartolome de Medina, of Pachuca, Mexico, in 1557 was an important factor in the rise in Mexican production. With the opening of the seventeenth century the silver production of Mexico began a period of regular increase. For 200 years each succeeding 20-year period showed increased production over the preceding period. From a production of 52,000,000 ounces in the 20-year period 1601 to 1620 the production rose to 362,000,000 ounces for the 20-year period that closed the eighteenth century—an increase of 593 per cent in 200 years. Among the discoveries of this 200-year period were the following: Batopilas, Chihuahua, in 1632; Cusihiuriachic, Chihuahua, in 1666; Santa Eulalia, Chihuahua, in 1704; the great bonanza of Real del Monte, Hidalgo, in 1762; Catorce, San Luis Potosi, in 1778; Guarisamey, Durango, in 1783; the bonanza of Sombrerete, Zacatecas, in 1792; and the great bonanza of Ramos, San Luis Potosi, in 1798.

TABLE 13.—*Mine production of silver in Mexico by various periods, 1521–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1521–1600	90,410,000	1,130,125		1856–1860	71,990,000	14,398,000	49.45
1601–1620	52,210,000	2,610,500		1861–1865	76,040,000	15,208,000	42.51
1621–1640	56,710,000	2,835,500		1866–1870	83,740,000	16,748,000	37.76
1641–1660	61,220,000	3,061,000	24.11	1871–1875	96,740,000	19,348,000	28.94
1661–1680	65,650,000	3,282,500		1876–1880	98,296,007	19,659,201	26.13
1681–1700	70,860,000	3,543,000		1881–1885	112,831,293	22,566,259	25.82
1701–1720	105,320,000	5,266,000		1886–1890	162,334,370	32,466,874	28.80
1721–1740	148,380,000	7,419,000		1891–1895	212,723,124	42,544,625	26.86
1741–1760	193,550,000	9,677,500	57.00	1896–1900	269,410,060	53,882,012	32.45
1761–1780	235,600,000	11,780,000		1901–1905	314,182,938	62,836,588	37.38
1781–1800	361,660,000	18,083,000		1906–1910	335,351,124	67,070,225	33.89
1801–1810	178,050,000	17,805,000	62.12	1911–1915	291,493,471	58,298,694	27.83
1811–1820	100,310,000	10,031,000	57.86	1916–1920	252,921,877	50,584,375	27.76
1821–1830	85,140,000	8,514,000	55.44	1921–1925	420,772,930	84,154,586	37.82
1831–1840	106,420,000	10,642,000	53.92	1926	98,291,166	98,291,166	38.73
1841–1850	135,130,000	13,513,000	53.34	1927	104,573,919	104,573,919	41.60
1851–1855	74,930,000	14,986,000	48.35				

During the 10-year period 1801 to 1810 the production rate of the preceding 20-year period was almost maintained in spite of the rebellion brewing against the Spanish colonial government. In September, 1810, a revolt broke out in the State of Guanajuato and rapidly spread to all Mexico. This revolt lasted for 14 years until in 1824 Mexico gained recognition as an independent nation. The production for the decade 1811 to 1820 fell to 100,000,000 ounces, which was followed by a further drop to 85,000,000 ounces for 1821 to

1830. In 20 years the production of Mexico had been cut to less than one-half. The restoration of order under a native government caused an increase in production to 106,000,000 ounces during the fourth decade. This increase was followed, in 1841 to 1850, by a further increase to 135,000,000 ounces, in spite of the war with the United States during this period. As a result of this war Mexico ceded to the United States territory then nonproductive of silver, which has since produced the major part of the United States silver output.

The outstanding silver discoveries of the 50-year period 1801 to 1850 include El Refugio, Chihuahua, in 1816, and Palmarejo, Chihuahua, in 1824. In 1824 the great silver deposit of Fresnillo, Zacatecas, was first opened. Not for a single decade during this period did Mexico fail to produce at least one-half the world's total silver. There was, however, a steady decline in the proportion of the world's silver supplied by Mexico from 62 per cent in the first decade to 53 per cent in the fifth. Since 1850 Mexico never again succeeded in producing one-half or more of the world total silver output.

During the 5-year period 1851 to 1855, 75,000,000 ounces was produced, followed by a production of 72,000,000 ounces for 1856 to 1860. A period of steady increase in Mexican production then began, which culminated with the 5-year period 1906 to 1910. This time of strong governments ended with the overthrow of Porfirio Diaz in 1910. During the five years from 1906 to 1910 the production was 335,000,000 ounces, an increase of 366 per cent over that of the period 1856 to 1860, 55 years before. This increase, however, did not keep pace with the rapid expansion of world output, as is indicated by the fact that Mexico's contribution to the world total decreased from 49 per cent in 1856 to 1860 to 34 per cent in 1906 to 1910.

In 1911 production reached 79,000,000 ounces, the highest yearly output ever attained by any country up to that time and a figure that has only been exceeded by Mexico itself since 1911. There was a rapid decline from this high production as the civil war grew more violent, until in 1914 only 28,000,000 ounces was produced. The year 1915 was marked by partial recovery only to be followed by a drop to 23,000,000 ounces in 1916, the lowest production since 1884. Since that date there has been slow but steady stabilization of government in Mexico, which has been reflected in a steady and very rapid rise in the silver production. In 1922 the output rose to 81,000,000 ounces, breaking all previous records, and in 1927 Mexico passed the 100,000,000 a year mark with a production of 104,573,919 ounces, 42 per cent of the world total. This figure exceeded the total Mexican output for any 5-year period before 1881 to 1885, any 20-year period before 1701 to 1720, and the 80-year period 1521 to 1600. With the exception of the years from 1872 to 1900 and from 1914 to 1918, when the United States was the leader, Mexico has been the world's leading producer of silver since 1681.

CANADA

Except for 1923 Canada has been the third largest silver producer in the world since 1908. Canada stands fifth among the silver-producing countries of the world in total quantity produced since 1493, in spite of the fact that no silver was mined before 1869. In 1868 the deposit on Silver Islet, an island some 80 feet in diameter in Thunder Bay, Lake Superior, was discovered. During the next 10 years the major portion of the ore from which was extracted the

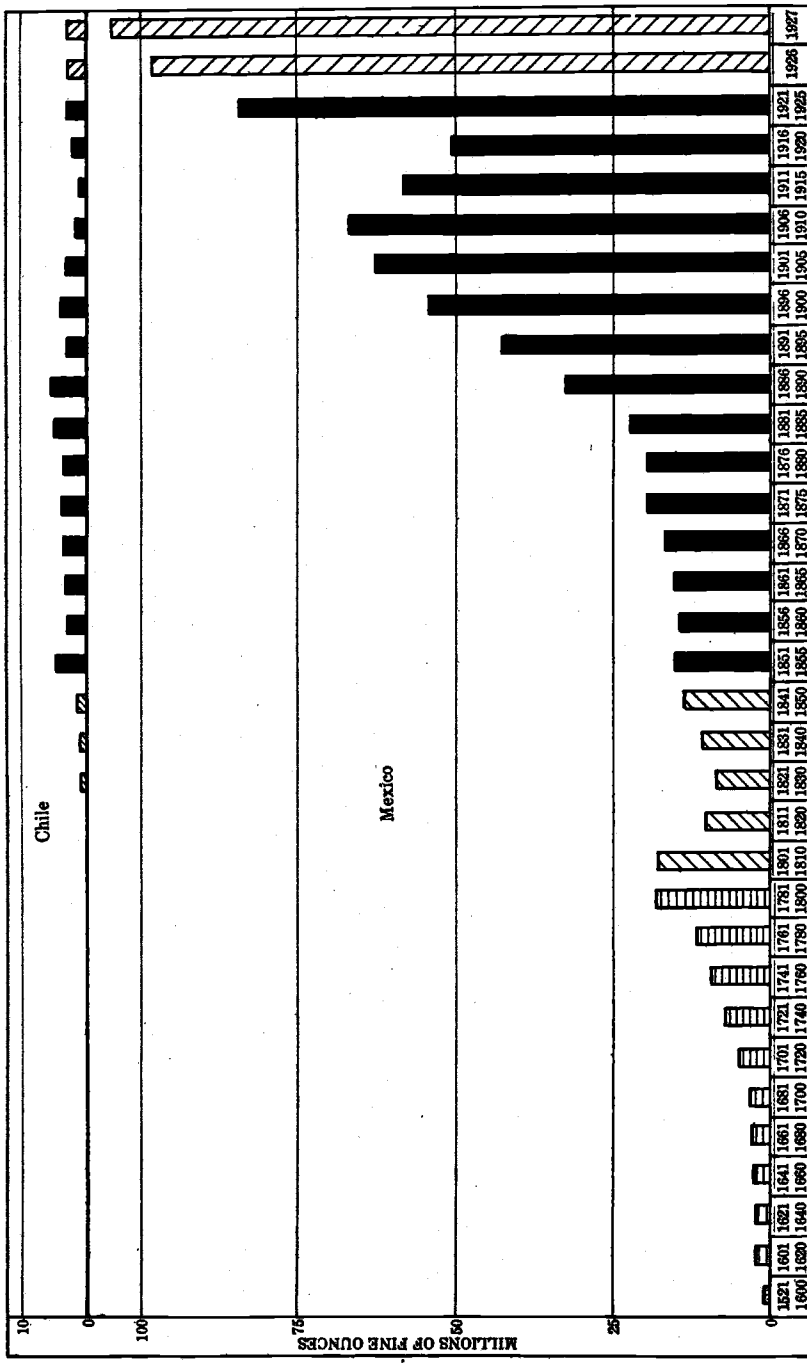

FIGURE 9.—Average annual mine production of silver in Mexico and Chile, from first production to 1600; by 20-year periods, 1601 to 1850; by 5-year periods, 1851 to 1925; and for 1926 and 1927

2,600,000 ounces of silver produced by this remarkable island had been mined. During the exploitation of this bonanza other silver deposits were being discovered and opened. It was not until 1894, however, that the discoveries and developments in British Columbia caused Canada's production to mount to over 1 per cent of the world total. In the summer of 1903 the Cobalt district in Ontario was discovered. In five years the production of this district raised Canada to third place among the silver-producing countries of the world. During the 5-year period 1906 to 1910, 104,000,000 ounces or 10 per cent of the world total was produced, followed by an output of

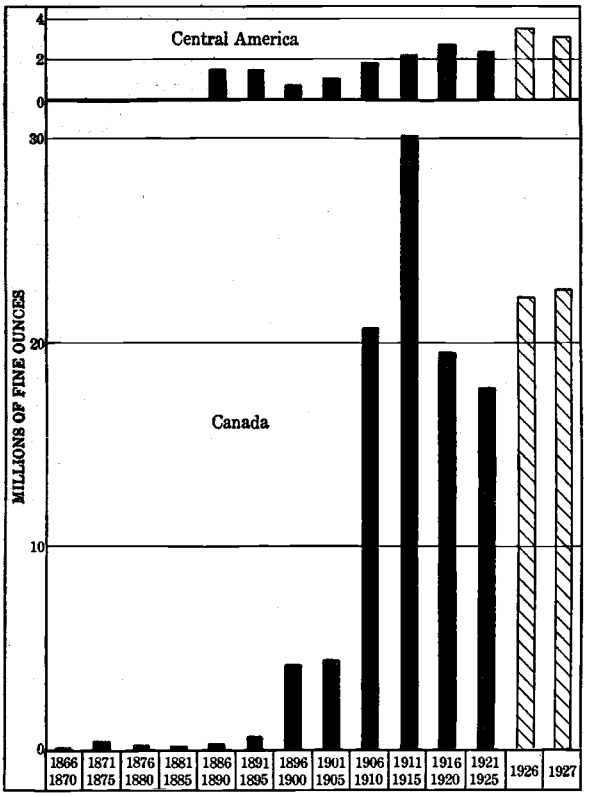

FIGURE 10.—Average annual mine production of silver in Canada and Central America, by 5-year periods from first production to 1925 and for 1926 and 1927

151,000,000 ounces or 14 per cent of the world total in the next period—1911 to 1915. In the following decade production declined to a little less than 100,000,000 ounces per 5-year period, a rate only slightly exceeded in 1926 and 1927.

The Cobalt district ranks fourth among the silver districts of the world in total yield of silver. It seems certain that no district has produced as much silver in any 23-year period as did Cobalt, with an output of 374,000,000 ounces between 1904 and 1926. In all, over 70 per cent of Canada's silver has come from this one district. The East and West Kootenay and the Portland Canal districts in British Columbia and the Keno Hill district in the Yukon Territory have been

the chief Canadian silver producers of the Rocky Mountain region. The Sullivan mine at Kimberley in the East Kootenay district, British Columbia, became the largest silver producer in the British Empire in 1925, a distinction it has since been able to maintain. In spite of the great importance of the Sullivan mine as a silver producer its greatest distinction comes from being the greatest single producer in the world of both lead and zinc. In the greatest silver mine in the British Empire silver is distinctly a by-product.

TABLE 14.—*Mine production of silver in Canada by various periods, 1869–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1869–1870	170,000	85,000		1901–1905	22,187,410	4,437,482	2.64
1871–1875	1,990,000	398,000	0.60	1906–1910	103,853,435	20,770,687	10.49
1876–1880	1,232,518	246,504	.33	1911–1915	150,923,578	30,184,716	14.41
1881–1885	590,672	118,134	.14	1916–1920	97,879,177	19,575,835	10.74
1886–1890	1,593,101	318,620	.28	1921–1925	89,436,382	17,887,276	8.04
1891–1895	3,531,664	706,333	.45	1926	22,371,924	22,371,924	8.81
1896–1900	21,076,521	4,215,304	2.54	1927	22,613,134	22,613,134	8.99

CENTRAL AMERICA

Production of silver in Central America was first recorded in 1886, when 1,500,000 ounces was reported for the year. Before that time there had undoubtedly been some output for centuries, but this appears to be the beginning of large production. The principal producer, the Rosario district, of Honduras, was first worked in 1882.

During the 5-year period 1886 to 1890 almost 8,000,000 ounces was produced in Central America. The output declined to 4,000,000 ounces for the period 1896 to 1900, then increased regularly until over 13,000,000 ounces was produced between 1916 and 1920. Since then there has been a slight decline for the period 1921 to 1925 to 12,000,000 ounces. For many years the Rosario district has produced an amount that accounted for 50 to 90 per cent of the Central America total. At no time has the silver production of Central America exceeded 2 per cent of the world total.

TABLE 15.—*Mine production of silver in Central America by various periods, 1886–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1886–1890	7,735,760	1,547,152	1.37	1911–1915	11,868,706	2,373,741	1.13
1891–1895	7,734,690	1,546,938	.98	1916–1920	13,372,000	2,674,400	1.47
1896–1900	4,262,435	852,487	.51	1921–1925	11,887,085	2,377,417	1.07
1901–1905	5,983,855	1,196,771	.71	1926	3,499,118	3,499,118	1.38
1906–1910	9,345,021	1,869,004	.94	1927	3,154,021	3,154,021	1.25

SOUTH AMERICA

In the 435 years from 1493 to 1927 South America produced 3,322,433,729 ounces of silver or 23 per cent of the world total and stood second only to North America in total production. For the periods 1493 to 1600 and 1601 to 1700 this continent led the world in silver production with 61 and 63 per cent, respectively, of the world production. During the eighteenth century the output of South

America declined 25 per cent and represented only one-third of the world total; and in the nineteenth century, although the output had nearly doubled, it amounted to only 20 per cent of world production. Toward the close of the century yearly production reached its peak, but was followed by a sharp recession early in the twentieth century. From 1901 to 1905 only 9 per cent of the world output was produced in South America. However, production has since recovered to a level just below the previous peak, and at the same time there has been a slight rise in South America's importance in the world picture. Bolivia, Peru, and Chile have been the chief producers of South America.

ARGENTINA

Table 16 shows the production of silver in Argentina since the first recorded output in 1876. Since the 5-year period 1876 to 1880, when a little less than one-half of 1 per cent of the world's silver came from Argentina, there has been a steady decline in the proportion of the world silver coming from this country. Since 1916 only one-hundreth of 1 per cent of the world production has come from Argentina.

TABLE 16.—*Mine production of silver in Argentina by various periods, 1876–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1876–1880	1,625,043	325,010	0.43	1906–1910	695,087	139,017	0.07
1881–1885	1,759,226	351,845	.40	1911–1915	375,378	75,076	.04
1886–1890	1,342,358	268,472	.24	1916–1920	130,300	26,060	.01
1891–1895	3,195,397	639,079	.40	1921–1925	118,000	23,600	.01
1896–1900	1,516,505	303,301	.18	1926	15,000	15,000	.01
1901–1905	391,780	78,356	.05	1927	15,000	15,000	.01

BOLIVIA

In 1545 the Potosi district, the first Bolivian producer, was discovered. This district was destined to become the world's greatest silver producer, with an output of approximately a billion ounces of silver—twice as much as its nearest competitor, Guanajuato, Mexico. In 1575 the silver mines of Oruro were discovered and opened. The discovery of the Huancevalica mercury mines of Peru in 1571 and the invention of the copper-pan or "cazo" system of amalgamation by Alonzo Barba at Potosi in 1590 proved to be great aids to the silver-mining industry throughout western South America. Since 1545 the total production of Bolivia has been 1,568,000,000 ounces of silver, or 11 per cent of the world total, a figure exceeded only by Mexico and the United States and almost one-half of the total production of South America since 1493.

During the 56-year period 1545 to 1600, 355,000,000 ounces of silver were produced in Bolivia. The rate of production was increased slightly for the following 20-year period, 1601 to 1620, when the yield was 132,000,000 ounces. Production then decreased steadily until the 20-year period 1721 to 1740, when only 28,000,000 ounces were produced. By the close of the eighteenth century, however, the production had recovered to 63,000,000 ounces for the period 1781 to 1800, but the total yield of the eighteenth century was less than half that of the seventeenth century.

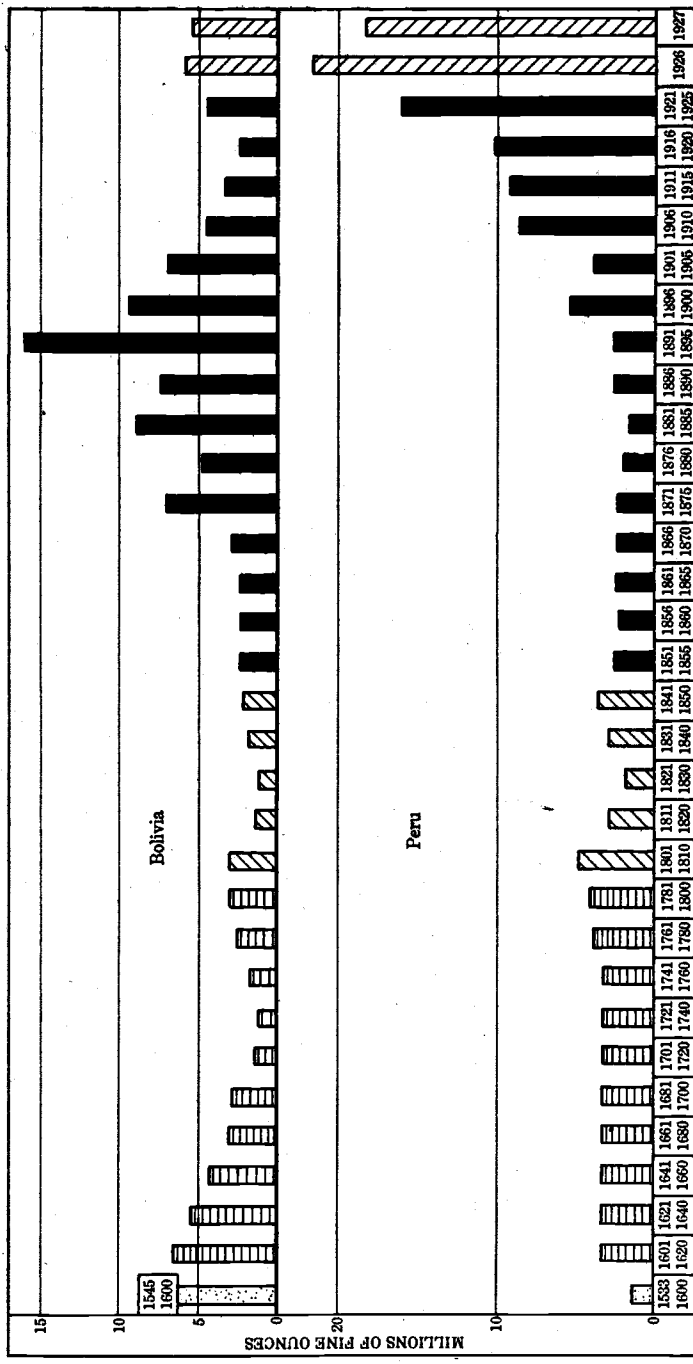

FIGURE 11.—Average annual mine production of silver in Bolivia and Peru from first production to 1600; by 20-year periods, 1601 to 1800; by 10-year periods, 1801 to 1850; by 5-year periods, 1851 to 1925; and for 1926 and 1927

During the 10-year period 1801 to 1810 the rate of production of the previous 20 years was maintained, and 31,000,000 ounces were produced. The revolution against Spanish authority which began in Mexico in 1810, soon spread to South America, and during the second decade of the nineteenth century Bolivia's production dropped to 16,000,000 ounces and further to 14,000,000 ounces in the third decade. It is interesting to note that one result of this revolution was the change of the name of this country from Potosi, South America's greatest silver mine, to Bolivia for Simon Bolivar, South America's greatest revolutionary leader. The recovery from the period of civil strife became apparent in the period 1831 to 1840, when Bolivia produced 20,000,000 ounces. Except for a few temporary recessions production increased regularly until the period 1891 to 1895, when the output exceeded 80,000,000 ounces or 10 per cent of the world total. In the next 25 years there was a rapid drop in production and in 1916 to 1920 only 12,000,000 ounces were taken from Bolivian mines. Since 1921 there has been a partial recovery to about 5,000,000 ounces per year, or 2 per cent of the world total.

TABLE 17.—*Mine production of silver in Bolivia by various periods, 1545–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1545–1600	355, 360, 000	6, 345, 714		1856–1860	11, 770, 000	2, 354, 000	8. 08
1601–1620	132, 400, 000	6, 620, 000		1861–1865	11, 560, 000	2, 312, 000	6. 46
1621–1640	110, 600, 000	5, 530, 000		1866–1870	14, 470, 000	2, 894, 000	6. 52
1641–1660	89, 500, 000	4, 475, 000	35. 92	1871–1875	35, 770, 000	7, 154, 000	10. 69
1661–1680	64, 620, 000	3, 231, 000		1876–1880	24, 651, 517	4, 930, 303	6. 55
1681–1700	59, 740, 000	2, 987, 000		1881–1885	44, 868, 643	8, 973, 729	10. 27
1701–1720	31, 580, 000	1, 579, 000		1886–1890	37, 718, 028	7, 543, 606	6. 69
1721–1740	28, 160, 000	1, 408, 000		1891–1895	80, 328, 227	16, 065, 645	10. 16
1741–1760	37, 420, 000	1, 871, 000	11. 66	1896–1900	47, 391, 100	9, 478, 220	5. 71
1761–1780	53, 370, 000	2, 668, 500		1901–1905	34, 895, 575	6, 979, 115	4. 15
1781–1800	63, 020, 000	3, 151, 000		1906–1910	23, 062, 533	4, 612, 507	2. 33
1801–1810	31, 030, 000	3, 103, 000	10. 83	1911–1915	16, 860, 913	3, 372, 183	1. 61
1811–1820	15, 850, 000	1, 585, 000	9. 14	1916–1920	12, 000, 300	2, 400, 060	1. 32
1821–1830	13, 600, 000	1, 360, 000	8. 86	1921–1925	22, 190, 487	4, 438, 097	2. 00
1831–1840	19, 610, 000	1, 961, 000	9. 94	1926	5, 834, 003	5, 834, 003	2. 30
1841–1850	21, 220, 000	2, 122, 000	8. 38	1927	5, 402, 840	5, 402, 840	2. 15
1851–1855	11, 770, 000	2, 354, 000	7. 59				

BRAZIL

Table 18 shows the production of silver in Brazil since the first discovery in 1691. Virtually all of this silver has been extracted from gold bullion produced in the Minas Geraes region. The Brazilian production has not exceeded two-tenths of 1 per cent of the world total at any time. The production from 1601 to 1882, as given in Table 46 at the end of this paper, was estimated at 10 per cent by weight of the recorded gold production.

TABLE 18.—*Mine production of silver in Brazil by various periods, 1691–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1691–1700	50,000	5,000	----------	1876–1880	24,000	4,800	0.01
1701–1800	2,700,000	27,000	0.15	1881–1885	16,900	3,380	----------
1801–1810	120,000	12,000	.04	1886–1890	20,533	4,107	----------
1811–1820	56,000	5,600	.03	1891–1895	35,800	7,160	----------
1821–1830	71,000	7,100	.05	1896–1900	42,100	8,420	.01
1831–1840	96,000	9,600	.05	1901–1905	54,300	10,860	.01
1841–1850	77,000	7,700	.03	1906–1910	52,300	10,460	.01
1851–1855	35,000	7,000	.02	1911–1915	214,404	42,881	.02
1856–1860	34,000	6,800	.02	1916–1920	127,000	25,400	.01
1861–1865	38,000	7,600	.02	1921–1925	117,779	23,556	.01
1866–1870	28,000	5,600	.01	1926	20,672	20,672	.01
1871–1875	27,000	5,400	.01	1927	20,000	20,000	.01

CHILE

Table 19 and Figure 9 give the production of silver in Chile since the first mineral discovery by the Spaniards in 1693. From this date until the end of the period 1851 to 1855 there was a steady increase in production. During that 5-year period 24,000,000 ounces or 15 per cent of the world total was taken from the mines of Chile. In the 10-year period 1841 to 1850 Peru stood first, Bolivia second, and Chile third among the silver producers of South America. Beginning with 1851 Chile was the leading silver producer of South America for the four 5-year periods until 1870, when Bolivia took the lead and Chile dropped to second place. So great was Chile's yield from 1851 to 1860 that it was exceeded only by that of Mexico and would have continued in second place for another 10-year period had the production of the United States not risen so rapidly. The production for 1861 to 1865 was 15,000,000 ounces, which rose to 25,000,000 ounces in 1886 to 1890. From that time on, production declined regularly until 1911 to 1915 when only 4,000,000 ounces, or less than one-half of 1 per cent of the world silver, was derived from Chilean mines. Since 1915 the increasing output of the great copper mines of Chile has increased the production of silver in Chile, until in 1927 the output was 3,000,000 ounces or a little over 1 per cent of the world total. The opening of the silver mines of Chanarcillo in 1832, the discovery of the great silver deposits of Caracoles in 1870, and the opening of the low-grade copper deposits in very recent years have been among the most important events in Chile's silver-mining history.

TABLE 19.—*Mine production of silver in Chile by various periods, 1693–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1693–1700	20,000	2,500	----------	1866–1870	17,830,000	3,566,000	8.05
1701–1720	40,000	2,000		1871–1875	20,610,000	4,122,000	6.17
1721–1740	643,000	32,150		1876–1880	18,738,337	3,747,667	4.98
1741–1760	964,000	48,200	0.35	1881–1885	25,089,829	5,017,966	5.74
1761–1780	1,608,000	80,400		1886–1890	25,487,919	5,097,584	4.52
1781–1800	3,215,000	160,750		1891–1895	15,335,056	3,067,011	1.94
1801–1810	2,250,000	225,000	.79	1896–1900	18,908,606	3,781,721	2.28
1811–1820	3,220,000	322,000	1.86	1901–1905	13,126,417	2,625,283	1.56
1821–1830	6,430,000	643,000	4.19	1906–1910	4,674,290	934,858	.47
1831–1840	10,610,000	1,061,000	5.38	1911–1915	4,494,464	898,893	.43
1841–1850	15,500,000	1,550,000	6.12	1916–1920	10,027,856	2,005,571	1.10
1851–1855	23,910,000	4,782,000	15.43	1921–1925	15,224,960	3,044,992	1.37
1856–1860	15,850,000	3,170,000	10.91	1926	2,876,911	2,876,911	1.13
1861–1865	15,360,000	3,072,000	8.60	1927	2,900,000	2,900,000	1.15

COLOMBIA

The production of silver in Colombia has been largely a by-product of gold mining. This production, since the first output in 1537, is given in Table 20. During the seventeenth century, when Colombia was the leading gold producer of the world, the silver production was only 1 per cent of the world total. After that time there was a decline in the proportion of the world silver produced in Colombia, followed by a revival during the closing quarter of the nineteenth century. Colombia produced 19,000,000 ounces during the 5-year period 1896 to 1900 or a little over 2 per cent of the world total. Since that time there has been a steady decline in production. The output before 1875 was estimated as equal by weight to that recorded by Soetbeer for gold.

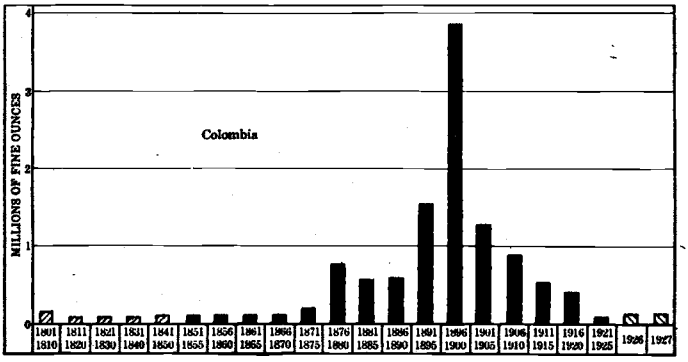

FIGURE 12.—Average annual mine production of silver in Colombia, by 10-year periods, 1801 to 1850; by 5-year periods, 1851 to 1925; and for 1926 and 1927

TABLE 20.—*Mine production of silver in Colombia by various periods, 1537–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1537–1600	4,100,000	64,063		1876–1880	3,867,250	773,450	1.03
1601–1700	11,200,000	112,000	0.88	1881–1885	2,846,595	569,319	.65
1701–1800	15,100,000	151,000	.82	1886–1890	2,972,111	594,422	.53
1801–1810	1,600,000	160,000	.56	1891–1895	7,691,644	1,538,329	.97
1811–1820	1,000,000	100,000	.58	1896–1900	19,323,778	3,864,756	2.33
1821–1830	1,000,000	100,000	.65	1901–1905	6,412,363	1,282,473	.76
1831–1840	1,000,000	100,000	.51	1906–1910	4,484,390	896,878	.45
1841–1850	1,100,000	110,000	.43	1911–1915	2,695,339	539,068	.26
1851–1855	560,000	112,000	.36	1916–1920	2,103,062	420,612	.23
1856–1860	560,000	112,000	.38	1921–1925	512,100	102,420	.05
1861–1865	560,000	112,000	.31	1926	125,953	125,953	.05
1866–1870	560,000	112,000	.25	1927	131,417	131,417	.05
1871–1875	1,000,000	200,000	.30				

ECUADOR

Table 21 records the production of silver in Ecuador. Since the first record of production in 1891 the silver output of Ecuador has increased steadily. In 1927 it totaled 87,601 ounces. The Zaruma district, chiefly known for its gold production, is the principal silver producer.

TABLE 21.—*Mine production of silver in Ecuador by various periods, 1891–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total.	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1891–1895	38,652	7,730		1916–1920	190,000	38,000	0.02
1896–1900	38,670	7,734		1921–1925	365,000	73,000	.03
1901–1905	55,466	11,093	0.01	1926	80,000	80,000	.03
1906–1910	83,974	16,795	.01	1927	87,601	87,601	.03
1911–1915	109,307	21,861	.01				

PERU

When Pizarro conquered Peru in 1532 this country became the first silver producer of South America, and its output up to the present time has been one and one-third billion ounces, or 9 per cent of the world total since 1493. This yield has been exceeded only by those of Mexico, United States, and Bolivia.

The Spanish conquistadores found the Incas a people well started in the metallic phase of civilization. It seems however, that their precious metal wealth was mainly in gold. The Spaniards immediately opened on a large scale the silver mines known to the natives and prospected for others. From 1533 until the close of the century (68 years) 94,000,000 ounces of silver were produced. From 1601 until 1760, according to Soetbeer, the production was maintained at an average rate of three and one-third million ounces a year. During this period the great silver-copper deposit of Cerro de Pasco was discovered in 1630. In 1771 the Hualgayo district was discovered, and production increased until the beginning of the revolutionary period in 1810. Between 1801 and 1810, 49,000,000 ounces of silver were mined in Peru. Production fell to 19,000,000 ounces in 1821 to 1830 and recovered to 35,000,000 ounces by 1841 to 1850. Beginning with the 5-year period 1851 to 1855, which had a production of 12,000,000 ounces, the Peruvian silver output was about 2,000,000 ounces a year until 1894. Except for a recession during the 5-year period 1901 to 1905 there has been a steady increase until the present time. In 1926 and 1927 the output was 21,000,000 and 18,000,000 ounces, respectively. About 1661 Peru took from Bolivia the distinction of being the leading silver producer of the world and held the honor until 1680, when Mexican production forced this country to second place, a position held until 1850, when Chile became the leading silver producer of South America.

The mines of Cerro de Pasco and near-by Morococha have proved to be second only to the Potosi mines as silver producers in South America. These mines mainly produced silver in the early days, but as work was carried deeper copper became the predominant metal. The Cerro de Pasco district, however, continues to produce more than half of Peru's silver and to be by a large margin the principal silver producer of South America. Huarachiri, Hualgayoc, and Santa Lucia are among the other most important Peruvian silver districts at present.

TABLE 22.—*Mine production of silver in Peru by various periods, 1533–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total, fine ounces	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total, fine ounces
1533–1600	94, 360, 000	1, 387, 647	----------	1856–1860	10, 610, 000	2, 122, 000	8. 29
1601–1620	66, 488, 000	3, 324, 400	26. 14	1861–1865	12, 060, 000	2, 412, 000	6. 74
1621–1640	66, 488, 000	3, 324, 400		1866–1870	11, 250, 000	2, 250, 000	5. 07
1641–1660	66, 488, 000	3, 324, 400		1871–1875	11, 250, 000	2, 250, 000	3. 37
1661–1680	66, 488, 000	3, 324, 400		1876–1880	9, 316, 320	1, 863, 264	2. 48
1681–1700	66, 488, 000	3, 324, 400		1881–1885	7, 466, 115	1, 493, 223	1. 70
1701–1720	66, 488, 000	3, 324, 400		1886–1890	12, 253, 868	2, 450, 774	2. 17
1721–1740	66, 488, 000	3, 324, 400		1891–1895	12, 460, 544	2, 492, 109	1. 57
1741–1760	66, 488, 000	3, 324, 400	19. 65	1896–1900	26, 250, 520	5, 250, 104	3. 16
1761–1780	78, 192, 000	3, 909, 600		1901–1905	18, 742, 819	3, 748, 564	2. 23
1781–1800	82, 564, 000	4, 128, 200		1906–1910	42, 729, 522	8, 845, 904	4. 32
1801–1810	48, 640, 000	4, 864, 000	16. 97	1911–1915	45, 308, 333	9, 061, 667	4. 33
1811–1820	28, 290, 000	2, 829, 000	16. 33	1916–1920	50, 451, 145	10, 090, 229	5. 55
1821–1830	18, 650, 000	1, 865, 000	12. 14	1921–1925	80, 467, 637	16, 093, 527	7. 23
1831–1840	28, 940, 000	2, 894, 000	14. 66	1926	21, 499, 798	21, 499, 798	8. 47
1841–1850	34, 720, 000	3, 472, 000	13. 70	1927	18, 295, 408	18, 295, 408	7. 29
1851–1855	12, 380, 000	2, 476, 000	7. 99				

OTHER SOUTH AMERICAN COUNTRIES

The other silver producers of South America are Venezuela, Uruguay, and the Guianas. In Venezuela and the Guianas the principal source of silver has been gold bullion. In Uruguay there has been some intermittent mining for silver and silver-lead ores in recent years. The total production of all these countries has never exceeded five one-hundredths of 1 per cent of the world production for any one year.

EUROPE

Europe has consistently held third place as a silver producer among the continents since the sixteenth century. During that century the European producers held the continent in second place, second only to South America. Before America was discovered, Europe and Japan were producing virtually all of the world's silver. Austria-Hungary and Germany have been the principal European producers.

AUSTRIA-HUNGARY

During the 108-year period 1493 to 1600 Austria-Hungary ranked fourth among the silver producers of the world; but the output of Peru and of Mexico, which ranked second and third, respectively, exceeded the Austrian production of 88,000,000 ounces by only a few million ounces each. Only Bolivia, with a production of 355,000,000 ounces, had greatly exceeded this European rival. The Austrian production was 12 per cent of the world total. With the opening of the seventeenth century there was a sharp drop in the Austrian production, which reached a low point between 1621 and 1660, a period during which the yearly average was a quarter million ounces. Following this there was a period of steady increase, which culminated with an average annual production of nearly a million ounces in the decade 1801 to 1810. For the next 30 years there was a recession to a total output of 6,000,000 ounces in the 10-year period 1831 to 1840. Then followed a period of slow increase to a maximum of

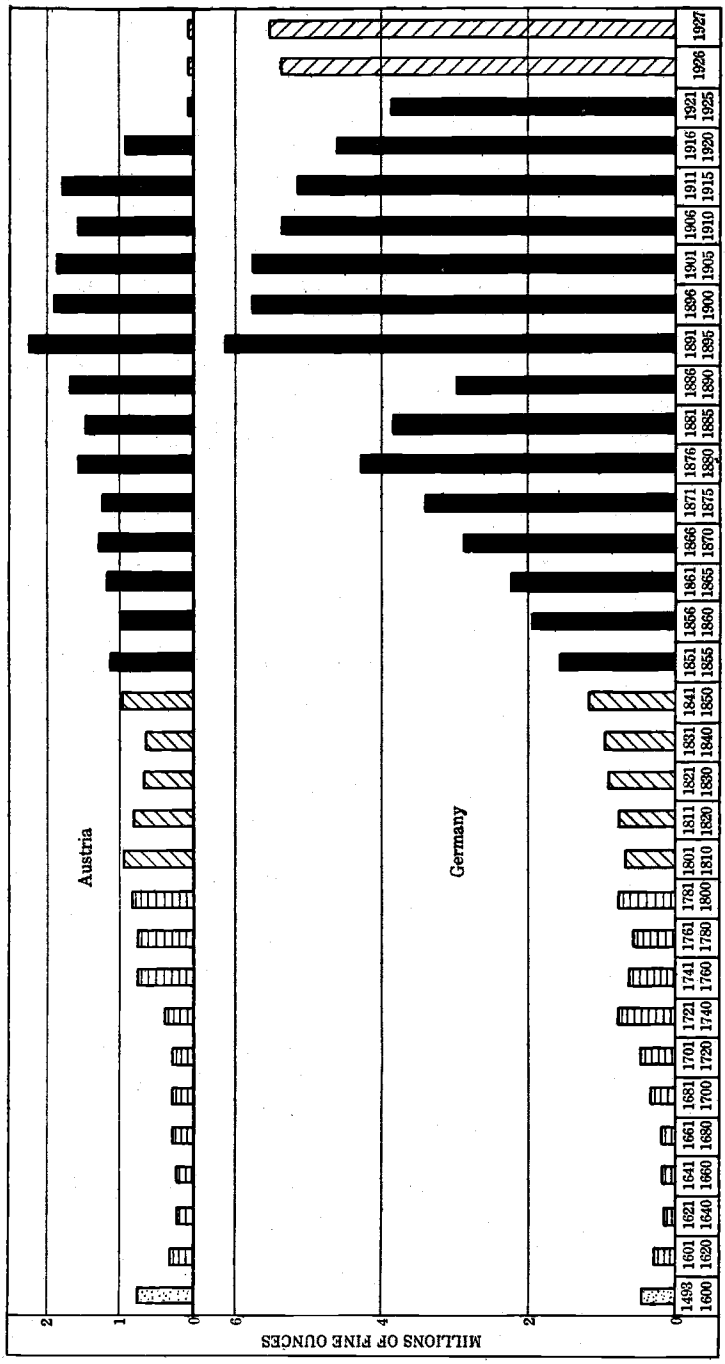

FIGURE 13.—Average annual mine production of silver in Germany and Austria from 1493 to 1600; by 20-year periods, 1601 to 1800; by 10-year periods, 1801 to 1850; by 5-year periods, 1851 to 1925; and for 1926 and 1927

11,000,000 ounces for the 5-year period 1891 to 1895. From 1896 on there was a gradual decline, until the treaty of Versailles terminated the status of Austria-Hungary as an empire and also ended its long record as an important European silver producer. The new Austria lost most of its silver mines to Czechoslovakia, Poland, and Yugoslavia, and Hungary lost all its silver mines to these same countries and Rumania.

Before the partition of the dual monarchy following the World War the principal silver areas of this country were the Bohemia or Pribram and the northern Hungary or Schemnitz and Kremnitz, now all in Czechoslovakia, and the eastern Hungary or Transylvania districts, now in Rumania. The Bohemian mines have been worked for several hundred years—the Kaurzim district has recorded production since 1283 A. D. The mines of Schemnitz and Kremnitz, in northern Hungary, have been producing silver since the thirteenth century. Nagy Banya, Abrudbanya, and Banat of Transylvania have histories antedating the discovery of America. At present the relatively unimportant Kitzbuhel and Rohrerbuchel districts of western Austria are the principal sources of Austrian silver.

TABLE 23.—*Mine production of silver in Austria-Hungary by various periods, 1493–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1493–1600	87,770,000	812,685	11.75	1856–1860	5,100,000	1,020,000	3.50
1601–1620	7,080,000	354,000		1861–1865	5,870,000	1,174,000	3.28
1621–1640	5,140,000	257,000		1866–1870	6,425,000	1,285,000	2.90
1641–1660	5,140,000	257,000	2.38	1871–1875	6,197,000	1,239,400	1.85
1661–1680	6,430,000	321,500		1876–1880	7,838,107	1,567,621	2.08
1681–1700	6,430,000	321,500		1881–1885	7,369,754	1,473,951	1.69
1701–1720	6,430,000	321,500		1886–1890	8,408,416	1,681,683	1.49
1721–1740	8,040,000	402,000		1891–1895	11,209,010	2,241,802	1.42
1741–1760	15,430,000	771,500	3.39	1896–1900	9,532,574	1,906,515	1.15
1761–1780	15,430,000	771,500		1901–1905	9,349,852	1,869,970	1.11
1781–1800	16,720,000	836,000		1906–1910	7,861,004	1,572,201	.79
1801–1810	9,480,000	948,000	3.31	1911–1915	8,828,621	1,765,724	.84
1811–1820	8,040,000	804,000	4.64	1916–1920	4,779,417	955,883	.52
1821–1830	6,750,000	675,000	4.38	1921–1925	85,873	17,175	.01
1831–1840	6,440,000	644,000	3.26	1926	14,050	14,050	.01
1841–1850	9,840,000	984,000	3.87	1927	9,677	9,677	----------
1851–1855	5,630,000	1,126,000	3.63				

FRANCE

The recorded production of silver in France dates from the beginning of the nineteenth century, when 200,000 ounces of silver was produced during the decade, 1801 to 1810. Production rose steadily, until during the 5-year period 1856 to 1860 the French output was 7,000,000 ounces, or almost 5 per cent of the world total. Until 1885 the production continued at about 1,000,000 ounces a year, then followed a sudden doubling of output which continued for a decade. In the period 1896 to 1900 there was a sharp drop to about a half million a year rate, which fell still further during the World War. Since the war France has maintained a production of about a quarter million ounces of silver per year.

There are no large silver producers in France; the production comes from several small western, central-southern, and central-eastern districts.

TABLE 24.—*Mine production of silver in France by various periods, 1801–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1801–1810	200,000	20,000	0.08	1881–1885	4,252,354	850,471	0.97
1811–1820	225,000	22,500	.14	1886–1890	9,727,496	1,945,499	1.73
1821–1830	397,801	39,780	.26	1891–1895	9,603,023	1,920,605	1.21
1831–1840	585,176	58,518	.30	1896–1900	2,447,727	489,545	.29
1841–1850	934,397	93,440	.37	1901–1905	3,067,639	613,528	.36
1851–1855	1,531,147	306,229	.99	1906–1910	3,449,344	689,869	.35
1856–1860	6,965,040	1,393,008	4.79	1911–1915	1,730,871	346,174	.17
1861–1865	5,557,995	1,111,599	3.11	1916–1920	637,136	127,427	.07
1866–1870	6,455,740	1,291,148	2.90	1921–1925	1,243,368	248,674	.11
1871–1875	6,239,655	1,247,931	1.87	1926	261,830	261,830	.10
1876–1880	5,421,511	1,084,302	1.44	1927	308,640	308,640	.12

GERMANY

Since 1493 Germany has produced one-half billion ounces or 3½ per cent of the world's silver, more than any other European country. Table 25 and Figure 13 give the German production since 1493. During the 108-year period, 1493 to 1600, Germany produced 50,000,000 ounces of silver, or almost 7 per cent of the world total. Production declined until in the 20-year period, 1621 to 1640, only 4,000,000 ounces was produced. From that time on the production increased until the maximum of 31,000,000 ounces for any 5-year period was reached in 1891 to 1895. This increase was not at all regular, as can be clearly seen in Figure 13. Since 1895 German production has declined to a low point of 19,000,000 ounces (1921 to 1925) and recovered to the 5,000,000-a-year mark for 1926 and 1927.

TABLE 25.—*Mine production of silver in Germany by various periods, 1493–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1493–1600	50,300,000	465,741	6.73	1856–1860	9,888,000	1,977,600	6.80
1601–1620	6,680,000	334,000		1861–1865	10,983,000	2,196,600	6.14
1621–1640	3,860,000	193,000		1866–1870	14,327,174	2,865,435	6.45
1641–1660	4,180,000	209,000	2.09	1871–1875	16,961,703	3,392,241	5.07
1661–1680	4,500,000	225,000		1876–1880	21,369,359	4,273,872	5.70
1681–1700	7,340,000	367,000		1881–1885	19,188,752	3,837,750	4.40
1701–1720	9,840,000	492,000		1886–1890	14,922,606	2,984,521	2.65
1721–1740	16,200,000	810,000		1891–1895	30,594,484	6,118,897	3.86
1741–1760	13,560,000	678,000	3.63	1896–1900	28,613,645	5,722,729	3.45
1761–1780	11,640,000	582,000		1901–1905	28,686,821	5,737,364	3.43
1781–1800	15,380,000	769,000		1906–1910	26,685,990	5,337,198	2.70
1801–1810	6,720,000	672,000	2.34	1911–1915	25,705,239	5,141,048	2.46
1811–1820	7,620,000	762,000	4.39	1916–1920	22,965,198	4,593,040	2.53
1821–1830	9,070,000	907,000	5.91	1921–1925	19,255,309	3,851,062	1.73
1831–1840	9,580,000	958,000	4.85	1926	5,358,858	5,358,858	2.11
1841–1850	11,570,000	1,157,000	4.57	1927	5,500,000	5,500,000	2.18
1851–1855	7,871,000	1,574,200	5.08				

The Saxon Erzgebirge, the most important silver region in the Old World, has been worked since the tenth century. The mining methods and metallurgical practice developed by the ingenious men of this region have spread throughout the world. In 1702 the School of Mines at Freiburg, Saxony, was established. This school soon became the leading institution of its kind in the world and continues a leader in mining and geological learning. In 1710 the metallurgical works of Freiburg were consolidated. In 1790 barrel amalgamation was introduced at these works, followed by the Augus-

tin process of handling silver ores in 1843, which was in turn superseded by the Ziervogel process in 1848. The Freiburg district is credited with 169,000,000 ounces of silver produced between 1163 and 1896.

The Harz Mountains district was discovered or rediscovered in 1520, and its silver production since that time has been second only to that of the Saxon Erzgebirge. In the Harz area silver is derived from the lead-silver mines of Clausthal and St. Andreasberg and the copper mines of Mansfeld and Rammelsberg.

Cologne and Coblenz in Rhenish Prussia produce silver-lead and silver-lead-zinc ores. The zinc-lead-silver area of Upper Silesia was an important contributor to German silver production until at the close of the World War it was included in the territory ceded to Poland and has since become the principal source of silver production in Poland.

GREECE

In 1860 a French company began reopening the famed Greek silver-lead deposits of Laurium, which had lain idle for 21 centuries. By 1866 the operations were under way, and during the 5-year period, 1866 to 1870, over 3,000,000 ounces of silver or 1½ per cent of the world total was produced. The output at first was derived solely from the smelting of slag left by the ancients; but the old mines were reopened as the work progressed and some silver was mined from veins discovered and worked for the first time by the French company.

Production was increased slowly to a maximum of almost 6,000,000 ounces for the 5-year period 1896 to 1900. Since this time the yield has sunk to a point below the million-ounce mark for the period 1921 to 1925. A slight recovery is indicated by the production in 1926 and 1927, 250,000 ounces a year. The Greek production of silver from 1866 to 1895 was calculated at 72 ounces per short ton of lead produced during that period. Table 26 and Figure 14 show production in Greece since 1866.

TABLE 26.—*Mine production of silver in Greece by various periods, 1866–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1866–1870	3,250,000	650,000	1.47	1901–1905	4,490,465	898,093	0.53
1871–1875	3,600,000	720,000	1.08	1906–1910	4,197,639	839,528	.24
1876–1880	3,460,000	692,000	.92	1911–1915	3,594,178	718,836	.34
1881–1885	3,680,000	736,000	.84	1916–1920	1,255,950	251,190	.13
1886–1890	5,150,000	1,030,000	.91	1921–1925	976,170	195,234	.09
1891–1895	5,508,082	1,101,616	.70	1926	254,274	254,274	.10
1896–1900	5,770,229	1,154,046	.70	1927	241,125	241,125	.10

ITALY

Table 27 gives the production of silver in Italy since 1841, and Figure 14 illustrates the same thing since 1851. Before 1841 there had been silver mining in Italy since early Roman times, but there is good evidence that this early work yielded little silver as judged by modern standards. In 1841 a mining revival was started in Italy, which spread to Sardinia a few years later. In the decade 1841 to 1850, 50,000 ounces was produced. A rapid increase followed, which raised the Italian production to a record—not equaled before nor since—of 5,000,000 ounces for the 5-year period 1881 to 1885.

During this period Italy produced a little over 1 per cent of the world's total silver output. Since 1885 there has been a rather regular decline, until for the 5-year period 1921 to 1925 only 1,500,000

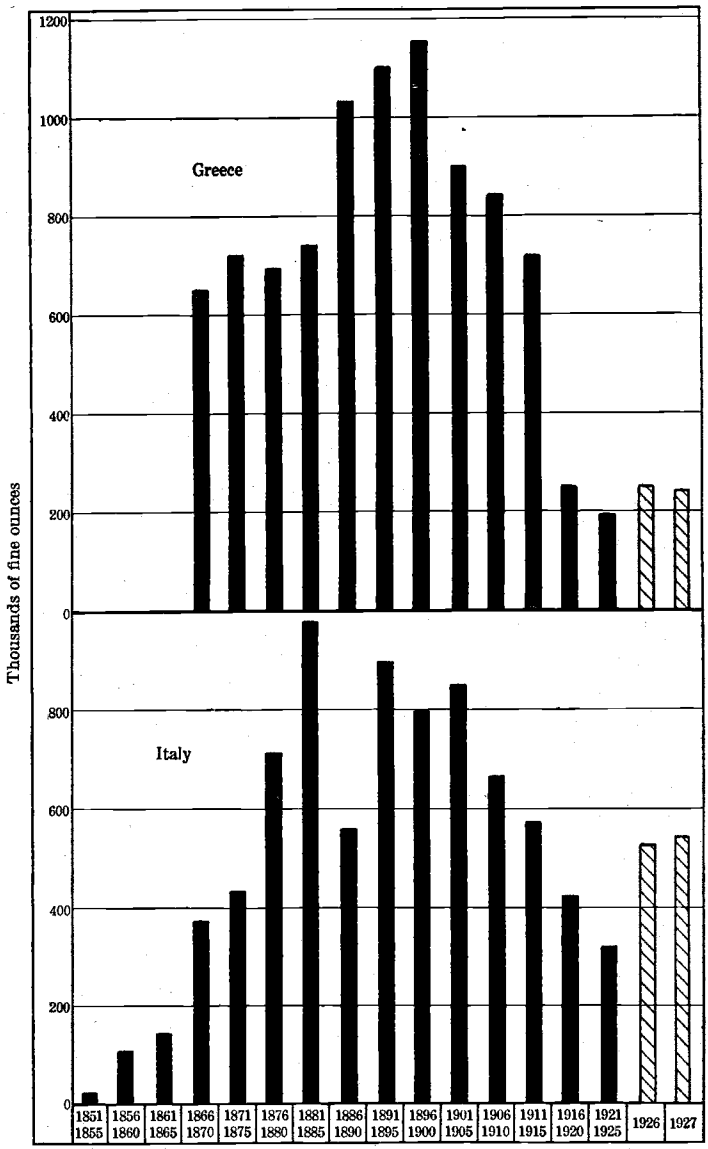

FIGURE 14.—Average annual mine production of silver for Greece and Italy by 5-year periods, 1851 to 1925, and for 1926 and 1927

ounces of silver was produced in Italy. During 1926 and 1927 a half-million-ounce-a-year rate has been maintained.

In continental Italy the Florentine area, where silver-lead ore is mined, is the most important silver producer. With the beginning

of the second half of the nineteenth century the mines of Sardinia began to produce, as the districts of Montevecchio and Monteponi were opened in 1849 and 1851. In 1866 the Malfidano district was opened, and five years later the silver mines of Iglesias began to produce. The first three of these Sardinian areas are silver-lead-zinc deposits.

TABLE 27.—*Mine production of silver in Italy by various periods, 1841–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1841–1850	50,000	5,000	0.02	1891–1895	4,515,256	903,051	0.57
1851–1855	120,000	24,000	.08	1896–1900	3,988,254	797,651	.48
1856–1860	530,000	106,000	.36	1901–1905	4,250,561	850,112	.51
1861–1865	702,000	140,400	.39	1906–1910	3,340,326	668,065	.34
1866–1870	1,858,000	371,600	.84	1911–1915	2,874,446	574,889	.27
1871–1875	2,165,000	433,000	.65	1916–1920	2,120,452	424,090	.23
1876–1880	3,598,000	719,600	.96	1921–1925	1,607,565	321,513	.14
1881–1885	4,938,597	987,719	1.13	1926	519,351	519,351	.20
1886–1890	2,762,745	552,549	.49	1927	537,098	537,098	.21

NORWAY

In 1623 the great silver deposit of Kongsberg was discovered and production started the following year. During the 177-year period 1624 to 1800, 25,000,000 ounces of silver were produced. Table 28 shows the production of Norway from the discovery of Kongsberg until the present. There was a rapid drop during the first three decades of the nineteenth century to less than 300,000 ounces for the decade 1821 to 1830. From 1831 on there was an irregular rise, culminating in an average annual production of over 325,000 ounces for each of the 5-year periods between 1911 and 1925. During 1926 and 1927 this rate of production nearly has been maintained.

TABLE 28.—*Mine production of silver in Norway by various periods, 1624–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1624–1700	10,970,000	142,468		1876–1880	687,898	137,580	0.18
1701–1800	14,250,000	142,500	0.78	1881–1885	962,496	192,499	.22
1801–1810	820,000	82,000	.29	1886–1890	906,008	181,202	.16
1811–1820	320,000	32,000	.18	1891–1895	817,822	163,564	.10
1821–1830	286,000	28,600	.19	1896–1900	863,288	172,658	.10
1831–1840	2,112,143	211,214	1.07	1901–1905	1,073,258	214,652	.13
1841–1850	1,947,853	194,785	.77	1906–1910	1,046,277	209,255	.11
1851–1855	531,130	106,226	.34	1911–1915	1,642,835	328,567	.16
1856–1860	1,029,949	205,990	.71	1916–1920	1,640,192	328,038	.18
1861–1865	531,130	106,226	.30	1921–1925	1,628,333	325,667	.15
1866–1870	579,999	116,000	.26	1926	308,640	308,640	.12
1871–1875	582,571	116,514	.17	1927	321,821	321,821	.13

RUSSIA

In this paper the silver production of Russia has not been segregated between European and Asiatic Russia. The major part of the Russian silver has been mined in European Russia, and therefore all Russia has been placed among the European countries. This has been partly compensated by including in the Asiatic total the total output of Turkey, part of which came from the Balkan area.

Table 29 shows the Russian silver production since 1741. During the 60-year period 1741 to 1800 Russia produced 31,000,000 ounces of silver. The rate of production increased until during the decade 1821 to 1830 the country attained its peak output of 7,500,000 ounces, or almost 5 per cent of the world total. After that time there was a slow and rather regular decline, until during the 5-year period 1906 to 1910 less than 750,000 ounces were produced. There was a sudden recovery, which nearly tripled production, during the next two 5-year periods, due to the development of the silver-bearing deposits, of which the copper deposits of the Urals and the Kirghis Steppes were the most important. There was a marked recession during the early years of the Bolshevist régime, followed by a rise during 1926 and 1927. The silver recovered from the gold bullion of Siberia, that obtained from the copper ores of the Caucasus Mountains area, and the silver from the silver-lead mines of southern Finland are the principal sources other than the Ural and Kirghis Steppes regions.

TABLE 29.—*Mine production of silver in Russia by various periods 1741–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1741–1800	31, 125, 000	518, 750		1881–1885	1, 629, 175	325, 835	0. 37
1801–1810	6, 478, 000	647, 800	2. 26	1886–1890	1, 896, 410	379, 282	.34
1811–1820	7, 321, 000	732, 100	4. 22	1891–1895	1, 913, 799	382, 760	.24
1821–1830	7, 478, 000	747, 800	4. 87	1896–1900	1, 208, 263	241, 653	.15
1831–1840	6, 626, 000	662, 600	3. 36	1901–1905	871, 519	174, 304	.10
1841–1850	6, 274, 000	627, 400	2. 48	1906–1910	703, 181	140, 636	.07
1851–1855	2, 758, 000	551, 600	1. 78	1911–1915	1, 915, 637	383, 127	.18
1856–1860	2, 794, 000	558, 800	1. 92	1916–1920	1, 900, 000	380, 000	.21
1861–1865	2, 770, 000	554, 000	1. 55	1921–1925	882, 900	176, 580	.08
1866–1870	2, 619, 000	523, 800	1. 18	1926	250, 000	250, 000	.10
1871–1875	1, 848, 000	369, 600	.55	1927	321, 500	321, 500	.13
1876–1880	1, 821, 565	364, 313	.48				

SPAIN (INCLUDING PORTUGAL)

So great was the metallic wealth of the Spanish possessions in the Western Hemisphere that the domestic mines were allowed to lie virtually idle until the opening of the nineteenth century. In the decade 1801 to 1810 there was a revival of mining in Spain, which was retarded during the second decade of the century by the Napoleonic wars and the general revolt of the Spanish colonies in the New World. In the decade 1821 to 1830, 3,500,000 ounces of silver were mined in Spain. The output was rapidly increased, until during the 5-year period 1851 to 1855, Spain produced 8,000,000 ounces, or 5 per cent of the world total. Exhaustion of the first rich discoveries reduced production to 3,000,000 ounces in the 5-year period 1861 to 1865. Following that time there was a fairly regular increase, until a maximum of 23,000,000 ounces were produced during the 5-year period 1911 to 1915. Lack of transportation for the argentiferous lead ores, which supplied the major portion of the silver, reduced production during the World War period. Spanish ores always have been smelted largely abroad. Since the war the production has remained at about the war-time level.

The principal silver producers of Spain are the silver-lead mines of southeastern Spain; the Linares, La Carolina, Murcia, Guadalcanal,

and Gador districts; and the cuprous pyrite deposits of the Rio Tinto district. Spain has been among the leading lead producers of the world and has led the world in the production of pyrite for many years. Spain affords a good example of by-product silver production.

TABLE 30.—*Mine production of silver in Spain by various periods, 1801–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1801–1810	500,000	50,000	0.17	1881–1885	10,031,193	2,006,239	2.30
1811–1820	200,000	20,000	.12	1886–1890	8,601,997	1,720,399	1.53
1821–1830	3,500,000	350,000	2.28	1891–1895	10,562,879	2,112,576	1.33
1831–1840	3,750,000	375,000	1.90	1896–1900	16,172,376	3,234,475	1.95
1841–1850	12,540,000	1,254,000	4.95	1901–1905	20,649,220	4,129,844	2.46
1851–1855	8,040,000	1,608,000	5.19	1906–1910	21,650,762	4,330,152	2.19
1856–1860	3,250,000	650,000	2.23	1911–1915	23,068,280	4,613,656	2.20
1861–1865	2,922,535	584,507	1.63	1916–1920	15,055,038	3,011,008	1.65
1866–1870	4,248,078	849,616	1.92	1921–1925	14,419,598	2,883,920	1.30
1871–1875	3,833,783	766,757	1.15	1926	3,000,656	3,000,656	1.18
1876–1880	11,937,571	2,387,514	3.17	1927	3,056,565	3,056,565	1.22

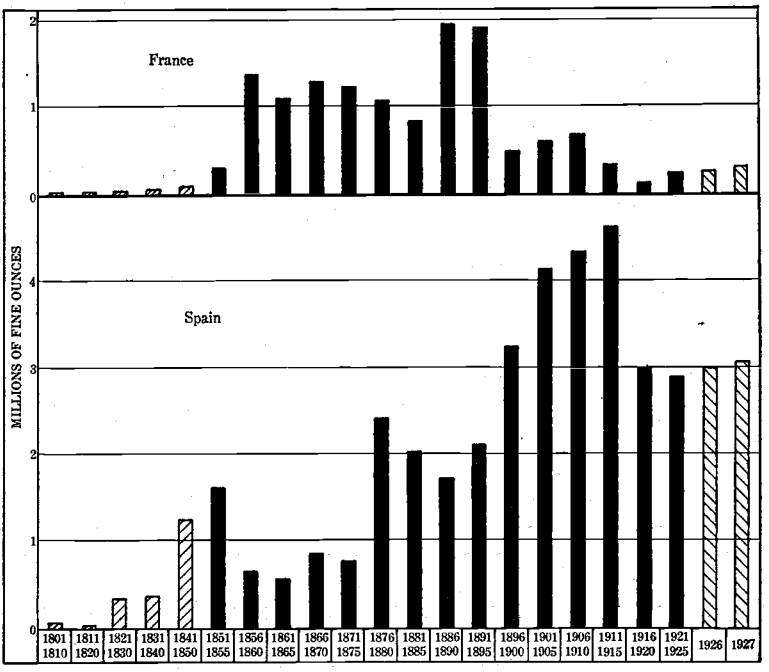

FIGURE 15.—Average annual mine production of silver for Spain and France by 10-year periods, 1801 to 1850; 5-year periods, 1851 to 1925; and for 1926 and 1927

SWEDEN

Table 31 gives the silver production of Sweden since 1493. The principal producer since the fourteenth century has been the Sala silver-lead district. Recently copper ores have accounted for some by-product silver. The production rate has been more nearly constant in Sweden than in any other country.

TABLE 31.—*Mine production of silver in Sweden by various periods, 1493–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1493–1600	3,632,166	33,631	0.49	1876–1880	203,035	40,607	0.05
1601–1700	1,952,450	19,525	.15	1881–1885	270,099	54,020	.06
1701–1800	1,173,759	11,738	.06	1886–1890	707,445	141,489	.13
1801–1810	126,899	12,690	.04	1891–1895	393,338	78,668	.05
1811–1820	126,899	12,690	.07	1896–1900	239,497	47,899	.03
1821–1830	180,719	18,072	.12	1901–1905	182,796	36,559	.02
1831–1840	260,260	26,026	.13	1906–1910	147,060	29,412	.01
1841–1850	355,748	35,575	.14	1911–1915	168,735	33,747	.02
1851–1855	203,482	40,696	.13	1916–1920	147,481	29,496	.02
1856–1860	178,372	35,674	.12	1921–1925	69,952	13,990	.01
1861–1865	181,491	36,298	.10	1926	80,375	80,375	.03
1866–1870	190,557	38,111	.09	1927	80,375	80,375	.03
1871–1875	125,356	25,071	.04				

UNITED KINGDOM

Table 32 gives the production of the United Kingdom since 1701. There was a rapid and steady rise in production until the 5-year period 1866 to 1870 when almost 4,000,000 ounces, or almost 2 per cent of the world silver, was produced in this country. The exhaustion of the silver deposits caused a decline even more rapid than the rise of production. During the 5-year period 1921 to 1925 the average annual production was 27,000 ounces a year, lower than at any time since the eighteenth century. The silver deposits are scattered in the northern England, northern Wales, and Cornwall-Devonshire areas.

TABLE 32.—*Mine production of silver in United Kingdom by various periods, 1701–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1701–1800	1,000,000	10,000	0.05	1881–1885	1,457,929	291,586	0.33
1801–1810	500,000	50,000	.17	1886–1890	1,534,619	306,924	.27
1811–1820	700,000	70,000	.40	1891–1895	1,155,938	231,188	.15
1821–1830	900,000	90,000	.59	1896–1900	1,114,277	222,855	.13
1831–1840	1,100,000	110,000	.56	1901–1905	796,899	159,380	.09
1841–1850	1,700,000	170,000	.67	1906–1910	688,000	137,600	.07
1851–1855	2,670,000	534,000	1.72	1911–1915	610,590	122,118	.06
1856–1860	2,843,764	568,753	1.95	1916–1920	386,407	77,281	.04
1861–1865	3,256,545	651,309	1.82	1921–1925	137,183	27,437	.01
1866–1870	3,899,863	779,973	1.76	1926	41,345	41,345	.02
1871–1875	2,918,122	583,624	.87	1927	46,714	46,714	.02
1876–1880	2,007,460	401,492	.53				

OTHER EUROPEAN COUNTRIES

The other silver producers of Europe are Czechoslovakia, Poland, Portugal, Rumania, and Yugoslavia. Portugal, which has never had more than a nominal production, has been included with Spain. Rumanian production comes almost entirely from the area acquired from Hungary after the World War. This area, Transylvania, contains the Nagy Banya, Abrudbanya, and Banat districts, all important producers while in the Austro-Hungarian Empire. Yugoslavia produces a little silver from the Serbian area. The other two countries, Czechoslovakia and Poland, came into existence only at the close of the war. Czechoslovakia derives its silver principally from the

Pribram district in Bohemia and the Schemnitz-Kremnitz district north of Budapest. Polish silver is almost entirely the by-product of the zinc-lead-silver mines of what was formerly German Upper Silesia.

ASIA

Asia is one of the minor producers of silver. The long record of Japan and the recent production from India are the most important factors in Asiatic silver production.

INDIA

In former times, when gold bullion was the only source of silver, the silver production has been estimated at 7.5 per cent by weight of

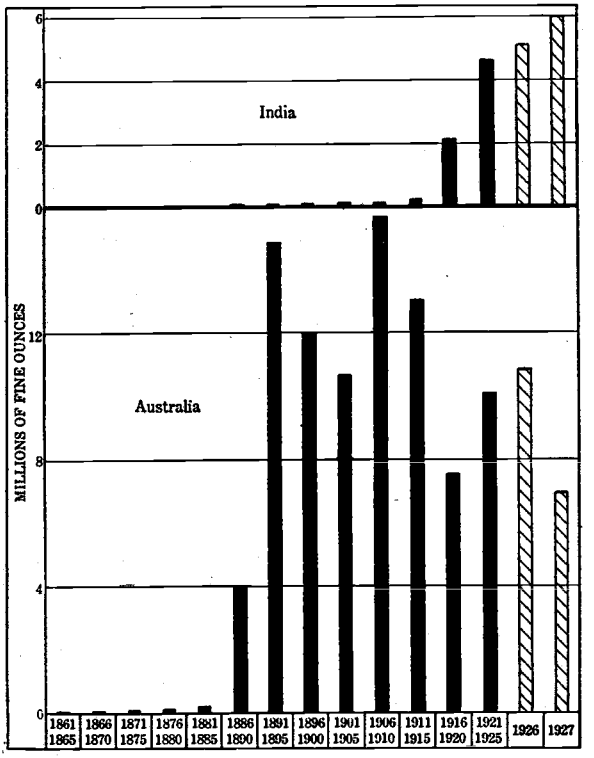

FIGURE 16.—Average annual mine production of silver for India and Australia by 5-year periods, 1861 to 1925, and for 1926 and 1927

the gold production. It was not until the development of the Bawdwin silver-lead-zinc district in the Northern Shan States of Upper Burma that India became an important producer of silver. For centuries the Chinese had extracted silver from the deposits of this region, but it was only with the advent of occidental methods that this district became important. In 1910 the Indian silver production started to increase rapidly and passed the mark of 6,000,000 ounces a year in 1927. Table 33 and Figure 16 give the production of silver in India since 1886.

TABLE 33.—*Mine production of silver in India by various periods, 1886–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1886–1890	16,000	3,200		1911–1915	843,850	168,770	0.08
1891–1895	66,000	13,200	0.01	1916–1920	10,602,501	2,120,500	1.16
1896–1900	141,000	28,200	.02	1921–1925	22,859,083	4,571,817	2.04
1901–1905	196,000	39,200	.02	1926	5,124,962	5,124,962	2.02
1906–1910	197,180	39,436	.02	1927	6,024,806	6,024,806	2.40

JAPAN

The production of Japan is given since 1493 in Table 34 and illustrated graphically since 1801 in Figure 17. The production for the first three centuries is based on the Japanese silver exports carried by Portuguese, Dutch, and English traders. These figures may therefore include production of earlier time, which had been held until the Portuguese opened the far-eastern trade routes during the fifteenth century. During the 108-year period 1493 to 1600 the production is estimated at 25,000,000 ounces and for the following century 75,000,000 ounces. At the close of the seventeenth century Japan closed her ports to all foreigners, and until 1854 when Commodore Perry negotiated a trade treaty between the United States and Japan there was very little recorded silver production. From the date of this treaty there was a rapid revival of silver mining, which culminated in a production of 29,000,000 ounces, or over 3 per cent of the world silver, in the 5-year period 1916 to 1920. Since 1920 there has been a slight decline to a production between four and five million ounces a year.

The oldest Japanese silver operation of which there is any record is the Sasu mine in Tsushima, which was discovered in 674 A. D. During the ninth century the famous silver mines known as the Handa, Ikuno, and Hosokura were discovered. Of late years the Tsubaki and Kosaka mines have been the principal sources of silver. The first is a silver-lead-zinc mine and the second a silver-copper property. Argentiferous lead ores have been the principal source of silver in Japan during the twentieth century, followed in turn by copper and dry and siliceous ores, but in very recent years the rapid rise of copper production has brought cooper ores to the fore.

TABLE 34.—*Mine production of silver in Japan by various periods, 1493–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1493–1600	25,000,000	231,481	3.35	1876–1880	1,578,613	315,723	0.42
1601–1700	75,000,000	750,000	5.90	1881–1885	3,300,338	660,068	.75
1701–1800	1,000,000	10,000	.05	1886–1890	6,183,071	1,236,614	1.10
1801–1810	100,000	10,000	.03	1891–1895	9,144,331	1,828,866	1.15
1811–1820	100,000	10,000	.06	1896–1900	9,195,685	1,839,137	1.10
1821–1830	100,000	10,000	.07	1901–1905	10,086,237	2,017,247	1.21
1831–1840	100,000	10,000	.05	1906–1910	18,203,486	3,640,697	1.84
1841–1850	100,000	10,000	.04	1911–1915	23,998,370	4,799,674	2.30
1851–1855	75,000	15,000	.05	1916–1920	29,360,648	5,872,130	3.22
1856–1860	100,000	20,000	.07	1921–1925	20,049,135	4,009,827	1.80
1861–1865	150,000	30,000	.08	1926	4,776,110	4,776,110	1.88
1866–1870	200,000	40,000	.09	1927	4,800,000	4,800,000	1.91
1871–1875	475,000	95,000	.14				

NETHERLAND EAST INDIES

Table 35 gives the production of silver in the Netherland East Indies since 1900. The production has increased very rapidly since that year and passed the 2,000,000-ounce mark in 1924. Virtually all of this silver comes from the gold-silver mines of the Benkoelen district on the west coast of Sumatra.

TABLE 35.—*Mine production of silver in Netherland East Indies by various periods, 1900–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1900	80, 659	80, 659		1916–1920	4, 120, 774	824, 155	0. 45
1901–1905	778, 519	155, 704	0. 09	1921–1925	8, 178, 906	1, 635, 781	. 74
1906–1910	2, 087, 607	417, 521	. 21	1926	2, 363, 829	2, 363, 829	. 93
1911–1915	2, 197, 940	439, 588	. 21	1927	2, 285, 801	2, 285, 801	. 91

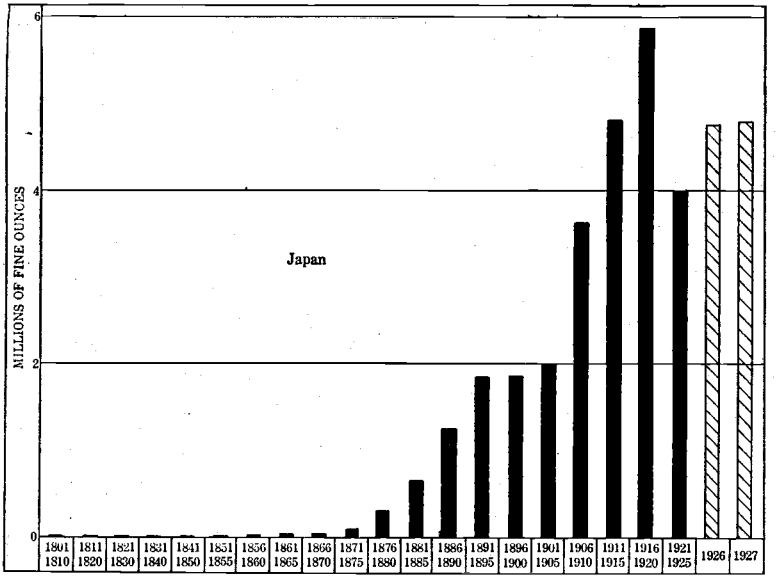

FIGURE 17.—Average annual mine production of silver for Japan by 10-year periods, 1801 to 1850; by 5-year periods, 1851 to 1925; and for 1926 and 1927

TURKEY

Table 36 gives the silver production in Turkey since 1851. There are no available records before that date, but it is improbable that the output was important. From an average annual production of over a third of a million ounces a year between 1851 and 1860 the output fell to less than a quarter of a million ounces for the whole 5-year period 1886 to 1890. After that period there was a rapid rise until almost 8,000,000 ounces was produced during the 5-year period 1911 to 1915. The World War crippled the industry, and it has not yet even approached the pre-war production figures. The silver deposits are in Asia Minor and include the Bulghar Maden silver district, the Balia Karaidin silver-lead-zinc district, and some small argentiferous copper deposits in the Caucasus Mountains.

TABLE 36.—*Mine production of silver in Turkey by various periods, 1851–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1851–1855	1,780,000	356,000	1.15	1896–1900	793,805	158,761	0.10
1856–1860	1,780,000	356,000	1.22	1901–1905	1,971,135	394,227	.23
1861–1865	1,500,000	300,000	.84	1906–1910	3,548,988	709,798	.36
1866–1870	500,000	100,000	.23	1911–1915	7,754,428	1,550,886	.74
1871–1875	250,000	50,000	.08	1916–1920	1,500,000	300,000	.16
1876–1880	260,534	52,107	.07	1921–1925	555,886	111,177	.05
1881–1885	252,446	50,489	.06	1926	225,050	225,050	.09
1886–1890	212,675	42,535	.04	1927	225,050	225,050	.09
1891–1895	920,466	184,093	.12				

OTHER COUNTRIES OF ASIA

China, Chosen, Indo-China, the Philippine Islands, and Taiwan have all contributed minor quantities of silver to the world total. China has undoubtedly produced silver in small quantities since before the Christian era, but records are entirely lacking, and even to-day the Chinese production is largely an estimate. Since 1913, when the first reliable estimates were made, China has produced 1,000,000 ounces of silver. In Chosen and Taiwan the production of silver has been largely the result of Japanese initiative since these countries have come under the control of Japan. The first production in Taiwan is recorded in 1907 and in Chosen in 1910. In Indo-China production, which started in 1903, has been very small. The silver produced in the Philippine Islands has been derived almost exclusively from the gold ores of the island. The date of the first silver output is 1907.

AFRICA

Africa has long been the least important of all continents as a silver producer. Since 1493 it has contributed only one-fourth of 1 per cent of the world silver, and in 1927 its output was only one-half of 1 per cent of the world total.

ALGERIA

Table 37 shows the silver production of Algeria since 1896. The silver-lead and silver-lead-zinc deposits have yielded increasing amounts of silver, but during no 5-year period has this production equaled one-tenth of 1 per cent of the world total.

TABLE 37.—*Mine production of silver in Algeria by various periods, 1896–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1896–1900	42,084	8,417	0.01	1916–1920	791,626	158,325	0.09
1901–1905	45,559	9,112	.01	1921–1925	502,192	100,438	.05
1906–1910	288,231	57,646	.03	1926	169,141	169,141	.07
1911–1915	673,775	134,755	.06	1927	118,087	118,087	.05

RHODESIA

Production of silver in Rhodesia started in 1900. Table 38 shows the output from that date to 1927. Since 1906 this country has produced about 1,000,000 ounces of silver every 5-year period. The silver-lead-zinc deposit of Broken Hill has been the principal producer in Rhodesia.

TABLE 38.—*Mine production of silver in Rhodesia by various periods, 1900–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1900	951	951		1916–1920	933,878	186,776	0.10
1901–1905	186,716	37,343	0.02	1921–1925	1,066,996	213,399	.10
1906–1910	1,021,089	204,218	.10	1926	117,763	117,763	.05
1911–1915	842,589	168,518	.08	1927	131,585	131,585	.05

UNION OF SOUTH AFRICA

Table 39 gives the production of silver for the Union of South Africa since it was begun in 1886. Production before 1901 has been estimated at 0.11 ounce of silver per ounce of gold produced. Virtually all of this silver has been obtained from the refining of the Witwatersrand gold bullion. This deposit, however, is very low in silver; therefore, silver production in the Union of South Africa has only just passed one-half of 1 per cent of the world total for any year so far. The Union of South Africa is credited with the entire output of South Africa before the Boer War and the present output of all the British possessions of South Africa except Rhodesia.

TABLE 39.—*Mine production of silver in Union of South Africa by various periods, 1886–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1886–1890	117,000	23,400	0.02	1911–1915	4,724,378	944,876	0.46
1891–1895	757,000	151,400	.10	1916–1920	4,567,108	913,422	.50
1896–1900	1,384,000	276,800	.16	1921–1925	5,881,058	1,176,212	.53
1901–1905	1,457,050	291,410	.17	1926	982,594	982,594	.39
1906–1910	3,807,838	761,568	.39	1927	1,013,070	1,013,070	.40

OTHER AFRICAN COUNTRIES

Very small amounts of silver have been reported from the other countries of Africa. The most important are German Southwest Africa (included under Union of South Africa since 1914) and the Belgian Congo. The areas under French, Portuguese, Italian, and Spanish control, as well as independent Ethiopia and British-controlled Egypt and Sudan, have produced almost no silver so far. From the early years of the twentieth century until the British invasion of 1914 the Germans produced a small amount of silver from the mines at Otavi, Southwest Africa. There is some silver produced as a by-product from the copper mines of Katanga.

AUSTRALASIA

Since the first recorded production of silver in 1861 Australasia has produced a half billion ounces, or 3 per cent of the world silver since 1493. There are only two producing countries—Australia and New Zealand.

AUSTRALIA

Table 40 and Figure 16 give the silver production of Australia since 1861. During the first 24 years (until 1885) the silver came largely from gold bullion and very small silver mines. In 1883 the

Broken Hill deposit, the greatest single lode of silver-lead-zinc ore that the modern world has ever seen, was discovered, and by 1885 its production began to be important. During the 5-year period 1881 to 1885 the million-ounce mark was passed followed by 20,000,000 ounces in the period 1886 to 1890 and 74,000,000 ounces in the period 1891 to 1895. Since 1895 a maximum of 79,000,000 ounces were produced during the 5-year period 1906 to 1910 and a minimum of 38,000,000 ounces during the war period 1916 to 1920. Production declined to little over 2,000,000 ounces in 1920, subsequently increased to 13,000,000 ounces in 1923, and then decreased to 7,000,000 ounces in 1927.

Although Broken Hill has been by far the greatest silver producer in Australia the copper deposit at Great Cobar, New South Wales, and the Mount Lyell silver-lead-zinc deposit and the Zeehan silver-lead deposit, Tasmania, also produce large amounts. Very large silver reserves have been blocked out at the Mount Isa silver-lead-zinc mine of Queensland, and an important silver yield is expected from the Read-Roseberry silver-lead-zinc field of Tasmania. Large-scale production from these ore bodies is expected in the fourth decade of the present century.

TABLE 40.—*Mine production of silver in Australia by various periods, 1861–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1861–1865	10,000	2,000	0.01	1901–1905	53,101,868	10,620,274	6.31
1866–1870	22,973	4,595	.01	1906–1910	78,729,141	15,745,828	7.95
1871–1875	374,538	74,908	.11	1911–1915	65,050,415	13,010,083	6.21
1876–1880	451,780	90,356	.12	1916–1920	37,526,403	7,505,281	4.12
1881–1885	1,181,738	236,348	.27	1921–1925	49,999,092	9,999,818	4.50
1886–1890	19,807,012	3,961,402	3.51	1926	10,800,073	10,800,073	4.25
1891–1895	74,314,559	14,862,912	9.39	1927	6,887,280	6,887,280	2.74
1896–1900	59,842,712	11,968,542	7.21				

NEW ZEALAND

Table 41 gives the production of silver in New Zealand since 1869. Silver has never been an important product of the mines of New Zealand. The highest yield was during the 5-year period 1906 to 1910, when 8,000,000 ounces of silver was produced. Virtually all of the silver has been a by-product of gold mining, and the Hauraki district has been the most important producing area.

TABLE 41.—*Mine production of silver in New Zealand by various periods, 1869–1927*

Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total	Period	Quantity, fine ounces	Average annual production, fine ounces	Per cent of world total
1869–1870	48,186	24,093	----------	1901–1905	4,431,449	886,290	0.53
1871–1875	223,174	44,635	0.07	1906–1910	8,209,540	1,641,908	.83
1876–1880	110,240	22,048	.03	1911–1915	4,644,527	928,905	.44
1881–1885	82,943	16,589	.02	1916–1920	2,980,780	596,156	.33
1886–1890	90,052	18,010	.02	1921–1925	2,277,676	455,535	.20
1891–1895	208,853	41,771	.02	1926	425,287	425,287	.17
1896–1900	842,949	168,599	.10	1927	427,358	427,358	.17

GENERAL SUMMARY

The world production of silver from 1493 to 1927 has totaled fourteen and one-third billion ounces. The rate of production has increased steadily since 1493. During the 108-year period 1493 to 1600 the production was 747,000,000 ounces, less than the production for 1925, 1926, and 1927. For the century 1601 to 1700, 1,272,000,000 ounces were produced, or less than the production from 1922 to 1927, and for the century 1701 to 1800 the production was 1,833,000,000 ounces, or less than the figure for 1919 to 1927. The total world production from 1493 to 1800, a period of 308 years, was 3,852,000,000 ounces, or less than the production from 1909 to 1927, a period of 19 years. Since 1888 more silver has been produced in the world than in the period 1493 to 1887; in other words, the production of 396 years has been exceeded by the production of the last 39 years. The increasing rate of production is illustrated in the following table, which gives the relation of the length of various periods and their productions to the total time (435 years) and the total production (14,357,000,000 ounces), respectively, since the discovery of America.

TABLE 42.—*World production of silver for various periods and their relative importance*

Period	Length of period, years	Production, ounces	Percentages		Cumulative			Inverted cumulative		
			Time	Production	Time	Percentages		Time	Percentages	
						Time	Production		Time	Production
1493–1600	108	747,000,000	24.9	5.2	108	24.9	5.2	435	100.0	100.0
1601–1700	100	1,272,000,000	23.0	8.9	208	47.9	14.1	327	75.1	94.8
1701–1800	100	1,833,000,000	23.0	12.8	308	70.9	26.9	227	52.1	85.9
1801–1850	50	1,064,000,000	11.5	7.4	358	82.4	34.3	127	29.1	73.1
1851–1875	25	1,036,000,000	5.7	7.2	383	88.1	41.5	77	17.6	65.7
1876–1900	25	2,999,000,000	5.7	20.9	408	93.8	62.4	52	11.9	58.5
1901–1910	10	1,830,000,000	2.3	12.7	418	96.1	75.1	27	6.2	37.6
1911–1920	10	1,958,000,000	2.3	13.6	428	98.4	88.7	17	3.9	24.9
1921–1925	5	1,113,000,000	1.1	7.8	433	99.5	96.5	7	1.6	11.3
1926–1927	2	505,000,000	.5	3.5	435	100.0	100.0	2	.5	3.5
1493–1927	435	14,357,000,000	100.0	100.0						

The rate of increase in silver production, however, has not been nearly as rapid as that for copper, zinc, lead, or gold, during the last 120 years (1801 to 1920). The following table gives the rate of increase by decades for this period.

TABLE 43.—*Rate of increase of world production of silver, lead, copper, gold, and zinc*

Decade	Increase over preceding decade, per cent									
	Silver		Lead		Copper		Gold		Zinc	
1801–1820	−39.5		39.4		36.6		−34.8		142.6	
1821–1830	−11.4		168.2		45.1		22.8		595.1	
1831–1840	28.5		25.2		33.3		40.2		53.5	
1841–1850	26.4		16.3		35.5		160.2		143.4	
1851–1860	18.6		38 8		53.7		277.2		112.8	
1861–1870	33.3	23.5	46.1	46.7	51.4	52.8	−5.4	57.5	66.2	123.9
1871–1880	77.3		39.8		23.9		−7.4		55.8	
1881–1890	40.9		40.1		74.8		−7.4		65.3	
1891–1900	62.1		50.5		66.7		94.0		39.7	
1901–1910	12.8		37.5		83.8		80.9		57.6	
1911–1920	7.0		11.6		59.8		12.3		30.8	

In spite of the greater relative increase in the production of gold than that of silver the price of silver has declined. In 1493 the ratio of value of gold to silver was about 12 to 1, a ratio that had been fairly constant since the time of the Cæsars. Variations from this ratio had usually placed still higher values on silver. The following table shows the gold-silver price and production ratios from 1493 to the present time (the price ratio as given by Soetbeer from 1501 to 1875 and since as given in Mineral Resources).

TABLE 44.—*The ratio of value of 1 ounce of gold to 1 ounce of silver, by various periods, 1501–1927*

Period	Average gold-silver price ratio	Silver-gold production ratio	Period	Average gold-silver price ratio	Silver-gold production ratio
1493–1600	[1] 11.3	32.5	1891–1895	26.4	20.3
1601–1700	14.1	44.1	1896–1900	33.4	13.3
1701–1800	15.0	29.9	1901–1905	36.1	10.7
1801–1850	15.7	28.0	1906–1910	35.3	9.4
1851–1875	15.5	6.7	1911–1915	36.8	9.4
1876–1880	17.9	13.3	1916–1920	22.5	9.6
1881–1885	18.6	17.6	1921–1925	31.2	12.7
1886–1890	21.1	20.4	1926–1927	34.7	13.0

[1] Price ratio for period 1501–1600.

The decline in the price of silver has been the result of a lessening demand rather than an abnormally increasing supply. The lessening demand has been due very largely to demonetizing of silver during the latter part of the nineteenth century by the principal nations of the world.

When Columbus sailed from Spain on his great voyage of discovery the principal silver producers of the world were Germany, Austria-Hungary, Japan, and Sweden. Discoveries of minerals in Bolivia, Peru, and Mexico soon after the beginning of the sixteenth century quickly forced the producers of the Old World into positions of secondary importance. In the 108 years from 1493 to 1600 Bolivia produced 48 per cent of the world's silver, followed in turn by 13 per cent from Peru and 12 per cent each from Mexico and Austria. During the next century, 1601 to 1700, the New World established its supremacy as a silver producer more firmly, accounting for over 77 per cent of the world total. Both Peru and Mexico almost quadrupled their production and doubled their proportion of the world total. Bolivia continued as the leading producer, with 36 per cent of the world total.

Mexico increased its production very rapidly, so that in the eighteenth century over 1,000,000,000 ounces—57 per cent of the world's silver—was mined in this one country. Peru remained in second place with a production of 360,000,000 ounces, or 20 per cent of the world total. The production of Bolivia dropped to 214,000,000 ounces, less than one-half of that in the preceding century.

In the decade 1801 to 1810 the Spanish colonies produced over 91 per cent of the total world silver of 287,000,000 ounces. With the close of this decade a revolution started which was to drive the Spanish governors from every capital of continental America within 20 years. Silver mining declined greatly for the two decades of revolution and reconstruction, but before the end of the half century

production had reached new heights. Mexico, with 605,000,000 ounces, or 57 per cent of the world total, continued to lead the world. Peru was second and Bolivia third with productions and percentages of 159,000,000 ounces, 15 per cent, and 101,000,000 ounces, 10 per cent, respectively.

During the next half century the production of the United States rose from a negligible amount to first place among the countries of the world. This period witnessed the development of the Western States. After the discovery of the Comstock lode in 1859, a year seldom passed without discovery of a great silver deposit. For the half century 1851 to 1900 the world production nearly quadrupled attaining a total of over 4,000,000,000 ounces. The United States produced one and one-third billion ounces, or 33 per cent; Mexico one and one-quarter billion ounces, or 31 per cent; and Bolivia one-third of a billion ounces, or 8 per cent of the world total.

The United States, producing 1,534,000,000 ounces or 31 per cent of the world total, was unable to hold first place during the first quarter of the twentieth century, being surpassed by Mexico, which produced 1,615,000,000 ounces, or 33 per cent. Canada was third with 464,000,000 ounces or 9 per cent of the world total and Australia fourth with 284,000,000 ounces or 6 per cent. In 1926 and 1927 the proportions showed an increase for Mexico to 40 per cent of the world total, the United States dropped to 24 per cent, Canada remained at 9 per cent, and Australia dropped to 3½ per cent.

The following table gives the amounts and proportions produced by countries that have contributed 1 per cent or more of the total. The first five countries in this list are in the Western Hemisphere and account for over 80 per cent of the total. Of this group of five, those of North America (Mexico, United States, and Canada) have produced 60 per cent of the world total and those of South America (Bolivia and Peru) 20 per cent.

TABLE 45.—*Principal silver producers of the world (1493–1927)*

Country	Quantity	Per cent	Country	Quantity	Per cent
Mexico	5,123,242,279	35.68	Austria	325,098,355	2.26
United States	2,995,643,236	20.87	Chile	294,944,645	2.05
Bolivia	1,567,624,166	10.92	Japan	243,176,024	1.69
Peru	1,349,052,029	9.40	Spain	200,990,531	1.40
Canada	539,449,516	3.76	All others	762,487,407	5.32
Germany	496,917,138	3.46			
Australia	458,099,584	3.19	Total	14,356,724,911	100.00

In early times the proportion of silver extracted from silver ore was much higher than it is now. Slowly the silver and the silver-gold deposits have become less important, and the silver-lead, silver-copper, silver-zinc, silver-lead-zinc, and other silver-bearing deposits have risen in silver-producing importance. Silver production is becoming more and more dependent on the production of these base metals and gold. This trend will probably continue, and the future of silver production should therefore follow the expanding production of these other metals. The silver content of base-metal deposits usually becomes smaller with depth, so it is probable that future silver production, though generally upward, will increase at a lower rate than the rates indicated for copper, lead, and zinc.

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TABLE 46.—*General Summary of World Production of Silver, 1493–1927 (fine ounces)*

Period	World total Quantity	World total Per cent	North America Quantity	North America Per cent	United States Quantity	United States Per cent	Mexico Quantity	Mexico Per cent	Canada Quantity	Canada Per cent	Central America Quantity	Central America Per cent
1493–1600	746,932,166	100.00	90,410,000	12.10			90,410,000	12.10				
1601–1700	1,271,922,450	100.00	306,650,000	24.11			306,650,000	24.11				
1701–1800	1,832,768,759	100.00	1,044,510,000	57.00			1,044,510,000	57.00				
1801–1810	286,614,899	100.00	178,050,000	62.12			178,050,000	62.12				
1811–1820	173,378,899	100.00	100,310,000	57.86			100,310,000	57.86				
1821–1830	153,553,520	100.00	85,140,000	55.44			85,140,000	55.44				
1831–1840	197,348,711	100.00	106,539,132	53.98	119,132	0.06	106,420,000	53.92				
1841–1850	253,365,466	100.00	135,436,468	53.46	306,468	.12	135,130,000	53.34				
1801–1850	1,064,261,495	100.00	605,475,600	56.89	425,600	.04	605,050,000	56.85				
1851–1855	154,988,259	100.00	75,123,500	48.47	193,500	.12	74,930,000	48.35				
1856–1860	145,582,525	100.00	72,299,400	49.66	309,400	.21	71,990,000	49.45				
1851–1860	300,570,784	100.00	147,422,900	49.05	502,900	.17	146,920,000	48.88				
1861–1865	178,863,296	100.00	104,850,600	58.62	28,810,600	16.11	76,040,000	42.51				
1866–1870	221,785,770	100.00	133,023,200	59.98	49,113,200	22.14	83,740,000	37.76	170,000	0.08		
1861–1870	400,649,066	100.00	237,873,800	59.36	77,923,800	19.45	159,780,000	39.87	170,000	.04		
1871–1875	334,264,202	100.00	219,813,300	65.76	121,083,300	36.22	96,740,000	28.94	1,990,000	.60		
1851–1875	1,035,484,052	100.00	605,110,000	58.44	199,510,000	19.27	403,440,000	38.96	2,160,000	.21		
1876	66,932,201		47,744,687		29,996,200		17,567,487		181,000			
1877	74,174,990		51,799,782		30,777,800		20,897,982		124,000			
1878	78,291,041		56,742,282		35,022,300		20,897,982		822,000			
1879	78,876,244		51,084,537		31,565,500		19,466,278		52,759			
1880	77,902,694		49,837,737		30,318,700		19,466,278		52,759			
1876–1880	376,177,170	100.00	257,209,025	68.37	157,680,500	41.91	98,296,007	26.13	1,232,518	.33		
1871–1880	710,441,372	100.00	477,022,325	67.14	278,763,800	39.24	195,036,007	27.45	3,222,518	.45		
1881	84,487,883		54,727,250		33,264,733		21,409,758		52,759			
1882	88,274,154		58,875,467		36,204,404		22,618,304		52,759			
1883	89,956,458		58,776,572		35,740,244		22,874,610		161,718			
1884	82,307,566		59,000,019		37,751,594		21,086,707		161,718			
1885	91,997,703		64,921,286		39,917,654		24,841,914		161,718			
1881–1885	437,023,764	100.00	296,300,594	67.81	182,878,629	41.85	112,831,293	25.82	590,672	.14		
1886	95,484,904		66,690,962		39,453,494		25,528,750		161,718		1,547,000	
1887	97,148,513		72,237,766		41,276,891		29,064,271		349,414		1,547,190	
1888	110,030,745		79,644,236		45,793,138		32,006,064		297,844		1,547,190	
1889	126,564,054		88,720,584		50,010,029		36,779,967		383,398		1,547,190	
1890	134,429,165		95,414,818		54,511,583		38,955,318		400,727		1,547,190	
1886–1890	563,657,381	100.00	402,708,366	71.44	231,045,135	40.99	162,334,370	28.80	1,593,101	.28	7,735,760	1.37
1881–1890	1,000,681,145	100.00	699,008,960	69.85	413,923,764	41.36	275,165,663	27.50	2,183,773	.22	7,735,760	.77
1891	138,283,427		95,058,137		58,342,087		34,854,619		314,241		1,547,190	
1892	154,377,339		104,897,229		63,499,992		39,504,867		345,495		1,546,875	
1893	166,594,198		106,157,933		59,999,956		44,362,519		248,583		1,546,875	
1894	164,829,094		98,932,943		49,500,000		47,038,381		847,687		1,546,875	
1895	167,744,560		106,012,216		55,726,945		46,962,738		1,775,658		1,546,875	
1891–1895	791,828,618	100.00	511,058,458	64.54	287,068,980	36.25	212,723,124	26.86	3,531,664	.45	7,734,690	.98
1896	157,321,170		108,567,801		58,834,800		45,718,982		3,205,343		808,676	
1897	160,765,331		114,133,518		53,860,000		53,903,180		5,558,446		811,892	
1898	169,537,121		116,344,745		54,438,000		56,738,000		4,452,333		716,412	
1899	168,806,306		114,700,404		54,764,500		55,612,090		3,411,644		912,170	
1900	173,688,775		120,546,848		57,647,000		57,437,808		4,448,755		1,013,285	
1896–1900	830,118,703	100.00	574,293,316	69.18	279,544,300	33.68	269,410,060	32.45	21,076,521	2.54	4,262,435	.51
1891–1900	1,621,947,321	100.00	1,085,351,774	66.92	566,613,280	34.93	482,133,184	29.73	24,608,185	1.52	11,997,125	.74
1876–1900	2,998,805,636	100.00	2,041,569,759	68.09	1,138,217,544	37.97	855,594,854	28.53	28,024,476	.93	19,732,885	.66
1851–1900	4,034,289,688	100.00	2,646,679,759	65.60	1,337,727,544	33.15	1,259,034,854	31.21	30,184,476	.75	19,732,885	.49
1801–1900	5,098,551,183	100.00	3,252,155,359	63.79	1,338,153,144	26.25	1,864,084,854	36.56	30,184,476	.59	19,732,885	.39
1901	173,100,586		118,992,912		55,214,000		57,656,549		5,242,697		879,666	
1902	162,936,273		120,871,228		55,500,000		60,176,604		4,223,304		971,320	
1903	167,814,265		130,065,596		54,300,000		70,499,942		3,149,591		2,116,063	
1904	164,274,497		122,724,661		57,682,800		60,808,978		3,577,526		655,357	
1905	172,393,042		128,498,206		56,101,600		65,040,865		5,994,292		1,361,449	
1901–1905	840,518,663	100.00	621,152,603	73.90	278,798,400	33.17	314,182,938	37.38	22,187,410	2.64	5,983,855	.71
1906	165,998,018		121,981,992		56,517,900		55,225,268		8,568,665		1,670,159	
1907	184,784,361		132,334,499		56,514,600		61,147,203		12,779,800		1,892,896	
1908	204,103,994		149,670,569		52,439,500		73,664,027		22,106,233		1,460,809	
1909	213,391,989		158,484,677		54,718,500		73,942,432		27,529,473		2,294,272	
1910	221,428,092		163,404,443		57,136,100		71,372,194		32,869,264		2,026,885	
1906–1910	989,706,454	100.00	725,876,180	73.35	277,326,600	28.03	335,351,124	33.89	103,853,435	10.49	9,345,021	.94
1901–1910	1,830,225,117	100.00	1,347,028,783	73.60	556,125,000	30.39	649,534,062	35.48	126,040,845	6.89	15,328,876	.84
1911	227,128,987		173,380,952		60,396,017		79,032,440		32,740,748		1,211,747	
1912	225,899,157		172,871,384		63,759,679		74,640,300		31,625,451		2,845,954	
1913	227,519,787		171,154,827		66,790,650		70,703,828		31,524,708		2,135,641	
1914	177,246,560		131,153,131		72,444,800		27,546,752		28,406,711		2,754,868	
1915	189,454,264		144,062,534		74,945,927		39,570,151		26,625,960		2,920,496	
1911–1915	1,047,248,755	100.00	792,622,828	75.68	338,337,073	32.31	291,493,471	27.83	150,923,578	14.41	11,868,706	1.13
1916	174,632,240		125,297,757		74,397,157		22,838,400		25,459,700		2,602,500	
1917	179,890,233		131,327,181		71,736,381		35,000,000		22,221,300		2,369,500	
1918	203,428,269		154,606,941		67,805,962		62,517,000		21,383,979		2,900,000	
1919	179,931,884		141,398,917		56,674,036		65,904,224		16,020,657		2,800,000	
1920	173,345,280		137,495,249		55,339,455		66,662,253		12,793,541		2,700,000	
1916–1920	911,227,906	100.00	690,126,045	75.74	325,952,991	35.77	252,921,877	27.76	97,879,177	10.74	13,372,000	1.47
1911–1920	1,958,476,661	100.00	1,482,748,873	75.71	664,290,064	33.92	544,415,348	27.80	248,802,755	12.70	25,240,706	1.29
1921	171,580,712		132,626,523		53,026,250		64,465,347		13,134,926		2,000,000	
1922	209,828,662		157,870,392		56,212,054		81,076,899		18,581,439		2,000,000	
1923	246,275,858		184,409,599		73,295,810		90,859,083		17,754,706		2,500,000	
1924	239,680,209		179,275,449		65,366,840		91,486,136		19,736,323		2,686,150	
1925	245,280,193		181,922,310		66,106,922		92,885,465		20,228,988		2,700,935	
1921–1925	1,112,645,634	100.00	836,104,273	75.15	314,007,876	28.22	420,772,930	37.82	89,436,382	8.04	11,887,085	1.07
1901–1925	4,901,347,412	100.00	3,665,881,929	74.79	1,534,422,940	31.31	1,614,722,340	32.94	464,279,982	9.47	52,456,667	1.07
1926	253,806,386	100.00	186,835,161	73.61	62,672,953	24.69	98,291,166	38.73	22,371,924	8.81	3,499,118	1.38
1927	251,396,555	100.00	190,735,273	75.87	60,394,199	24.03	104,573,919	41.60	22,613,134	8.99	3,154,021	1.25