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SILVER
AN ANALYSIS OF FACTORS
AFFECTING ITS PRICE

SILVER

An Analysis of Factors Affecting
Its Price

BY
Y. S. LEONG

WASHINGTON, D. C.
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DIRECTOR'S PREFACE

The drastic fall in the market price of silver during recent years has brought to the fore again the "silver question," which was so continuously agitated in the United States from the seventies to the end of the nineties. There has been much pressure from various groups who entertained strong beliefs as to what the country might do for silver or as to what silver might do for the country. This agitation has not resulted in definitive legislation by Congress but it has been acceded to in the extent of empowering the President to accept silver in international debt payments and to shift our currency system back to a bimetallic base.

From both the political and the economic side the silver question is highly controversial. There is a sharp clash of interests—industrial, regional, national, and international. Contending views, though put forward with great positiveness, have generally lacked broad foundation in established facts about the commodity under discussion. The present volume neither lays down nor takes up the gauge of battle on the monetary question as related to silver. It attempts rather to supply the necessary store of reliable, related, and co-ordinated facts as to the production and use of silver which determine its economic position. Such factual materials and analysis of their relations and meaning are essential to any true understanding of what might or what should be done about silver as an element in our monetary system. It is hoped that this objective approach to the problem may serve to stimulate more fruitful thinking, better understanding, and intelligent action on the part of the public.

The members of the staff of the Institute of Economics

DIRECTOR'S PREFACE

who served with the Director on the committee co-operating with the author in the preparation of this volume were Charles O. Hardy and Harold G. Moulton.

EDWIN G. NOURSE
Director

Institute of Economics
July 1933

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Y. S. LEONG

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INTRODUCTION

Silver has engaged the attention of the general public intermittently during the past 60 years. The substitution of the gold standard for the silver or bimetallic standard by one country after another, and the growing supply of silver arising from increasing production on the one hand and diminishing consumption on the other, have resulted in an almost continual decline in the value of silver. The recent drastic fall, coming at a time when the whole world is engulfed by an overwhelming depression, has once more aroused interest in this unruly metal.

A subject complicated in itself has been rendered even more confusing by the welter of conflicting views which are being presented in current literature. The protagonists of private gain stress one angle of the situation, while the guardians of public welfare emphasize another. Information and misinformation appear side by side in support of pet theories and biased opinions. Only a dispassionate and candid analysis of the facts concerning any economic phenomenon, however, can lead to understanding and intelligent action. It is accordingly the purpose of the present study to present an objective account of the factors which have shaped the destiny of silver.

Prior to 1873 England was the only important country on the gold standard. But in that year Germany also adopted the gold standard and began to dispose of its demonetized silver in the open market. Thus at a time of increased world production of silver an important country became a seller instead of a buyer.¹ A rapid de-

¹ It is estimated that Germany sold approximately 120 million ounces

cline in the value of silver followed. The Netherland and the countries of the Latin Monetary Union suspended the free minting of silver soon afterwards,² and the formation of the Scandinavian Monetary Confederation in 1873 resulted in the adoption of the gold standard by Sweden, Norway, and Denmark. Thus at the close of the seventies the free minting of silver was terminated in practically every important European country.

In 1893 the monetary demand for silver was further curtailed when free coinage of silver was discontinued in British India and the Sherman Act of 1890 was repealed in the United States.³ Despite the abrogation of the silver standard, however, India is still an important consumer of silver. Its monetary demand continued until the close of the World War and its requirements for industrial and hoarding purposes have remained large to this day.

Post-war developments have still further curtailed monetary demand. One country after another has de-

of silver between 1873 and 1879, when further sales were suspended. See J. L. Laughlin, *History of Bimetallism in the United States*, 4th ed. 1897, p. 141.

² Gradual restriction began in 1874, but complete suspension of the free coinage of silver became the final policy of the Union in 1878. See H. P. Willis, *A History of the Latin Monetary Union*, 1901, Chap. XIV-XVI.

³ This Act provided for a compulsory purchase by the government of 4.5 million fine ounces of silver monthly at the market price, not to exceed one dollar for 371.25 grains of fine silver or \$1.293 per fine ounce, by means of an issue of legal tender Treasury notes. It superseded the Bland-Allison Act of 1878 which authorized the purchase of not less than two million dollars' worth and not more than four million dollars' worth of silver bullion monthly, for coinage into silver dollars at the rate of 371.25 grains of fine silver per dollar. F. W. Taussig *The Silver Situation in the United States*, 1892, pp. 8, 50-51. This source contains an excellent account of the silver situation in the United States during this period.

based or demonetized its silver money. India has not only ceased to import for coinage purposes but since 1927 has sold large stocks of demonetized silver in the open market. In 1929 China was advised by the Commission of Financial Experts to abandon the silver for the gold standard. All these events, together with the world-wide depression, could not but have a depressing influence upon the silver market.

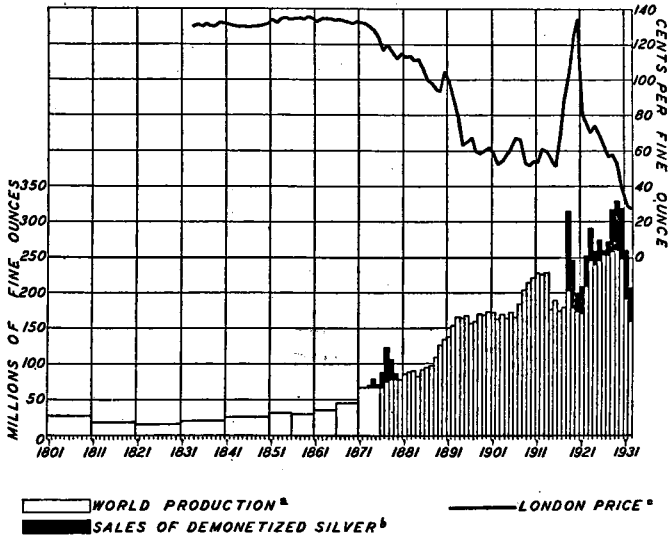
The relation between the price of silver and the world supply is shown graphically on page 4. It will be seen that the price level was virtually steady during the period prior to the seventies when production was relatively constant and many countries were on a bimetallic standard. The precipitous price decline beginning in 1873 culminated in an unprecedented low price in 1896, when the doom of bimetallism in America was pronounced by the election of McKinley. The demonetization of silver in many European countries, the sale of demonetized silver by Germany and the Scandinavian countries, the closing of mints in British India to the free coinage of silver, and increased world production gave impetus to the fall.⁴ The purchase of silver by the United States Treasury under the Bland-Allison Act of 1873 and the Sherman Act of 1890 arrested the downward movement, but the repeal of the Sherman Act in 1893 removed this counter-force.

The price of silver continued at the low level reached in the nineties until the advent of the World War. Beginning in 1915 there was a phenomenal ascent which in 1920 reached a level equal to that prevailing before the seventies. Decreased production owing to disturbances in

⁴ The general commodity price level was falling during this period and so probably accentuated the decline in the price of silver.

SILVER

COMPARISON OF SILVER PRODUCTION AND PRICE



^a Sources of data: 1801-1926, C. W. Merrill, "Summarized Data of Silver Production," *U. S. Bureau of Mines Economic Paper 8*, 1930, pp. 5-6; 1927-31, *Annual Report of the Director of the Mint*, U. S. Treasury Department, 1930, p. 262, 1932, p. 150; 1932, Handy and Harman, *Review of the Silver Market*, 1932, p. 24. For the years 1801-50 the figures represent ten-year averages; 1851-75, five-year averages; thereafter, annual amounts.

^b The years 1873-79 are based upon data computed from Laughlin, *History of Bimetallism in the United States*, p. 141; 1918-19 are computed from *Annual Reports of the Director of the Mint*; 1920-32 are compiled from Handy and Harman, *Reviews of the Silver Market*.

^c *Annual Report of the Director of the Mint*, 1932, p. 128. These figures represent the average price per fine ounce of bar silver in London. The original figures in pounds sterling have been converted into dollars as follows: 1833-1930, at par of exchange; 1931-32, at current rates of exchange.

Mexico (the chief producing country), the pressing monetary demand of India and other countries, and the upward movement of general commodity prices con-

tributed to the rise. A steep decline began in 1920 when Great Britain and other European countries began to sell silver derived from demonetization and debasement. This was somewhat checked, however, by purchases under the Pittman Act and by increased absorption of silver by India and China. In 1927, when silver production had attained a new high level, India began to dispose of surplus silver; French Indo-China did likewise

COMMERCIAL RATIO OF SILVER TO GOLD, 1866-1932^a

Period	Ratio	Period	Ratio
1866-70	15.6	1916-20	23.0
1871-75	16.0	1921-25	31.1
1876-80	17.9		
1881-85	18.6	1926	33.1
1886-90	21.1	1927	36.5
1891-95	27.1	1928	35.3
1896-1900	33.5	1929	38.8
1901-05	36.3	1930	53.7
1906-10	35.7	1931	71.3
1911-15	36.8	1932	73.3

^a Basic data are from *Annual Report of the Director of the Mint*, 1931, p. 128. These ratios were computed by dividing \$20.6718, the legal monetary value for a fine ounce of gold, by the average daily price for a fine ounce of silver. London prices were used through 1914 and New York prices thereafter. The ratios through 1925 are five-year averages and those for the following years are annual averages.

in 1929 and Siam in 1931. The net result was a new low price level in 1932.

The depreciation of silver is well illustrated by the accompanying table, in which the ratios of silver to gold over a period of years are shown. From a high value of 15.6 to 1 during 1866-70, the quinquennium preceding the adoption of the gold standard by Germany, silver fell to 36.8 to 1 in 1911-15. The recovery in the war period, during which the ratio at times returned to its level of the sixties, was followed by a sharp decline,

which resulted in a ratio of over 70 to 1 at the end of 1932.

Such then is the silver situation: diminishing demand on the one hand and growing production on the other, with a steady fall in value as an inevitable consequence. The facts regarding this situation during the period⁶ from 1900 to the present time are discussed in detail in the following chapters.

The component elements of the demand for silver will be analyzed in Chapter I. The monetary demand, industrial consumption, and absorption by India and China are there considered. Some phases of the production of silver will be examined in Chapter II. We shall study the trend of silver production; inquire into the nationality of capital control of the silver production of the world; and determine to what extent silver is a main product, to what extent it is a by-product of base metals, and to what extent its by-product nature tends to prevent a reduction in output despite the decline in demand.

Chapter III will undertake a comparison of the course of the price of silver with price levels of general commodities, non-ferrous metals, and farm products; a comparison of the purchasing power of silver with that of gold and non-ferrous metals; and an appraisal of the effect of the recent drastic decline in the price of silver on the principal producing and consuming countries. Chapter IV will present the conclusions of this study. Finally, an analysis of the silver provisions of the Farm Relief Act of 1933 has been made.

⁶ Statistical data of demand for silver are extremely meager prior to 1900 or even 1910. For this reason the period from 1900 to the present is selected for this detailed examination.

CHAPTER I

THE DEMAND FOR SILVER

The demand for silver falls into three classes: its use for monetary purposes; its consumption in the arts and industries; and its hoarding by India and China. In this chapter we shall try to determine the approximate trend of the demand from these sources in the near future.

I. THE MONETARY DEMAND FOR SILVER

Except perhaps in China, where bullion as well as silver coins is utilized as a circulating medium, silver in monetary use is practically always minted into coins. And coined silver either goes directly into hand-to-hand circulation or enters the banks for reserve or till money. In the following sections we shall study the trends of silver coinage, silver in circulation, and silver in reserves or tills.

A. The Coinage of Silver

Reliable and comparable statistics showing the amount of silver consumed for currency purposes by all the countries of the world are not available. The United States Bureau of the Mint, however, has been able to obtain coinage figures directly from certain countries through the diplomatic representatives of the United States accredited to them. The figures in the table on page 8 indicating the net amount of silver minted annually by certain countries are those of the Bureau of the Mint. Although admittedly incomplete, they represent a reliable estimate of the coinage trend of the world.

Prior to 1920, the year in which the post-war debasement and demonetization of silver began, there is no

NET COINAGE OF SILVER BY SPECIFIED COUNTRIES, 1900-31^a
(In millions of fine ounces)

Cal-endar year	United States	Austria-Hungary	Austria	Hungary	Australia	Canada	France	Germany	Great Britain	Italy	India	Indo-China	Japan	Mexico	The Netherlands	Persia	Russia	Total, All Countries	
1900	24.9	4.8				0.4	0.1	—	5.9	0.1	48.4	10.9	0.6	13.4	-0.2		3.8	113.1	
1901	21.0	2.3				0.3	0.1	—	2.2	0.4	14.0	2.9	0.5	19.5	-0.3		1.1	64.0	
1902	20.3	5.6				0.2	—	—	2.4	—	12.3	3.6	0.3	5.8	—		0.3	50.2	
1903	12.7	3.3				0.2	—	—	0.9	—	43.4	8.0	0.4	21.4	—		1.9	92.2	
1904	10.2	0.4				0.2	—	—	—	—	30.3	4.5	0.8	8.0	—		-5.9	48.5	
1905	3.4	0.2				0.3	—	—	-0.4	—	43.8	2.8	5.1	—	-0.6		-5.2	49.4	
1906	7.0	0.4				0.6	—	—	4.0	—	61.0	8.0	4.2	-4.1	-0.8		2.4	82.7	
1907	8.6	—				0.8	—	—	4.5	-1.1	54.5	11.0	6.6	2.3	—		2.6	89.8	
1908	8.3	6.0			—	0.2	—	8.4	2.5	0.7	4.7	11.0	4.7	-0.4	—		1.4	47.5	
1909	5.3	10.6			—	0.4	8.2	8.6	1.6	0.5	—	7.3	2.4	2.5	-1.4	—	1.8	47.8	
1910	2.2	4.2			1.2	1.2	—	7.4	7.3	1.0	—	0.8	—	—	—	7.6	0.6	33.5	
1911	4.3	6.3			1.2	0.6	0.1	6.5	5.3	0.5	1.9	0.5	2.1	—	0.7	0.8	1.6	31.4	
1912	4.9	2.7			0.7	0.1	2.7	5.5	5.1	0.9	44.7	0.2	2.6	0.9	—	0.4	3.9	75.3	
1913	1.9	6.2			0.6	0.7	—	8.2	3.9	2.1	46.8	4.7	0.9	3.1	0.1	1.9	2.7	83.8	
1914	3.9	5.7			0.9	0.3	1.5	10.8	10.1	2.8	10.7	0.6	-4.5	—	5.3	3.3	7.1	58.5	
1915	2.5	7.6			0.3	0.1	7.1	6.9	25.6	2.0	5.9	1.0	0.2	—	2.3	1.6	22.2	85.3	
1916	1.3	—			2.0	0.7	15.1	1.9	27.8	3.1	71.5	0.3	0.8	0.2	1.7	3.8	43.1	173.3	
1917	19.6	—			—	1.4	11.6	—	13.1	1.6	91.4	—	67.2	9.8	—	—	—	215.7	
1918	-110.9	—			1.5	1.6	12.4	—	30.7	1.6	146.2	—	4.9	2.4	1.0	—	—	89.8	
1919	-66.2	—			0.8	2.2	10.3	—	10.9	—	150.5	0.1	2.6	0.5	1.8	1.3	—	114.8	
1920	17.6	—			0.4	1.2	-5.7	—	-0.8	—	37.3	0.6	—	14.2	—	0.3	—	65.1	
1921	67.8	—			1.1	0.4	—	—	-13.4	—	0.1	6.7	—	6.1	0.9	0.3	1.7	71.7	
1922	62.6	—			0.5	-0.1	—	—	-17.7	—	-2.2	7.5	11.9	9.7	2.1	1.7	—	76.0	
1923	49.1	0.4			—	-0.2	—	—	-18.2	—	-2.0	2.8	13.4	11.0	0.2	1.1	8.7	66.3	
1924	14.5	5.0			0.2	-0.1	—	21.0	-5.7	—	-3.3	2.5	5.6	11.2	1.0	0.3	22.1	74.3	
1925	13.3	19.0			0.6	-0.1	—	14.5	-5.4	—	-3.0	2.3	-0.2	2.3	0.1	1.8	22.6	67.8	
1926	13.1	8.3	2.4		1.0	-0.2	—	15.2	-2.3	-0.8	-3.6	4.5	0.4	1.8	-0.3	3.9	11.8	55.2	
1927	6.0	9.1	1.8	1.5	-0.1	—	—	7.0	-6.5	-6.8	-0.3	6.7	-0.1	0.1	0.1	3.8	—	22.3	
1928	3.5	4.6	—	0.5	0.4	-43.2	9.6	-9.4	-4.5	-13.4	6.8	-0.6	-1.4	1.2	7.7	—	-38.2	—	
1929	3.3	2.7	1.0	—	0.6	4.9	4.4	8.1	4.6	-28.2	0.4	0.6	10.1	3.5	4.7	—	4.5	—	
1930	-0.2	—	0.7	1.9	-0.4	0.1	—	8.1	2.7	-4.8	-0.9	-38.4	1.0	-1.0	0.2	8.0	0.9	15.5	-6.6
1931	-4.5	—	0.9	...	—	—	7.8	18.0	5.3	—	-39.6	-3.9	...	-0.8	-5.5	-22.3 ^b

Compiled from *Annual Reports of the Director of the Mint*. These net figures were obtained by subtracting from the total annual domestic coinage of each country the amount of domestic coin withdrawn from monetary use. The coins struck and the coins withdrawn were converted into fine ounces on the basis of their legal content; or, where only the value of the fine silver consumed in coinage or withdrawn from circulation was given, the fine silver content was derived by dividing the value by the average price of silver in London.

The minus sign indicates that withdrawals from monetary use were greater than new coinage. A balance between coinage and withdrawals is indicated by a dash.

marked upward or downward trend in the coinage figures for the individual countries. There are, however, year-to-year fluctuations. The World War had varying effects upon different countries. Large issues of paper money and the concomitant rise in the price level compelled France, Great Britain, and other belligerent countries to increase their supplies of silver coin considerably, while the exigencies of war forced Germany and Austria-Hungary to discontinue silver coinage. The rise in the world price of silver, and the increase in wages and in commodity prices, made it necessary for India to coin more silver and to purchase a large amount of silver withdrawn from monetary use in the United States during 1918 and 1919.

Beginning in 1920, however, certain of the countries which had increased their silver coinage during the war period either ceased to mint new silver or began to debase or demonetize their silver currencies.¹ France discontinued the coinage of silver in 1920 and began to

¹ No official statistics of the amount of silver derived from demonetization and debasement are available, but unofficial estimates of the amount sold from these sources have been made. Handy and Harman have kindly given the author their estimates of such sales during 1920-32. They are as follows (in millions of fine ounces):

Year	Sales	Year	Sales
1920	27	1928	60
1921	37	1929	67
1922	43	1930	72
1923	45	1931	69
1924	20	1932	47
1925	30		
1926	8	Total	543
1927	18		

The quantity derived from these sources is probably somewhat larger than the amount sold, as a number of countries still have a reserve of retired silver. France, for instance, has disposed of only a part of its demonetized silver, and India has a large supply for sale.

demonetize its silver coin in 1928. Great Britain reduced the fineness of its silver coin from 0.925 to 0.500 in 1920, and since then the amount of silver withdrawn from monetary employment has been in excess of the amount coined. India, which formerly consumed as much silver for currency purposes as all the countries of the Western World, has been consistently demonetizing its coins since 1921. With the exception of the United States, Spain, China, and India, practically every important nation which has any silver money in circulation has reduced the fineness of its silver coins.²

It is difficult to ascertain what effect demonetization has had on the price of silver. But whatever the effect, it was largely counteracted by the increased purchase of silver for monetary use on the part of other countries. Simultaneously with the curtailment in the consumption of silver as a result of the monetary policies of certain countries, the United States began to buy silver to replace the stock sold to Great Britain under the Pittman Act to enable the latter to balance its payments with India. Austria, Hungary, Germany, and other countries whose metallic money was driven out of circulation by inflation during and after the war were compelled during reconstruction to acquiesce in the popular demand for "hard" money. Though the fineness of the new coins was substantially reduced, the amount consumed was sufficient, together with the purchases of the United States, to offset the fall in demand resulting from demonetization. It may be observed from the table on page 8 that the trend of silver consumed in coinage by all the countries during the greater part of this period of

² See Table I, p. 139, for changes in the legal content of the silver coins of various countries.

debasement and demonetization remained practically the same as during the previous period. Not until 1927 was there an appreciable decline in the total coinage demand, and by 1928 the amount retired from circulation was considerably greater than the quantity of silver consumed for new coins.

China is the only important silver-consuming country for which we do not have reliable coinage statistics. An

CHINA'S NET IMPORTS AND EXPORTS OF SILVER, 1890-1932^a
(In millions of fine ounces)

Period	Net Imports ^b	Period	Net Imports ^b	Period	Net Imports
1890-94.....	6.1	1915.....	-22.2	1925.....	75.4
1895-99.....	11.0	1916.....	-34.6	1926.....	64.2
1900-04.....	-5.8	1917.....	-25.3	1927.....	78.6
1905-09.....	-15.1	1918.....	28.4	1928.....	128.4
		1919.....	64.1	1929.....	127.7
1910.....	26.3	1920.....	111.7	1930.....	81.0
1911.....	46.2	1921.....	39.1	1931.....	55.0
1912.....	23.2	1922.....	47.8	1932.....	29.3
1913.....	43.4	1923.....	81.1		
1914.....	-16.4	1924.....	31.4		

^a Data are from *Foreign Trade of China*, Chinese Maritime Customs, Shanghai. The original figures in Haikwan taels have been converted into fine ounces at 1.20665 ounces per tael. Figures are five-year averages through 1909 and on a yearly basis thereafter.

^b Minus sign indicates net exports.

estimate by Kann,³ based on coinage statistics supplied by the Chinese Minister of Finance and on data of the distribution of silver bullion among the minting centers in China, states that 290 million dragon dollars were coined from 1891 (when China first began to mint its own coin) to the end of 1914, and 1,300 million republican dollars from 1915 to 1930. This estimate seems to be borne out by silver import and export figures. As China is not a

³ E. Kann, "How Much Silver is there in China? An Investigation of the Present Status," *Chinese Economic Journal*, April 1931, pp. 410-20.

producer of silver it must import the metal for monetary and other uses. It is evident from the table on page 11, in which net imports and exports of silver are shown, that China could not have struck many silver coins during the period prior to 1917. We may safely conclude that the inclusion of Chinese mintage for the period 1900-17 would not greatly modify the trend of world coinage. During the recent period, as evidenced by the large net imports of silver and as substantiated by the estimates cited above, the trend of world coinage may well be raised to some extent by the inclusion of Chinese coinage.

B. Silver in Circulation

Since there are practically no statistical data for silver in circulation, our conclusions with respect to the trend of the volume of silver money in circulation must be based largely upon reports of American diplomatic officers,⁴ observations of representatives of the United States Department of Commerce,⁵ and coinage figures. Such fragmentary data as we have indicate that so far as the Western World is concerned there has probably been a diminution in the quantity (fine ounces) of silver in circulation since 1914, though there has possibly been an increase in the amount (total face value).

During the war, particularly while the price of silver was rising rapidly, virtually all silver money was driven out of circulation in countries which resorted to paper inflation. Zinc, aluminum, copper, and nickel token coins

⁴ Published in the *Annual Reports of the Director of the Mint*.

⁵ A good summary of these observations may be found in L. R. Robinson, "Changes in the Monetary Uses of Silver Since 1914," *U. S. Bureau of Foreign and Domestic Commerce Trade Information Bulletin No. 140*, 1923.

were substituted for it. During the reconstruction period some new silver coins of lower legal content were issued to satisfy the demand for hard money and some hoarded silver which came back into circulation was reminted and its fineness reduced. Some countries which had escaped excessive currency depreciation had to substitute paper money and base metal coin for silver money that had been melted down or smuggled across the borders.

As a result of substitution and debasement, individuals in the countries affected became accustomed to the use of paper currency instead of hard money and resigned themselves to accepting coins having a reduced legal content. Governments were therefore able to impound gold and demonetize and debase silver coins to the present extent.

There were some nations, however, which did not experience a shortage of silver during the war. Great Britain was perhaps the only belligerent European power of which this statement is true. The following table gives the average annual circulation of silver coins in that country for specified periods (in millions of pounds sterling):⁶

1912-14	22.4
1917-19	52.5
1921-24	41.1
1925-29	47.7

English silver coins in circulation increased in volume from 20 million pounds sterling before the war to 50 millions during the war. During the post-war period, however, silver coins were debased.⁷ In recent years the

⁶ Computed from data in *Annual Reports of the Director of the Mint*.

⁷ It was estimated by Joseph Kitchin that from 1920 to 1930 Great Britain sold 91 million fine ounces of silver apparently derived from debasement. See the (London) *Economist*, Mar. 28, 1931, p. 662.

circulation of silver has increased slightly, but the coins circulated are largely of reduced legal content.

Neutral countries were also affected by the war. Spain, Denmark, and Norway suffered a loss of silver coin, particularly during the war years, when silver circulated at less than its bullion value as a result of the depreciation of money in those countries. Switzerland, Sweden, and The Netherlands, because of the premiums on their currencies, were the depositaries of silver coins from neighboring countries. In fact, Switzerland had such a large supply of silver that the government was forced to demonetize the five-franc silver coin of the Latin Union countries.⁸ Circulation of silver in Sweden increased considerably at the expense of Norway and Denmark, the other two members of the Scandinavian Union. Coins exported from nearby countries increased circulation of silver in The Netherlands to 50 per cent above its pre-war level.⁹

At the present time there is some agitation for increasing the amount of silver in circulation in the United States. It is accordingly pertinent at this point to inquire into the facts regarding silver circulation in this country. From the accompanying table it will be seen that the amount of silver currency (that is, standard silver dollars and silver certificates) outside of the Treasury¹⁰ shows

⁸ Later these demonetized coins were returned to the countries of their respective origins.

⁹ Robinson, *U. S. Bureau of Foreign and Domestic Commerce Trade Information Bulletin No. 140*, p. 35.

¹⁰ The Treasury holds a small amount of silver money as "assets of the government," largely in the form of standard silver dollars. The silver currency outside of the Treasury, together with this holding as "assets of the government," comprises the stock of standard silver dollars of the United States. For convenience the term "silver currency" is employed in this discussion to represent standard silver dollars and silver certificates. Of the amount of silver currency outside of the Treasury, a part is in hand-to-hand circulation and the remainder is held in the banks for reserve and till-money purposes.

THE DEMAND FOR SILVER

15

STANDARD SILVER DOLLARS IN CIRCULATION AND STANDARD SILVER DOLLARS
AND SILVER CERTIFICATES OUTSIDE OF THE UNITED STATES TREASURY,
1900-32^a

Year	Silver Dollars in Circulation ^b		All Silver Dollars Outside of Treasury ^c		Silver Currency Outside of Treasury ^d (In millions of dollars)
	In Millions	<i>As Percentage of Silver Currency Outside of Treasury</i>	In Millions	<i>As Percentage of Silver Currency Outside of Treasury</i>	
1900....	118	21.4	142	25.8	550
1901....	85	15.7	115	21.1	544
1902....	70	12.7	99	18.1	545
1903....	65	11.9	92	16.8	547
1904....	60	10.9	84	15.4	547
1905....	59	10.9	83	15.4	539
1906....	45	8.3	71	13.1	543
1907....	63	11.3	88	15.7	558
1908....	38	6.9	81	14.9	547
1909....	52	9.4	76	13.8	555
1910....	47	8.5	76	13.7	555
1911....	47	8.8	76	14.3	531
1912....	46	8.5	73	13.5	542
1913....	44	8.1	75	13.7	545
1914....	31	5.7	61	11.4	540
1915....	30	5.5	56	10.4	538
1916....	32	5.8	69	12.3	559
1917....	44	7.9	74	13.4	551
1918....	23	5.4	43	10.1	422
1919....	58	23.0	83	32.8	252
1920....	56	22.0	136	53.4	254
1921....	51	18.5	77	27.6	278
1922....	43	11.5	69	18.5	373
1923....	45	9.3	68	14.1	480
1924....	42	8.6	78	15.9	486
1925....	40	7.6	71	13.7	520
1926....	37	7.0	70	13.2	528
1927....	34	6.3	63	11.8	533
1928....	34	6.5	61	11.5	533
1929....	...	...	52	9.9	520
1930....	...	...	45	8.4	532
1931....	...	...	42	7.8	535
1932....	...	...	39	7.4	526

^a Figures are for June 30 of each year. See Table II, p. 140, for basic data.

^b Figures for 1929-32 are not available. See footnote 11, p. 16.

^c Includes silver dollars in circulation and in banks.

^d Includes standard silver dollars and silver certificates in circulation and in banks.

a very slight decline from 550 million dollars in 1900 to 526 millions in 1932. On the other hand, all standard silver dollars outside of the Treasury and standard silver dollars in active circulation show, in general, a more decided downward trend. The former decreased from 142 million dollars in 1900 to 39 millions in 1932 or from 26 per cent of the silver currency outside of the Treasury to 7 per cent, while the latter fell from 118 millions in 1900 to 34 millions in 1928 or from 21 per cent of the silver currency outside of the Treasury to 6.5 per cent. We do not have figures for silver dollars in circulation since 1928;¹¹ but, if we assume that the same proportion of silver dollars outside of the Treasury was in circulation in 1932 as in 1928, the amount of standard silver dollars in hand-to-hand circulation would have declined to about 20 millions or 4 per cent of the silver currency outside of the Treasury. The unimportance of silver dollars as a circulating medium is more vividly illustrated in the chart on page 17, from which it will be observed that silver dollars in active circulation compose but a small part of the silver currency in use, and that the greater proportion of the silver currency in circulation is in the form of silver certificates.

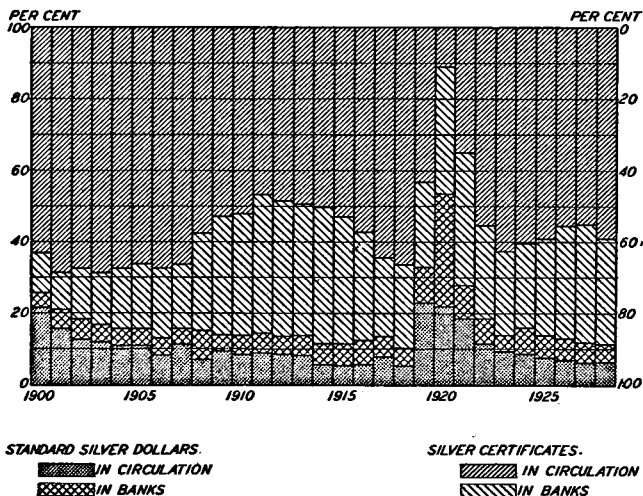
Undoubtedly the silver dollar, because of its inconvenient size and heavy weight, will be further restricted in its use as a circulating medium. Since there is so little demand for hard money the amount now in circulation could probably be replaced by silver certificates.¹² In

¹¹ The Comptroller of the Currency has not been classifying cash in the vaults of banks into various kinds of money since 1928. It has therefore not been possible to estimate the amount of silver currency in circulation since that date.

¹² If this country should resort to inflation there would probably be an increase in the demand for hard money, but the demand for silver dollars in such an event would be for hoarding rather than for circulation purposes.

SILVER CURRENCY OUTSIDE OF THE UNITED STATES
TREASURY, 1900-28*

(Total for June 30 of each year = 100 per cent)



* See Table II, p. 140, for basic data. There was a slight increase in the amount of silver dollars in circulation in 1919-21, but the rise in the percentages of silver dollars in circulation in 1919-22 is largely to be attributed to the decline in the stock of silver currency in this period. In 1918 and 1919 the Treasury withdrew about 200 million dollars of silver certificates from circulation in order to release the silver sold to Great Britain under the Pittman Act. As reference to the table on page 15 will indicate, the volume of silver currency outside of the Treasury was reduced from 550 million dollars in 1917 to 250 millions in 1919-20. It was not until 1925 that the amount of silver currency outside of the Treasury attained the 500 million dollar mark again.

fact, the silver certificates which now circulate could be readily replaced by Federal Reserve notes or some other form of paper money. Thus the 540 million standard silver dollars, or 418 million fine ounces of silver, now reposing in the Treasury are rendering no indispensable economic service. From the standpoint of economy it

may be seriously argued that in common with the other countries of the world the United States should demonetize or debase its monetary stock of silver and dispose of the proceeds.

A study of the trend of silver in circulation would not be complete without the inclusion of India and China. Official statistics of silver circulation are not available

ESTIMATED CIRCULATION OF RUPEES IN INDIA 1900-27^a
(In millions)

Year	Rupees in Cir- culation	Year	Rupees in Cir- culation	Year	Rupees in Cir- culation
1900.....	1,300	1910.....	1,860	1920.....	2,600
1901.....	1,430	1911.....	1,840	1921.....	2,350
1902.....	1,380	1912.....	1,820	1922.....	2,490
1903.....	1,360	1913.....	1,910	1923.....	2,480
1904.....	1,440	1914.....	1,870	1924.....	2,350
1905.....	1,520	1915.....	2,040	1925.....	2,360
1906.....	1,640	1916.....	2,120	1926.....	2,690
1907.....	1,780	1917.....	2,270	1927.....	2,870
1908.....	1,910	1918.....	2,190		
1909.....	1,870	1919.....	2,300		

^a Figures for 1900-18 are from G. F. Shirras, *Indian Finance and Banking*, p. 462; for 1919-27 from Shirras, "Gold and British Capital in India," *Economic Journal*, December 1929, p. 632.

for either country. For India, however, Professor Shirras has made certain careful estimates of the rupees in "active circulation." These estimates are assembled in the table on this page. Professor Shirras has not discussed the accuracy of his estimates, but a study of his formula reveals that his method is an ingenious one.¹⁸ His estimate

¹⁸ Professor Shirras' estimates are based upon the census of rupees, which may be described as an examination of the composition of the rupee circulation made in March of each year since 1875. Ten thousand coins are examined in each treasury or currency office and the number bearing each coinage date is expressed as a percentage of all coins examined. It was found that the coins which had been issued for not more than two or three years comprised the highest percentages of the total,

of the circulation of rupees in 1912 is in close agreement with those by the Government Price Enquiry Committee and the Controller of the Currency of India.¹⁴ In the absence of actual circulation figures, Professor Shirras' estimates may perhaps be trusted to give us a good indication of the trend of silver circulation in India.

From 1,300 million rupees in 1900 silver circulation rose to approximately 2,000 millions in 1915. During the war period circulation increased rapidly, attaining a peak of 2,600 millions in 1920. The decline in 1921-25 was followed by a rise in 1926 and 1927. We do not have figures for the period since 1927, but undoubtedly there must have been a decrease in circulation in recent years, at least during the past three years of severe economic depression.¹⁵

For China, Kann estimates that the silver dollars,

and that hoarding and melting reduced the percentages of coins in circulation for a greater length of time. On the basis of these percentages, and with the assumption that all coins struck on each coinage date were placed in circulation by the time the highest percentage for the respective coinage date was reached, Professor Shirras devised a formula through which he obtains an estimate of the circulation of rupees in India in any particular year. See Shirras, *Indian Finance and Banking*, pp. 162-66, 478-82; also Professor Edgeworth's comments on the method in the *Journal of the Royal Statistical Society*, July 1920, pp. 608-13.

¹⁴ See Shirras, *Indian Finance and Banking*, p. 165.

¹⁵ According to the *Report of the Controller of the Currency*, Calcutta, 1931-32, p. 79, there was a large return of rupees from circulation in 1929-30 and 1930-31 (217 million in 1929-30 and 216 million in 1930-31). There was a net absorption of 39 million rupees in 1931-32, but this outflow of silver from the Indian Treasury occurred from October to March, coincident with the net export of gold from India, which began soon after England abandoned the gold standard. Evidently a large part of the rupees which flowed from the Treasury during this period did not enter into active circulation but replaced the gold which was sold from private hoards. See the same, p. 80.

It may also be pointed out that, since 1927 and until the end of the fiscal year 1931-32, India sold 128 million fine ounces of demonetized silver. See the same, p. 10.

sycee bullion,³⁶ and subsidiary coins in circulation in 1930 had a minimum face value equivalent to 2,200 million silver dollars.³⁷ His estimate is derived largely from fragmentary records of Chinese coinage and does not represent the volume of silver money in active circulation. It shows only the approximate amount of silver money which may be located in China.

In both India and China the absence of banking facilities and the lack of confidence in the very few existing banking institutions have encouraged hoarding. In India silver bullion and ornaments are usually hoarded and seldom emerge as circulating media. In China, on the other hand, silver coins are hoarded and sooner or later re-appear in circulation. It is impossible to estimate how much of the silver money in China has been stored away, but there is no doubt but that a considerable portion of the total has been hoarded. It would seem that the suspension of the Banque Industrielle de Chine in 1921 and the many subsequent runs on other banks have caused hoarding to increase.

As there was practically no net import of silver into China in the period prior to 1918, and as there was only a relatively small amount of silver coins struck during this period, the trend of silver circulation must have been a constant if not a falling one. In fact, between 1914 and 1917 there was a net export of approximately 100 million ounces of fine silver, which must have been withdrawn from circulation and attracted from hoards by the high prices of silver then prevailing. Since 1918 China has been importing large quantities of silver, and it was during this recent period (according to such fragmentary coinage figures as we have and to Kann's esti-

³⁶ A small bar of silver containing about 55 ounces of fine silver.

³⁷ Kann, *Chinese Economic Journal*, April 1931, p. 410.

mates) that most of the coins now in China were minted. The trend of silver circulation in China since 1918 is evidently an upward one.

C. The Silver Holdings of the Banks of Principal Countries

For the purpose of determining the importance of silver holdings to the principal banks of issue, we have compiled annual data on the gold and silver holdings of 18 institutions for the period 1900-29.²⁸ From these figures we have computed the percentages given in the table on page 22, which show silver holdings in their relation to total metallic holdings during this period.

An examination of these percentages shows that, relatively to gold, the silver holdings of all but four of the banks of issue listed here have been decreasing in importance since 1900. The decrease is most noticeable during the war period, when the policy of impounding gold in the central banks was inaugurated. The silver holdings of all banks, which constituted 25 per cent of the total metallic holdings in 1900-04, declined to 15 per cent in 1910-14, to 9 per cent during the war period, and to 7 per cent in 1925-29.

Not only have the silver holdings of these 18 banks of issue decreased relatively, but they have declined absolutely, as shown by the following five-year averages (in millions of dollars):

1900-04	501.6
1905-09	514.9
1910-14	471.4
1915-19	306.7
1920-24	290.3
1925-29	273.0

²⁸ See Table III, p. 142.

SILVER HOLDINGS AS PERCENTAGES OF TOTAL METALLIC HOLDINGS OF 18 BANKS OF ISSUE, 1900-29^a
(Five-year averages)

Bank of Issue	1900-04	1905-09	1910-14	1915-19	1920-24	1925-29
National Bank of Austria-Hungary...	20.5	19.4	16.0	14.2	0.0	1.8 ^b
National Bank of Belgium.....	20.1	23.5	19.2	3.5	7.4	4.5
National Bank of Bulgaria.....	52.6	34.0	29.1	25.4	31.9	25.0
National Bank of Denmark.....	0.0	2.9	6.7	1.4	3.8	6.0
Bank of Finland.....	11.5	8.2	6.2	0.2	15.5	4.5
Bank of France.....	30.8	23.8	16.0	7.1	7.3	3.7
Banks of Italy, Naples, and Sicily...	13.9	10.9	8.6	9.5	9.7	6.5
Bank of Japan.....	2.0	0.2	0.1	0.0	1.9	2.4
Bank of Java.....	...	...	46.4	16.5	20.6	13.5
Bank of The Netherlands.....	55.3	38.1	6.8	1.3	2.0	5.4
National Bank of Norway.....	0.0	0.0	2.2	0.4	7.0	0.0
Bank of Portugal.....	58.9	53.1	61.3	56.1	58.8	9.2
Reichbank (Germany).....	28.0	25.6	17.0	2.1	3.0	2.5
National Bank of Roumania.....	6.0	0.7	0.3	0.0	1.3	2.6
Imperial Bank of Russia.....	7.0	4.9	4.0	7.1 ^c	0.0	9.1 ^d
Bank of Spain.....	55.3	63.5	57.6	28.2	20.1	21.0
Bank of Sweden.....	8.5	5.0	4.4	6.6	3.6	1.5
National Bank of Switzerland.....	8.8	7.7	8.1	13.3	16.3	10.3
18 banks of issue.....	24.5	20.4	15.1	8.7	9.1	7.1

^a See Table III, p. 142, for basic data. The face value of coins has been used as the basis for computing silver holdings, whether in the form of coins or bullion to be minted. As a number of countries have been reducing the silver content of their coins since the post-war period, at least part of the holdings of some of the banks must have consisted of debased coins in recent years. To the extent that this was true, their silver holdings were somewhat less than those given here.

^b Austrian National Bank only.

^c For the period 1915-17 only.

^d State Bank of U.S.S.R.

The data for the separate banks given on pages 142-45 indicate that among the banks which hold relatively large amounts of silver only two—the Bank of Spain and the National Bank of Switzerland—had more silver in their vaults in 1925-29 than they did in 1900-04. The silver holdings of the Swiss bank, which grew rapidly during the war at the expense of the other members of the Latin Monetary Union, have been dwindling in recent years.

It is clear that silver holdings have had a persistently downward trend; that compared with gold holdings they have become more and more insignificant with the passage of time. The fall in the price of the metal might have been expected to drive hoarded silver into the vaults of the banks, but our figures do not indicate any general tendency in this direction. Among the central banks of the belligerent countries, the Bank of France is practically the only one which seems to show an increase in silver holdings during the early post-war years. In 1928 it demonetized its entire holdings, but during the next year silver again flowed into its vaults. Undoubtedly part of this must have come out of private stores.

Statistics of the silver holdings of other central banks are not obtainable, but there is no reason to believe that they would vitiate our conclusion. With the exception of China, which is on the silver standard, Great Britain, the United States, and India are the only other countries where large amounts of silver are held in banks or in central reserves. (See page 24 for the monetary silver holdings in these countries since 1900.)

The Bank of England holds a small amount of silver as reserve in the issue department and practically all

the metallic money in the banking department consists of silver coin.¹⁹ The Deputy Master of the Royal Mint has compiled figures of the silver holdings of all banks in the United Kingdom, including the Bank of England, from which source the figures in the first column of the accompanying table are derived. The average amount of silver held by the British banks increased between 1905

SILVER HELD BY BANKS IN GREAT BRITAIN AND THE UNITED STATES AND IN THE INDIAN CURRENCY RESERVE, 1900-29
(Five-year averages)

Period	Banks in Great Britain ^a (In millions of pounds sterling)	Banks in the United States ^b (In millions of dollars)	Indian Currency Reserve ^c (In millions of rupees)
1900-04.....	...	26.7	113.2
1905-09.....	5.8	28.5	201.6
1910-14.....	6.9	29.2	215.9
1915-19.....	10.9	27.5	260.6
1920-24.....	15.3	38.0	703.9
1925-29.....	14.6	30.2	954.0

^a From *Annual Report of the Deputy Master of the Royal Mint*, 1927, p. 20; 1929, p. 21. The figures from which these five-year averages were derived are for the last week-day in June of each year.

^b Estimated by the writer. See Table II, p. 140, for basic data and method.

^c The figures for 1900-15 are from Shirras, *Indian Finance and Banking*, p. 463; for 1916-29, from the *Weekly Bullion Letters* of Samuel Montagu and Company. The annual figures from which the averages are derived are for March 31 through 1915 and January 1 thereafter.

and the post-war period; but the year 1921 brought both the high point of 17 million pounds sterling and the beginning of a downward trend which ended in 1929 with the low figure of 13 millions.²⁰

The silver holdings of all banks in the United States, including the Federal Reserve Banks after 1914, have remained practically constant throughout the three dec-

¹⁹ See *Report of the Committee on Finance and Industry* (Cmd. 3897), 1931, pp. 30, 302-03.

²⁰ As Great Britain has been debasing its silver coins since 1920 it is probable that the silver coins held by the banks in recent years are largely of reduced legal content, that is, 0.500 instead of 0.925 fineness.

ades. An examination of the annual figures, from which the averages given on page 24 were obtained, shows that there are year-to-year fluctuations but discloses no marked trend.

The accumulation of rupees in the paper currency reserve of the Indian government has been rapid since 1920-24, when the enormous amounts of rupees which had been absorbed during the war years began to flow back into the public Treasury. In 1926, when the policy of reducing the reserve to 250 million rupees of silver coins was adopted, there were 850 million rupees in the reserve.²¹ In spite of the fact that by the end of 1931 the government had demonetized and sold 380 million rupees, the reserve stock of silver had risen to 1,230 million rupees.

Will the silver that is accumulating in the reserve be re-absorbed by the Indian population at some later date? One reason given for the continuous inflow of silver into the Treasury is that paper currency is taking the place of rupees. Doubtless notes have increasingly found favor in India; but since there has been no marked increase in the absorption of notes, and since in 1929 and 1930 a large amount of them returned from circulation, the popularity of paper currency is hardly an adequate explanation. The Indian Controller of the Currency attributes the heavy return of rupees from circulation in recent years to the failure of the wheat and cotton crops and to the investment by certain Indian states of reserves previously kept in the form of rupee coin.²² To the extent that the return is the effect of such transitory causes or of business depression, the removal of the causes, or

²¹ See footnote 3, p. 125.

²² *Report of the Controller of the Currency*, Calcutta, 1928-29, pp. 17-18; 1929-30, p. 31; 1930-31, p. 31.

the improvement of business conditions, will not only stop the inflow of silver into the Treasury but will enable the population to re-absorb some of the excessive rupees now concentrated in the reserve.²³ But perhaps the main reason for the return from circulation is the release of rupee coins from war-time hoards. The fall in the price of silver may have induced hoarders to buy silver with their long-hidden rupees, which, because they are "pegged" at the rate of 1s. 6d., are worth considerably more than their value as bullion.²⁴ Redundant silver originating from this source, as well as rupees which have returned from circulation because of the increasing popularity of paper currency, will, under the monetary policy of the government, have to be sold. By the end of 1932 the reserve stock was 850 thousand rupees in excess of the amount the government intends to hold as a permanent reserve.

D. Summary

Coinage figures for those countries for which data are available show year-to-year fluctuations but no decided increase or decrease from 1900 to 1920. Since 1920, when post-war debasement and demonetization began, these data reveal a decline in the coinage of silver in a number of countries. During the early post-war years this decline was offset by increased coinage demand in countries where silver coins were driven out of circulation or disposed of during the World War. As a result it was not until 1928 that a general decrease became

²³ According to the Controller of the Currency there was a net absorption of rupees in 1932. But, as shown elsewhere, a large part of the coins absorbed probably did not enter into active circulation but replaced hoarded gold after England abandoned the gold standard in the fall of 1931. (See footnote 15, p. 19.)

²⁴ See H. M. Bratter, "The Silver Market," *U. S. Bureau of Foreign and Domestic Commerce Trade Promotion Series No. 139, 1932*, p. 46.

noticeable. With the possible exception of China, where demand has increased steadily since 1918, world consumption of silver for coinage purposes has fallen rapidly.²⁵ As some demonetized silver is still unsold, and as debasement and demonetization are still in process, the coinage demand for silver will probably continue to decline.

So far as the Western World is concerned, there is probably a decrease in the bullion value though there may have been an increase in the face value of silver in circulation since 1914. During the war, especially in the belligerent countries, the use of paper currency and base metal coins as substitutes for silver money became generally accepted; and since the war, although silver coins have returned to circulation, their silver content has been considerably reduced. Increased circulation of silver coins in some of the neutral European countries during the war years by no means compensated for the losses suffered by other countries. Circulation of silver in the United States has shown a downward trend, only 7 per cent of the stock of standard silver dollars being in actual circulation in 1929. In India, too, the trend has been continuously downward since 1920. Perhaps only in China has there been a notable increase of silver in circulation in recent years.

The total silver holdings of 18 central banks have declined relatively and absolutely. In relation to the total metallic holdings they have fallen from 25 per cent in 1900-04 to 7 per cent in 1925-29 and in absolute amount they have been reduced from 500 million dollars in the early period to 270 millions in the recent. It seems probable that the conclusion drawn from this sample study

²⁵ In recent years Germany has increased its silver coinage to some extent. See H. M. Bratter, "The Monetary Use of Silver in 1933," *U. S. Bureau of Foreign and Domestic Commerce Trade Promotion Series No. 149*, 1933, p. 61.

is applicable in general to other central institutions for which comparable data are not available. The silver holdings of all banks in Great Britain, including the Bank of England, increased steadily up to 1921, when they started on a downward trend; in the United States they have remained practically constant throughout the three decades. The silver rupees in the Indian currency reserve, on the other hand, have multiplied rapidly, particularly in recent years.

It is evident that the monetary demand for silver has declined and will continue to do so. The general recognition by the important countries of the world that gold should be used for reserve purposes will more and more relegate silver to till-money purposes. Coinage of silver will therefore be largely for subsidiary use. There is at the present time a general movement on the part of the nations of the world to debase or demonetize their coins. And, moreover, it is quite probable that some countries which have thus far preserved the quantity and quality of their silver coins may decide to imitate their economical neighbors. There is no good economic reason why Spain, which holds one of the largest stocks of silver in Europe, or any of the nations which are on the gold or gold exchange standard should retain its silver coins at their high intrinsic value when neighboring countries have long been profiting from the seigniorage derived from re-coinage. Silver circulation has fallen and may and probably will persist in falling because of the increasing readiness with which people are willing to accept paper currency as a substitute for hard money. It is likely that the silver holdings of central and other banks and of government treasuries will shrink further. The prospects of silver, so far as monetary uses are concerned, are therefore none too bright.

II. THE INDUSTRIAL DEMAND FOR SILVER

The United States, Great Britain, France, Sweden, and Switzerland are five of the principal industrial consumers of silver. A detailed analysis of the rough estimates available for the European countries in this group would serve no purpose, but the data in the table on this page indicate the distribution of industrial consumption of silver among these five principal consumers. It will be seen that from 1900 through 1929 the figures for the United States have been increasingly larger than those for the other countries. Available data enable us to analyze the industrial demand for silver in this country and to form some interesting conclusions concerning its probable future.

INDUSTRIAL CONSUMPTION OF SILVER BY FIVE PRINCIPAL CONSUMING COUNTRIES, 1900-29^a
(Five-year averages, in millions of fine ounces)

Period	United States	Great Britain	France	Sweden	Switzerland
1900-04.....	17.4	8.3	7.1	0.2	1.7
1905-09.....	24.4	7.9	8.0	0.3	2.2
1910-14.....	29.4	11.4	7.9	0.3	2.0
1915-19.....	31.6	8.2	...	0.4	1.7
1920-24.....	34.4	8.0	8.7	0.3	1.2
1925-29.....	39.1	8.4	10.5	0.4	1.2

^a Compiled from *Annual Reports of the Director of the Mint*. The European figures are based on reports submitted annually to the Director of the Mint by ambassadors and ministers of the United States accredited to the respective countries. They are more or less rough estimates. All figures in the table include both old and new silver consumed industrially.

The chart on page 31 compares the industrial consumption of silver with the physical volume of all manufactures in the United States. It also shows the increased use of old silver in manufacturing. Year-to-year variations appear in the industrial consumption of silver, but these movements do not always correlate with the cyclical

cal fluctuations of general manufacturing. The curve representing consumption of silver should probably show a slight depression in 1921 instead of a steep decline in 1920.²⁶ Estimates by Handy and Harmon indicate a decrease in 1921 and, according to the *Census of Manufactures*, silversmithing and the manufacture of sterling and plated silverware were considerably less in 1921 than in 1919, a year in which manufacturing data closely resembled those of 1920. The trend for industrial consumption of silver and the trend for production of manufactured articles are both upward, but, while the index of manufactures has increased at a steady rate, the rate of increase in silver production has been slowing down throughout the three decades.

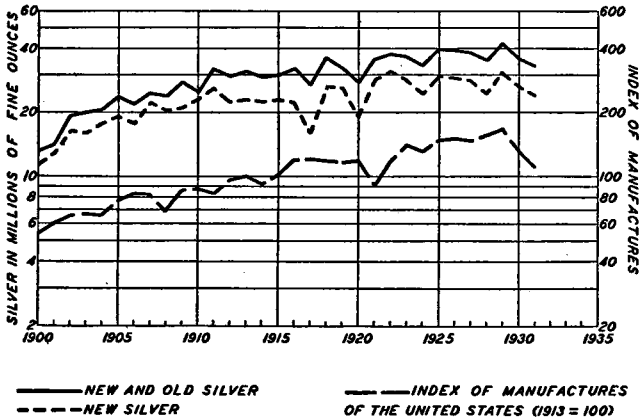
The gap between total consumption of silver and consumption of new silver has widened somewhat since 1911 because of the growing use of secondary or old silver. The proportion of the industrial demand for silver which has been satisfied by secondary silver is shown in the following average percentages for the years 1880-1929.²⁷

Period	Percentage	Period	Percentage
1880-84	6.7	1905-09	17.4
1885-89	12.0	1910-14	19.9
1890-94	11.7	1915-19	27.8
1895-99	11.0	1920-24	23.0
1900-04	14.4	1925-29	26.4

²⁶ An examination by Mr. Frantz of the Statistical Division of the Bureau of the Mint revealed that the sales of new silver reported by one of the largest dealers were entirely too low in 1920 and somewhat too high in 1921 as compared with sales in a number of preceding and following years. As the reporting firm is no longer in business the sales figures cannot be checked and corrected.

²⁷ Computed from data published in *Annual Reports of the Director of the Mint*.

INDUSTRIAL CONSUMPTION OF SILVER IN THE UNITED STATES COMPARED WITH THE INDEX OF MANUFACTURES, 1900-31^a



^a The index numbers of production of manufactures for the United States are from the following sources: 1900-23, *Recent Economic Changes in the United States*, National Bureau of Economic Research, Inc., Vol. II, p. 449; 1924-29, *Journal of the American Statistical Association*, December 1930, pp. 453-59; 1930-31, *Annual Report of the Federal Reserve Board*, 1931, p. 201.

The data for industrial consumption of silver in the United States are from the *Annual Reports of the Director of the Mint*. For a description of the method by which these figures were compiled, see *Annual Report of the Director of the Mint*, 1932, p. 62.

Thus from 7 per cent in 1880-84 the proportion grew to 14 per cent in 1900-04, to almost 28 per cent in the exceptional years 1915-19, and it stood at more than 26 per cent in 1925-29.²⁸ Undoubtedly the use of old silver in the arts and industries will continue to grow, which means that it will displace more and more new silver.

²⁸ There is a tendency in recent years for manufacturers of silverware to send their scrap metal to refineries instead of refining it themselves as they formerly did. Such silver is included in the "old silver" recorded by the Director of the Mint and may exaggerate the percentages for recent years.

Statistics showing the quantities of silver consumed by the different industries in the United States over a long period of time are not available. Recently, however, the Bureau of Mines of the United States Department of Commerce has compiled figures which show that during 1928-31 the sterling silverware industry consumed annually an average of 35 per cent of all silver consumed industrially; the photographic industry 25 per cent; and the electroplating industry 15 per cent. These three industries absorbed approximately 75 per cent of the silver consumed in the arts and industries in the United States.

As shown by the table on page 33, the sterling silverware and the photographic industries maintained a relatively high level of consumption throughout the four years. Though in 1931 the absolute consumption by these two industries was slightly less than in 1929, its relative importance had increased. In the case of the sterling silverware industry the remarkable recovery in 1931 after the drop in 1930 can probably be attributed to the lower price of silver, which made it feasible for the sterling silverware manufacturers to market their wares at lower prices. The sustained consumption in the photographic industry is to be ascribed to the continued absorption of silver by the motion picture industry.

The electroplating industry is more sensitive to economic conditions than the other silver-using industries. This is strikingly shown by a comparison of the figures for plated silverware and sterling silver. Whereas the absolute and relative amounts of silver consumed for the former declined steadily in 1930-31, the silver utilized by the latter increased relatively. The consumption of

PRINCIPAL INDUSTRIAL USES OF SILVER IN THE UNITED STATES, 1928-31^a
(In millions of fine ounces and as percentages of industrial consumption in the United States)

Industry	1928		1929		1930		1931	
	Quantity	Per Cent	Quantity	Per cent	Quantity	Per cent	Quantity	Per cent
Sterling silverware.....	9.4	36.4	9.9	34.4	7.5	31.5	8.8	37.4
Photographic.....	6.6	25.4	7.6	26.6	7.5	31.5	6.6	27.9
Electroplating.....	3.8	14.9	4.1	14.4	2.8	11.6	2.3	9.8
Jewelry, novelties, and optical goods.	2.2	8.6	2.6	9.0	2.2	9.2	2.1	8.8
Chemical ^b	1.5	6.0	1.8	6.2	1.7	7.0	1.5	6.2
All other.....	2.3	8.7	2.6	9.4	2.2	9.2	2.3	9.9
Total consumption.....	25.8	100.0	28.6	100.0	23.9	100.0	23.6	100.0

^a These data were obtained directly from manufacturers of silver products by questionnaires sent out by the Bureau of Mines. They are in close agreement with data compiled by the Director of the Mint. See C. W. Merrill, "Consumption of Silver in the Arts and Industries of the United States," *U. S. Bureau of Mines Economic Paper 14 and Information Circular 6647* (mimeographed).

^b Exclusive of silver products prepared for the photographic and electroplating industries.

silver by manufacturers of optical goods and silver novelties has remained remarkably steady.

Only a small fraction of the silver consumed by the chemical industry is actually used in chemical laboratories or for medicinal purposes. The greater part of it is merely prepared for ultimate disposal by the photographic, electroplating, and mirror-making industries. Consumption by the chemical industries was well sustained throughout the four years. Silver consumption by "all other" industries represents absorption by manufacturers of dentist supplies, electrical equipment, mechanical refrigerators, and other products requiring the use of silver solder. These manufacturers likewise consumed silver at a surprisingly steady rate.

The most distinctive characteristic of the silver-using industries in the United States is the sustained consumption of silver throughout the years 1928-31. In all of these industries except electroplating the amount of silver absorbed during 1930 and 1931, when general production suffered an unprecedented decline, remained close to the high level established in the prosperous years 1928 and 1929.

Data for as few as four years do not permit a study of the trend of the principal silver-using industries. But fortunately we have fairly reliable estimates of the silver consumed during a longer period in the United States and Canada by the sterling silverware, the chemical, and the plated-ware industries, which together absorb over 80 per cent of the amount of silver industrially used in the United States. Since Canada consumes only a small part of this silver,²⁹ these estimates may be taken to rep-

²⁹ The following comparison of industrial consumption of silver in the United States and Canada during the years 1928-31, for which com-

resent absorption by these three principal industries in the United States alone. The chart on page 37 indicates that the consumption of silver by the three industries is quite similar in trend and in year-to-year movements to the consumption of silver by all industries in the United States as estimated by the Director of the Mint, if a correction be made for the years 1920 and 1921.⁸⁰ Furthermore, the table on page 36 shows that the estimated amounts of silver consumed by the three industries in the two countries during the years 1928-31 are in close agreement with the quantities of silver absorbed by the sterling silverware, electroplating, and chemical-photographic industries in the United States alone⁸¹ during the same period. The estimated figure may therefore be taken as a dependable indication of the course for the past 13 years of the silver consumed by the three industries, if not in the United States alone, at least in the United States and Canada.

The sterling silverware industry, which consumed during the greater part of the period as much silver as the other two, appears to have stopped growing since

parable data are available, indicates that the amount of silver consumed by Canadian industries constitutes but a small proportion of the silver industrially utilized in this country (in millions of fine ounces).

Year	United States and Canada	United States	Canada
1928	33.5	24.9	8.6
1929	37.0	31.0	6.0
1930	29.5	26.9	2.6
1931	30.5	24.3	6.2

Figures for the United States and Canada are estimates from Handy and Harman, *Reviews of the Silver Market*; for United States are from the *Annual Report of the Director of the Mint*, 1932. Figures for Canada are the difference between the first two columns.

⁸⁰ See p. 29.

⁸¹ See the table on p. 33.

**PRINCIPAL INDUSTRIAL USES OF SILVER IN THE UNITED STATES AND CANADA,
1920-32***

(Estimated in millions of fine ounces)

Calendar Year	Sterling Silverware	Chemicals	Plated-Ware	Total
1920.....	8.7	4.4	5.1	18.2
1921.....	7.8	4.2	2.8	14.8
1922.....	11.1	4.8	4.0	19.9
1923.....	12.4	5.8	5.0	23.2
1924.....	12.1	6.5	4.6	23.2
1925.....	13.8	7.8	4.8	26.4
1926.....	14.2	9.4	5.1	28.7
1927.....	13.9	9.5	5.0	28.4
1928.....	14.3	9.6	4.8	28.7
1929.....	14.2	11.5	5.0	30.7
1930.....	10.5	10.1	3.3	23.9
1931.....	11.7	10.9	2.9	25.5
1932.....	10.3	9.1	2.0	21.4

* Estimated on the basis of index numbers computed by Handy and Harman representing the estimated silver consumption of the three principal silver-using industries in the United States and Canada. The original indexes, which were supplied to the writer through the courtesy of Handy and Harman, are as follows:

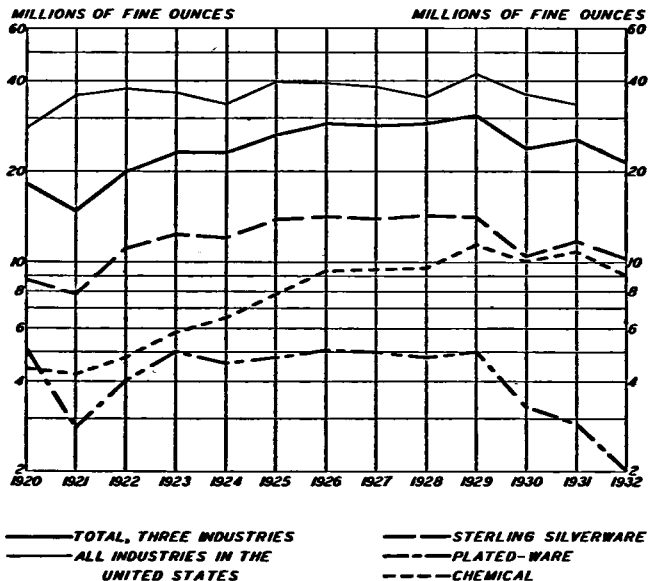
Year	Sterling Silver-ware	Chemi-cal	Plated-ware	Year	Sterling Silver-ware	Chemi-cal	Plated-ware
1920....	100.0	51.0	58.0	1927....	160.1	109.2	57.7
1921....	89.5	49.0	31.8	1928....	165.0	111.1	54.8
1922....	128.1	55.6	45.7	1929....	164.0	132.9	57.1
1923....	142.8	66.9	57.4	1930....	121.6	117.0	37.8
1924....	139.1	74.9	52.7	1931....	135.1	126.0	33.9
1925....	159.5	89.6	55.9	1932....	118.4	104.7	23.4
1926....	163.6	108.7	58.3				

One hundred is equal to the total ounces of fine silver consumed in the manufacture of sterling silverware (both flatware and hollow-ware) in 1920. This has been used as an index basis for all other figures.

Our figures were obtained by the following method. Handy and Harman estimated that in 1928, 33.5 million fine ounces of silver were consumed by the silver-using industries in the United States and Canada. According to the Bureau of Mines 83 per cent of the silver industrially consumed by silver-using industries in the United States in 1928 was absorbed by the sterling silverware, the electroplating, and the chemical (including the photographic) industries. Assuming that 83 per cent of 33.5 million ounces, or 27.8 million ounces, were distributed among the three industries in accordance with the Handy and Harman indexes for 1928, we find that 100 represents 8.7 million fine ounces.

Thus, 1928: Sterling silverware index.....	165.0
Chemical index.....	111.1
Plated-ware index.....	54.8
	330.9=27.8 million fine ounces
Therefore	100.0= 8.7 million fine ounces

CONSUMPTION OF SILVER BY PRINCIPAL SILVER-USING INDUSTRIES IN THE UNITED STATES AND CANADA, 1920-32^a



^a Data for the three industries given separately and as a total are from the table on p. 36; those for "All Industries in the United States" are from the *Annual Report of the Director of the Mint*, 1932, p. 38. The latter figures represent the total consumption of new and old materials by all industries in the United States.

1925. This observation is affirmed by the *Census of Manufactures*, which shows that the "values added by manufacture" in the silversmithing and silverware industries in the United States have remained practically static since 1925. The 1930 decline in the sterling silverware industry and the recovery in the following year, which we have already noted, are also observable here.

Absence of growth and greater cyclical fluctuations—the sharp depression in 1921, the moderate recession in 1924, and the severe drop in 1930-32—characterize the plated-ware industry. The demand for plated ware, unlike that for sterling silver, which is relatively inelastic, is evidently subject to considerable variation. In times of economic distress people are likely to substitute unplated or lightly plated ware for heavily plated ware.

The consumption of silver by the chemical industry for the most part represents the production of silver nitrate, most of which, as has already been pointed out, ultimately finds its way into the photographic, mirror-making, and electroplating industries.⁸² Since the photographic industry takes more than 80 per cent of the silver-bearing products of the chemical industry, the course of silver consumption by the latter may be considered as that of the former; and since the motion picture industry in turn consumes most of the products of the photographic industry, the consumption of silver by the chemical industry may be taken to represent the productive activities of the motion picture industry also. The trend of consumption by the chemical group, as shown in the chart on page 37, is rising persistently and rapidly. A

⁸² The following figures, which are computed from data compiled by the Bureau of Mines and published in Merrill, *Information Circular No. 6647*, show the average annual distribution during 1928-31 of the silver-bearing products of the chemical industry among the silver-using industries in the United States:

Industry	Millions of Fine Ounces	Percentage Distribution
Photographic	8.8	83.2
Electroplating	0.2	1.6
Mirror-making	0.3	3.1
Laboratory and medicinal use	0.1	1.2
Miscellaneous, and sales to jobbers..	1.2	10.9
Total	10.6	100.0

study of the growth of the motion picture industry in the United States from 1919 to 1931, as measured by "values added by manufactures" of the *Census of Manufactures*, reveals that its rate of increase parallels that of the consumption of silver by the chemical industry.

The use of silver by the chemical industry will probably continue to increase in the near future. The development of talking films, which makes it necessary for producers to have plays re-acted in foreign languages for export,⁸³ and the adoption of wider screens requiring wider films will probably further increase the use of silver in the motion picture industry.⁸⁴ If consumption of silver by the chemical industry continues to increase at its present rate, as it probably will, it will soon exceed that of the sterling silverware industry, as yet the largest industrial silver consumer. It is the rising demand for silver by the chemical industry which is responsible for the upward trend in the industrial consumption of silver. Indeed, had it not been for the greater consumption in the chemical industry, the increasing use of secondary silver would have caused an absolute as well as a relative decline in the industrial consumption of new silver.

This analysis does not encourage the hope that there will be a considerable increase in the demand for new silver in the arts and industries in the near future. If the

⁸³ Formerly, films for export needed only to have the subtitles on the positive films translated into the desired language. Since the advent of the talkies it is necessary to have plays retaken on negative films, from which positives are developed for the export trade. A negative film of a play is many times the length of a positive and requires a denser coat of silver.

⁸⁴ Recording pictures on wide films is still in the experimental stage but, should it attain a commercial scale, more silver would undoubtedly be absorbed, as the quantity of silver consumed by the motion picture industry varies with the width of the film used.

use of old silver continues to increase and the demand for sterling and plated silverware remains practically constant, or even increases slightly, there will probably be an absolute decline in the consumption of new silver. It is generally agreed that the tendency of silver to tarnish and exorbitant retail prices are the two serious obstacles to the wider use of silverware. It is clear that if the consumption of silver is to be increased, producers must create a greater demand for fabricated articles. They must develop some inexpensive non-tarnishable silver alloy,³⁵ secure the reduction of the present prohibitive retail prices to reasonable levels, and discover some new industrial uses for silver. It seems probable that they will prefer to regulate the sales of silver, and to demand the establishment of bimetallism and the restoration of silver coins to their former fineness.

III. INDIA'S DEMAND FOR SILVER FOR OTHER THAN MONETARY USE

In addition to consuming silver for monetary purposes, India has long been absorbing large quantities for private uses. These private uses are generally termed "hoarding" and take the form of private storing of silver in the form of ornaments or actual bullion. It is estimated that 90 per cent of the silver consumed for private purposes is made into ornaments while only 10 per cent is stored as bullion.³⁶ Since ornaments and bul-

³⁵ At the direction of the U. S. Senate Commission on Gold and Silver Inquiry, the Bureau of Standards and the Bureau of Mines made a joint investigation on tarnish resisting silver alloys in 1927. They failed to discover any non-tarnishing composition and came to the conclusion that the development of such an alloy would be unlikely. See L. Jordan, L. H. Grenell, and H. K. Herschman, "Tarnish Resisting Silver Alloys," *U. S. Bureau of Standards Technologic Paper No. 348*, 1927, p. 496.

³⁶ See D. C. Bliss, "The Bombay Bullion Market," *U. S. Bureau of Foreign and Domestic Commerce Trade Information Bulletin No. 457*, 1927, pp. 40-41.

lion are inter-convertible, the former not only have decorative value but constitute a reserve supply of capital. In times of stress they can be sold for their bullion content. Since 1921 India has consumed yearly, for other than monetary uses, an average of 85 million fine ounces of silver, or over 35 per cent of the world's annual production. Despite the fact that the government has been demonetizing some of its silver coins, therefore, India is one of the largest factors in the silver market.

It is generally maintained that India's demand for silver for private uses is governed by the condition of its trade balance. Primarily an agricultural country, India produces an excess of raw materials, which it exports to industrial countries in exchange for manufactured goods. Because of retarded industrial development and a low standard of living, exports practically always exceed imports in value.⁸⁷ The trade balance is usually settled by the importation of silver and gold.

The chart on page 42 shows the trade balance⁸⁸ and net imports of silver and gold of India, on private account, for the years 1900-14 and 1920-32. It is apparent that while a marked correlation exists between the net exports of merchandise and net imports of gold, the relationship between variations in the trade balance and in net imports of silver is not at all close.

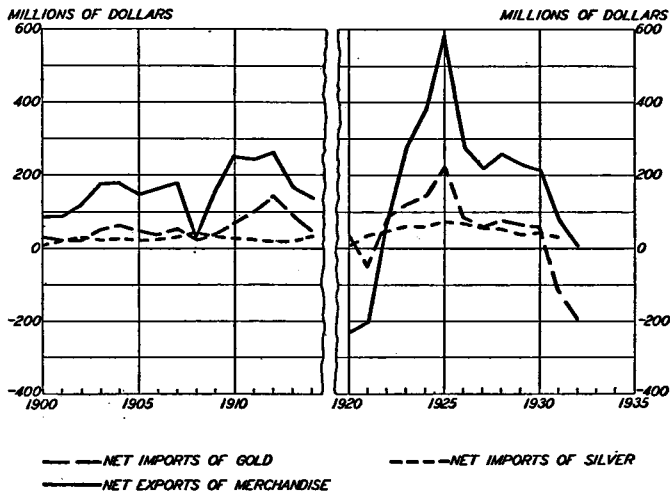
During 1900-14 net silver imports seem to vary in-

⁸⁷ A considerable part of India's merchandise exports goes to meet annual interest payments due to foreigners. During the fiscal year 1929-30 these payments amounted to approximately 360 million rupees, or 130 million dollars. See *Memorandum on International Trade and Balances of Payments, 1927-1929*, League of Nations Document No. II (Economic and Financial) 1930. II. 54, Vol. II, p. 122.

⁸⁸ Exports and imports on government account (which were negligible) and re-exports are excluded. "Trade balance" throughout this section represents the difference between private exports of Indian merchandise and private imports of general merchandise.

versely with changes in the export balance of trade and in the import balance of gold. In other words, while the curves for net exports of merchandise and net imports of gold move together, the curve for net imports of sil-

INDIA'S NET PRIVATE EXPORTS OF MERCHANDISE AND NET PRIVATE IMPORTS OF GOLD AND SILVER COMPARED, 1900-14 AND 1920-32^a



^a To facilitate a visual comparison of the figures, net *exports* of merchandise and net *imports* of gold and silver are plotted as *positive* quantities and vice versa, net imports of merchandise and net exports of gold as negative quantities. Data are from the table on p. 155.

ver tends to move in the opposite direction. This inverse relationship between silver imports and the other two series is more clearly shown in the accompanying table, in which net imports of silver are expressed as percentages of net imports of gold and net exports of merchandise. These percentages move in the opposite direction to

THE DEMAND FOR SILVER

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NET PRIVATE IMPORTS OF SILVER INTO INDIA COMPARED WITH NET PRIVATE
IMPORTS OF GOLD AND NET PRIVATE EXPORTS OF MERCHANDISE,
1900-32^a

Calendar Year	Net Imports of Silver			Net Ex- ports of Merchan- dise ^b (In millions of dollars)	Net Im- ports of Gold ^c (In millions of dollars)
	In Millions of Dollars	<i>As Percent- age of Net Exports of Merchandise</i>	<i>As Percent- age of Net Imports of Gold</i>		
1900.....	4.3	4.5	15.6	95.9	27.5
1901.....	15.8	16.0	84.5	98.6	18.7
1902.....	25.0	19.4	126.3	129.1	19.8
1903.....	21.0	11.2	41.3	187.9	50.9
1904.....	23.4	12.4	37.0	189.3	63.3
1905.....	18.5	11.7	39.6	157.7	46.7
1906.....	20.9	12.0	53.0	173.7	39.4
1907.....	29.2	15.3	53.6	191.2	54.5
1908.....	41.4	105.1	184.8	39.4	22.4
1909.....	33.1	19.9	86.2	166.5	38.4
1910.....	24.8	9.4	33.1	263.8	74.9
1911.....	21.9	8.3	21.5	262.8	101.7
1912.....	18.5	6.6	12.9	279.3	143.6
1913.....	18.0	6.3	19.5	287.8	92.5
1914.....	32.4	20.6	74.1	157.0	43.7
1920.....	5.9	0.0	15.8	-119.8	37.4
1921.....	36.8	0.0	0.0	-157.4	-51.3
1922.....	46.9	41.0	54.2	114.4	86.6
1923.....	61.7	18.6	50.6	331.4	122.0
1924.....	59.6	13.9	41.4	428.4	143.7
1925.....	73.4	11.7	33.3	627.3	220.6
1926.....	68.2	21.7	80.8	314.3	84.4
1927.....	55.0	21.5	92.1	255.6	59.7
1928.....	52.7	17.9	68.5	294.7	76.9
1929.....	36.9	14.1	57.1	261.4	64.6
1930.....	44.2	19.0	77.5	233.0	57.0
1931.....	27.1	27.7	0.0	98.0	-115.6
1932.....	... ^d	... ^d	0.0	12.1	-195.7

^a Compiled from annual *Accounts Relating to the Sea-borne Trade and Navigation of British India*, Department of Commercial Intelligence and Statistics, Calcutta. The original figures, which were in rupees or pounds sterling, have been converted into dollars at the average rate of exchange of each year. The war years 1915-19 were omitted from consideration because, owing to the world shortage of gold and silver, to the many impediments to the free flow of treasure, and to the restriction on private importation of treasure by the Indian government, practically no gold or silver was imported into India on private account during this period.

^b The minus sign denotes a net import.

^c The minus sign denotes a net export.

^d Statistics for silver imports are incomplete for 1932. See footnote 40, p. 44.

net imports of gold and merchandise. Evidently gold was more desirable than silver for hoarding purposes in times of prosperity.

During 1920-32 there was a slight tendency for silver imports to move in the same direction as the export trade balance and gold imports. The significant fact brought out by this analysis is that net imports of silver vary little from year to year and that, while India's demand for gold for private use is largely determined by the status of its trade balance, its demand for silver for private purposes, contrary to the common assumption, bears no fixed relationship to its trade balance.

The common belief that gold imports for private purposes have been increasing at the expense of silver imports for similar purposes in recent years is also unfounded. The table on page 43 shows that the net imports of silver dropped from 54 per cent of the net imports of gold in 1922 to 33 per cent in 1925. During this period the net exports of merchandise increased from 114 million to 627 million dollars. In 1926-30, when the net exports of merchandise fell (to 233 million dollars in 1930), net silver imports constituted on the average over 75 per cent of the net imports of gold. And in 1931-32, when the trade balance became less favorable and when there was a large net export of gold,³⁹ silver was imported on net balance.⁴⁰ The fact is that gold imports

³⁹ The net outflow of gold during 1931-32 was induced by the suspension of gold payments by England as well as by the less favorable balance of trade of India.

⁴⁰ Statistics of the net imports of silver into India for 1932, and perhaps for 1931, do not indicate the actual amount of silver absorbed by the Indians. Because of the high import duty of 7.5 annas on an ounce of silver, which at the prices of bullion current in 1932 amounted to over 40 per cent of the value, a considerable quantity of silver was smuggled into the country or brought across the land border of Burma, where

increased when the trade balance became relatively more favorable and decreased when the trade balance became relatively less favorable, that silver imports did not vary in close conformity with either merchandise exports or gold imports, and that there has not been any tendency for gold imports to displace silver for private purposes in recent years.

PRIVATE NET IMPORTS AND GOVERNMENT NET IMPORTS OF SILVER INTO INDIA, 1921-32^a
(In millions of fine ounces)

Calendar Year	Net Private Imports	Net Government Imports ^b
1921.....	51.4	0.3
1922.....	75.2	1.0
1923.....	91.9	1.0
1924.....	86.4	0.2
1925.....	99.9	-0.1
1926.....	105.9	0.2
1927.....	93.1	0.1
1928.....	87.7	-19.0
1929.....	66.1	-19.5
1930.....	78.4	-15.1
1931.....	60.9	-23.8
1932.....	... ^c	-24.1

^a Compiled from annual *Accounts Relating to the Sea-borne Trade and Navigation of British India*.

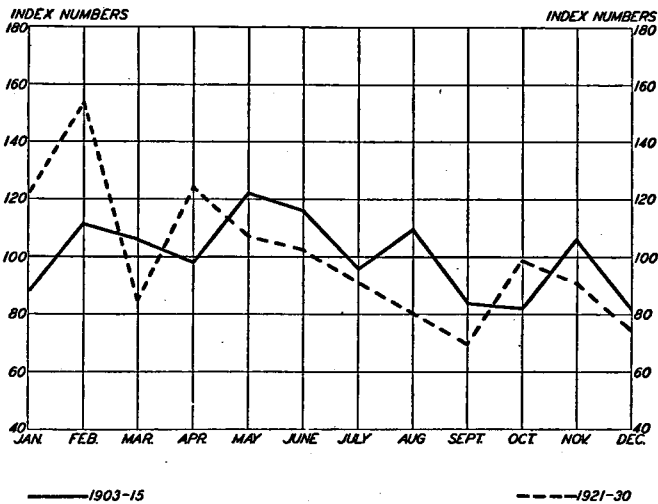
^b Minus sign indicates a net export.

^c Statistics are incomplete. See footnote 40, p. 44.

The table on this page compares net imports of silver into India for private use with those for government account during 1921-32. Although prior to the close of

no customs existed. Such silver was not recorded in the customs reports. It is not known how much silver actually went into private uses in 1932, but Handy and Harman estimated that the net amount consumed during the year was 12 million ounces. (*Review of the Silver Market, 1932*, pp. 14-15). As the Indian government exported 24 million ounces in 1932, the Indians must have absorbed approximately 40 million ounces of silver for private purposes. (See table on this page.)

INDEXES OF SEASONAL VARIATIONS IN INDIA'S SILVER
IMPORTS ON PRIVATE ACCOUNT, 1903-15 AND 1921-30^a



^a These seasonal indexes were computed by the writer for two separate periods, 1903-15 and 1921-30, by the method of "twelve-month moving average," from figures of private imports of silver in standard ounces compiled from monthly *Accounts Relating to the Sea-borne Trade and Navigation of British India*. The figures plotted in the above chart are as follows:

Month	1903-15	1921-30	Month	1903-15	1921-30
January	87.9	121.7	July	96.0	91.2
February	111.2	153.6	August	109.4	80.5
March	106.0	85.1	September	83.8	69.6
April	98.0	124.1	October	82.1	98.9
May	122.1	107.2	November	105.6	90.8
June	116.1	102.4	December	81.9	74.9

the World War the government had imported an average amount of 40 million ounces annually, since then it has imported negligible quantities. Beginning in 1928 the exportation of demonetized silver produced a net

export balance on the government account.⁴¹ The decline in net imports of silver on private account during 1927-32 was evidently due to domestic sales of demonetized silver by the government.

India's demand for silver for private purposes, although more or less independent of the trade balance, is considerably influenced by seasonal factors, as may be seen from the accompanying chart. The high points early and late in each year are probably due to the harvesting of the two major crops, the "rabi" and the "kharif."⁴² The high point in April or May can be attributed to the Hindu marriage season, which is usually accompanied by a marked increase in the use of treasure for the fabrication of ornaments. Since the war the seasons of silver imports appear to have undergone some changes. The high points in the spring and fall of the year are more marked. The imports during the spring attain a peak in April whereas in the pre-war years the imports for the marriage season reached the high point a month later.

IV. CHINA'S DEMAND FOR SILVER

Whether in coin or in bullion, silver circulates in China at its bullion value. As a result there is a considerable and continuous interflow of silver between monetary and industrial uses. Even if we had accurate coinage statistics it would therefore be impossible to ascertain what proportion of the net imports of silver goes into other than monetary uses. Consequently we shall not

⁴¹ According to the Controller of the Currency the total amount of silver sold by the government of India from 1927 to the end of the fiscal year 1931-32 aggregated 128 million fine ounces. See *Report of the Controller of the Currency*, Calcutta, 1931-32, p. 10.

⁴² See Bliss, *U. S. Bureau of Foreign and Domestic Commerce Trade Information Bulletin No. 457*, p. 6.

attempt to distinguish non-monetary from monetary demand in this analysis.

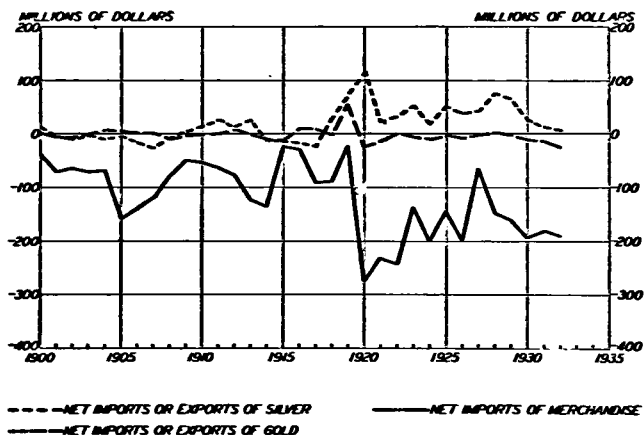
Changes in China's trade balance⁴⁸ and net imports or exports of silver and gold during 1900-32, in terms of value, are shown in the accompanying chart. It will be noted that the trade balance has generally been more adverse since 1919 than previously and that the silver curve has moved in rough conformity with that of the trade balance. There are many close agreements between year-to-year changes in the two lines and some instances of contradiction. Since many things which affect silver movements do not affect merchandise and vice versa, perfect conformity would not be expected. In general, it may be said that there is approximate correlation between silver and the merchandise balance. The gold curve, on the other hand, shows practically no correlation with the trade balance.

The relationship between changes in China's foreign trade and net imports or exports of silver may be more readily seen in the chart on page 50, which shows net imports or exports of silver in fine ounces and the percentage ratio of the index of the physical volume of Chinese exports to the index of the physical volume of Chinese imports. The ratios are in close agreement with net imports of merchandise as given in the preceding chart. Changes in the money value of the trade balance are clearly in the same direction as changes in the physical volume. In the chart on page 50 the changes in the silver curve from 1900 to 1919 lag approximately two years behind those in the ratio line. It seems that when exports increase for two consecutive years relatively to

⁴⁸ In this section the term "trade balance" means the merchandise trade balance. Imports and exports of silver and gold are excluded.

imports, more and more silver is imported, and that when exports decrease continuously for two years, more and more silver is exported.

CHINA'S NET IMPORTS OF MERCHANDISE AND NET IMPORTS OR EXPORTS OF GOLD AND SILVER COMPARED, 1900-32^a

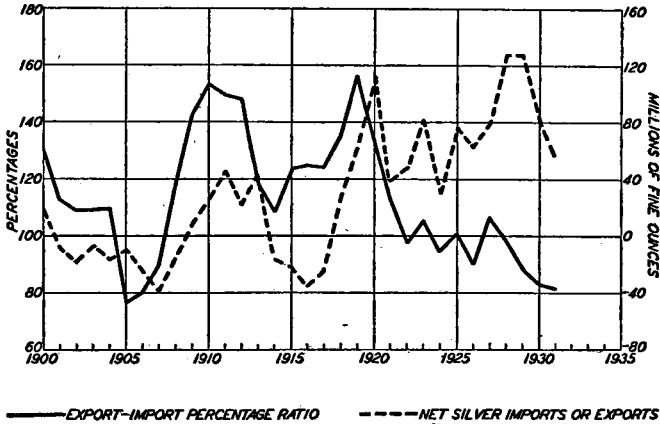


^a Data are from the *Foreign Trade of China*, Chinese Maritime Customs. The figures, originally in Haikwan taels, were converted into dollars at the average exchange rate for each year. To facilitate a graphic comparison of the figures, net imports of gold and silver are plotted as positive and net exports of gold and silver as negative quantities, while net imports of merchandise are plotted as negative quantities.

Beginning in 1920 the balance of trade became generally more unfavorable, while net imports of silver showed an upward trend (see the chart on this page). The continually unfavorable balance of trade⁴⁴ must

⁴⁴ China has had an adverse balance of trade almost always since 1864, when the customs statistics were first published. With the exception of six years, 1864, 1872-76, imports have habitually exceeded exports. Possibly the unfavorable balance was smaller than it appears for there is little doubt that the existence of an export duty in China has given rise to

CHINA'S NET IMPORTS OR EXPORTS OF SILVER COMPARED
WITH THE PERCENTAGE RATIO OF THE INDEX OF CHINESE
PHYSICAL EXPORTS TO THE INDEX OF CHINESE
PHYSICAL IMPORTS, 1900-31^a



^a Figures for imports and exports of silver are from the *Foreign Trade of China*, Chinese Maritime Customs. They were converted from Haikwan taels into fine ounces at 1.20665 ounces per tael. The basic data for the export-import percentage ratio curve are the physical volume indexes of China's exports and imports, presented in Table IV, p. 146. For these indexes the average for 1923-25 = 100.

have been settled by the invisible items, of which we have no reliable statistics. Estimates of China's balance of international payments by various authorities differ widely but they are in agreement in designating foreign investments and remittances by Chinese emigrants as

some under-valuation of declared exports. It should be remembered that the trade figures as shown in the chart on p. 49 are in dollars, which have been appreciating in value both in terms of silver and commodities. China's balance of trade, therefore, has in recent years been continuously more unfavorable in terms of the tael or commodities than it appears to be on the chart.

the two important invisible items which largely offset the adverse trade balance.⁴⁵

Whatever the invisible items may be which enable China to pay for its habitual net imports of merchandise, they must have increased considerably during the recent period. According to international trade theory, therefore, we should expect the gross barter terms of trade to become more favorable to China; that is, because of the growing influx of invisible items into China, the physical volume of Chinese imports of merchandise should increasingly exceed the physical volume of Chinese exports of merchandise.⁴⁶ This is indeed the case. It will be observed from the chart on page 50 that, beginning in 1920, the trend of the ratio of exports to imports⁴⁷ has been downward. Evidently it is the increasing inflow of invisible items which permits China to offset a mounting unfavorable merchandise balance and at the same time to pay for the rising imports of silver in recent years.

⁴⁵ Perhaps the most careful estimates made of China's international balance of payments are those of Professor C. F. Remer. He has not yet published his results, but he has kindly shown the author his tentative figures for 1928, which indicate that remittances from Chinese overseas, investments of foreigners in China, and remittances for military and naval establishments are the three main invisible items which enable China to settle its unfavorable balance. Compare the estimates of China's balance of payments by Wagel, Morse, Nelson, and *Capital and Industry*, compiled in the *Nankai Weekly Statistical Service*, Sept. 22, 1930, p. 38. The fact that China has not been paying some of its private foreign debts in recent years may partly account for the increase in Chinese imports.

⁴⁶ For a discussion of the effect of invisible items on the barter terms of trade, see F. W. Taussig, *International Trade*, 1927, pp. 113-22.

⁴⁷ The method of measuring the gross barter terms of trade by taking the ratio of the index of the physical volume of exports to the index of the physical volume of imports is devised by Professor Taussig. This ratio is generally known as the index of the gross barter terms of trade. It should be pointed out that the index does not disclose whether the terms of trade in a given year are favorable but whether they are more or less favorable compared to that of the base year. See Taussig, the same, pp. 251-52.

China did not become an important consumer of silver until recently. During the decade 1900-09 China actually exported silver, and during the next decade, although imports exceeded exports, net imports were relatively small. It is only since the war that China has become a significant factor in the silver market. For the period 1925-29 it imported on the average 95 million

CHINA'S NET IMPORTS OF SILVER AND GOLD, 1900-31^a
(In millions of dollars)

Period	Net Imports of Silver ^b	Net Imports of Gold ^b
1900-04.....	-2.9	-0.8
1905-09.....	-9.7	-0.3
1910-14.....	14.1	-0.8
1915-19.....	11.1	12.7
1920-24.....	49.5	-8.7
1925-29.....	56.2	-0.9
1930.....	30.9	-7.6
1931.....	15.1	-10.9

^a Data are taken from *Foreign Trade of China*, Chinese Maritime Customs. The original figures in Haikwan taels have been converted into dollars at the average rate of exchange for each year. Prior to 1930 the figures are five-year averages.

^b Net exports are indicated by the minus sign; net imports are shown as positive numbers.

ounces annually,⁴⁸ or 37 per cent of the world's production. In spite of the world depression and the many civil and foreign disturbances which the Chinese people have suffered in the past two years, China has continued to be a net importer of silver. The story of gold does not parallel that of silver. China has almost always been a net exporter of gold.⁴⁹ Only during the World War, when

⁴⁸ See the table on p. 53.

⁴⁹ China produces practically no gold. Its net exports are probably derived from the gold brought into the country by Chinese emigrants. The gold brought to China by returning emigrants is not recorded by the Maritime Customs, while exports of the metal usually are. For this reason the Maritime Customs figures almost always indicate a continual net export.

there was a decline in the value of gold relatively to that of silver, did imports exceed exports.

The silver that has been imported into China is largely located in the coast cities and treaty ports. Although Shanghai is the only city for which we have statistics to

NET IMPORTS OF SILVER INTO CHINA AND SILVER STOCKS AT SHANGHAI
1918-32
(In millions of fine ounces)

Calendar Year	Net Imports ^a	Shanghai Stock ^b
1918.....	28.4	37.5
1919.....	64.1	36.2
1920.....	111.7	52.9
1921.....	39.1	59.5
1922.....	47.8	62.7
1923.....	81.1	52.6
1924.....	31.4	73.1
1925.....	75.4	103.3
1926.....	64.2	120.2
1927.....	78.6	125.8
1928.....	128.4	122.1
1929.....	127.7	182.2
1930.....	81.0	223.6
1931.....	55.0	204.1
1932.....	29.3	257.7

^a The original data are from *Foreign Trade of China*, Chinese Maritime Customs. They have been converted from Haikwan taels into fine ounces at 1.20665 ounces per tael.

^b Computed from data compiled in Samuel Montagu's *Weekly Bullion Letters*. The original data are yearly averages computed from the monthly figure nearest to the 15th of the month. The original data compiled by Montagu are in sycees, dollars, and bars. The sycees are in fine ounces, while the dollars and bars are in numbers. The dollars are converted into ounces at 0.7685 and the bars at 1,100.

show the large and growing supply, it is generally known that the commercial centers have been accumulating increasing stocks of silver.⁵⁰ Comparison of month-to-month movements of silver into China with changes in the Shanghai stock indicates that there is on the whole

⁵⁰ E. Kann has made some rough estimates of the silver stock in Tientsin, Hongkong, Hankow, and Manchuria. See *Far Eastern Financial Notes No. 126* (a mimeographed statement issued by the U. S. Bureau of Foreign and Domestic Commerce), 1933, p. 6.

a close inverse relationship between them. Even a comparison of year-to-year figures shows that in general the inverse relationship holds. The explanation is simple: Imports of silver increase when the inland demand becomes sufficiently great to drain the stocks of Shanghai and other coast cities and decrease when silver begins to flow back to the treaty ports. The significance of these stocks, therefore, is that they have a temporary or short-run effect on the demand for silver. It is for this reason that the silver dealers regard the accumulation of silver at the treaty ports as an important barometer of the silver market.

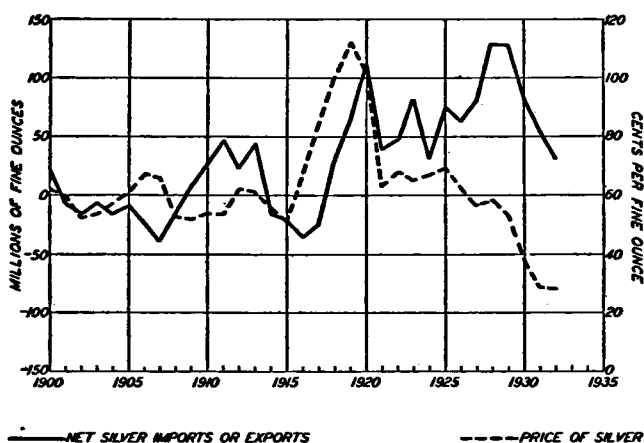
Whether or not Chinese demand for silver is stimulated by cheapness is shown in the accompanying chart, which traces the net silver imports and exports of China and the average price of silver at New York. In general, low price has a tendency to stimulate the demand for silver. Leaving out the war years, it will be seen that in the main Chinese net imports and exports of silver move in the opposite direction to the price of silver.

Is there any possibility that China may abandon the silver standard in the near future? The latest proposal for Chinese monetary reform is that of the Commission of Financial Experts,⁶¹ which provides for a gold reserve standard, to be ushered in by stages, and for the accumulation of a gold standard reserve by sales of sur-

⁶¹ The Commission of Financial Experts, of which Professor E. W. Kemmerer was president, was appointed by the Minister of Finance of China to study the currency situation in China with the view of recommending monetary reforms. On Nov. 11, 1929 the Commission submitted its findings in a volume entitled *Project of Law for the Gradual Introduction of Gold Standard Currency System in China together with a Report in Support Thereof*, which was reprinted by the Bureau of Industrial and Commercial Information, Ministry of Industry, Commerce, and Labor, Shanghai, 1929.

plus silver derived from seigniorage profits. It is, however, unlikely that such a scheme, or any scheme which has as its object the establishment of a system of token coinage, will be adopted. The maintenance of a unified system of token coinage will require a strong centralized

COMPARISON OF CHINA'S NET IMPORTS OR EXPORTS OF SILVER AND THE PRICE OF SILVER IN NEW YORK, 1900-32^a



^a Data for imports and exports of silver are from *Foreign Trade of China*, Chinese Maritime Customs. They were converted from Haikwan taels into fine ounces at 1.20665 ounces per tael. Figures for the price of silver are from the *Annual Report of the Director of Mint*, 1932, p. 127.

government capable of preventing counterfeiting at home and the smuggling of counterfeited coin from foreign countries. That such a goal could be achieved in the near future is open to serious doubt; and even if it could be, it would be no simple task to induce the Chinese people, who have become habituated to the use

of coins at bullion values, to accept a token coinage. Moreover, any scheme of monetary reform which relies upon the sale of silver to build up a gold reserve is not likely to succeed. It is difficult to conceive how, with the present low price of silver, it would be possible for China to accumulate a sufficient reserve from the sales of surplus silver to maintain a gold exchange standard. Furthermore, the adoption of such a plan would put China in the same selling role as India and would be certain to depress the price of silver to even lower levels. Thus the means would tend to defeat the end. It therefore seems quite improbable that China will abandon the silver standard, at least in the immediate future.

What conclusion can we draw respecting China's future demand for silver? We have noted that there has been a growing net import of silver since 1918, despite an increasingly adverse trade balance. Whether or not China will continue to import large quantities of silver will, of course, depend upon the continuation of those conditions which permitted an increase in net imports of merchandise and silver. But whatever the factors may be which enable China to offset its unfavorable trade balance and to import silver, there is no reason to believe that they will be greatly modified in the near future. China's demand for silver is largely for monetary purposes and there is hardly any possibility of the adoption of monetary reforms which will affect this demand. With the return of better world business conditions the continuance of the present low price of silver would be likely to stimulate demand. Silver tends to circulate at its bullion value in China. Therefore, other things being equal, if the price of silver should remain low, an additional amount of silver approximately proportionate to

the decline in the value of the metal would be required for monetary purposes. In other words, if the present low price of silver should persist for any length of time, China's monetary demand for silver would necessarily increase.

CHAPTER II

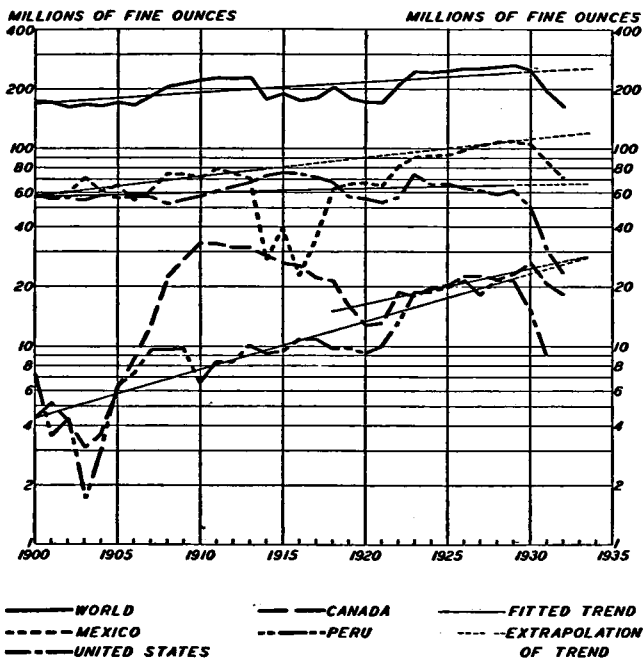
THE PRODUCTION OF SILVER

Having analyzed in the preceding chapter the statistics of the demand for silver, we shall in the present chapter examine the available data on the production of silver. In the first section we shall study the rates of growth of the silver output of the world as a whole and of the principal silver-producing countries, compare the world production of silver with the world production of all commodities and of gold, and inquire into the nationality of the capital control or ownership of silver production. In the second section we shall analyze silver production with the view of determining what proportion of it is main product, what proportion of it is a by-product of other metals, and to what extent the by-product nature of the metal tends to sustain the output in spite of the decline in price.

I. MINE AND REFINERY PRODUCTION OF SILVER

The annual mine production of silver of the world and of the four principal producing countries, Mexico, the United States, Canada, and Peru, for the years 1900-32 is shown in the chart on page 59, together with straight-line trends fitted by the method of least squares to the logarithms of the data. The world mine production increased from 168 million ounces, the annual average for 1900-04, to 254 million ounces, the annual average for 1925-29. The computed compound interest curve gives an average or normal rate of increase of 1.25 per cent per year. It will be noted that world production varied from period to period. The rapid rise from 1906

MINE PRODUCTION OF SILVER IN THE PRINCIPAL SILVER-PRODUCING COUNTRIES, WITH WORLD TOTAL, 1900-32^a



^a Sources: 1900-26, Merrill, *U. S. Bureau of Mines Economic Paper 8*, pp. 5-6; 1927-31, *Annual Report of the Director of the Mint*, 1930, pp. 260-62, and the same, 1932, pp. 148-50; 1932, Handy and Harman, *Review of the Silver Market*, 1932, p. 24.

The equations for the lines of secular trend are as follows:

World production: fitted to five-year averages of the data from 1890 to 1929, origin at 1892: $\log y = 2.156994 + 0.005379x$.

United States: fitted to five-year averages, 1890 to 1929, origin at 1892: $\log y = 1.735700 + 0.001815x$.

Mexico: fitted to five-year averages, 1890 to 1914, origin at 1902: $\log y = 1.779469 + 0.009522x$.

Peru: fitted to five-year averages, 1885 to 1929, origin at 1907: $\log y = 0.810236 + 0.024036x$.

Canada: fitted to annual data, 1918 to 1930, origin at 1924: $\log y = 1.285291 + 0.017607x$.

In each of these equations, y is in millions of ounces and the unit of x is one year.

to 1913 is largely to be attributed to the increased output of the Canadian mines. The decline during the war years, which would have been even more pronounced but for increased production in the United States, was due to the Mexican revolution, which severely curtailed production in Mexico. In 1917 Mexican production began to increase, but world production continued to fall below the computed trend until 1923 on account of diminished output in the United States, Canada, and Peru. The high level attained in 1923 and maintained until 1930 was chiefly due to increased production in Mexico, Canada, and Peru.

MINE PRODUCTION OF SILVER OF THE WORLD AND THE PRINCIPAL PRODUCING COUNTRIES, 1900-29*
(Five-year averages)

I. In Millions of Ounces

Period	World	United States	Mexico	Canada	Peru
1900-04.....	168.4	56.1	61.3	4.1	4.1
1905-09.....	188.1	55.2	65.8	15.4	8.5
1910-14.....	215.8	64.1	64.6	31.4	8.5
1915-19.....	185.5	69.1	45.2	22.3	10.1
1920-24.....	208.1	60.6	78.9	16.4	14.0
1925-29.....	254.0	61.8	102.6	22.0	20.6

II. As Percentage of World Total

Period	United States	Mexico	Canada	Peru	Four Countries
1900-04.....	33.3	36.4	2.4	2.4	74.5
1905-09.....	29.3	35.0	8.2	4.5	77.0
1910-14.....	29.7	29.9	14.6	3.9	78.1
1915-19.....	37.3	24.4	12.0	5.4	79.1
1920-24.....	29.1	37.9	7.9	6.7	81.6
1925-29.....	24.3	40.4	8.7	8.1	81.5

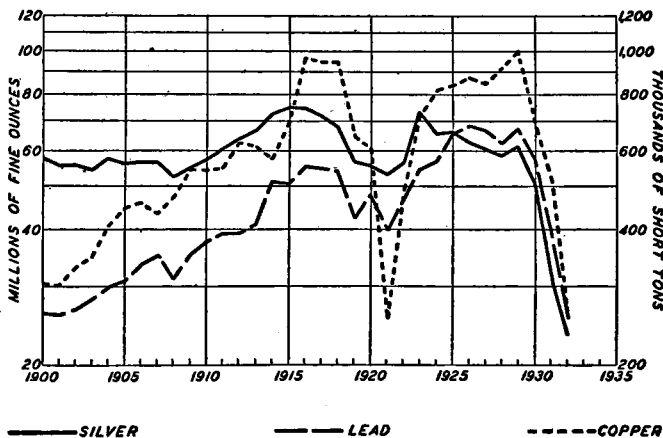
* 1900-24, Merrill, *U. S. Bureau of Mines Economic Paper 8*, p. 6; thereafter, *Annual Report of the Director of the Mint*, 1932, p. 151.

The importance of the United States, Mexico, Canada, and Peru may be seen from the accompanying table, which indicates that since 1920 these four countries have been furnishing over 80 per cent of the silver mined in the world.

Mexico is the largest silver-producing country. In 1925-29 its annual average output was over 100 million ounces of silver, or more than 40 per cent of the world production. A trend fitted to the data from 1890 to 1914 gives an average annual compound interest rate of 2.2 per cent. From 1900 to 1913 Mexican production varied closely around a rising line of growth, but as a result of the civil wars it dropped sharply from 70 million ounces in 1913 to 27 millions in 1914. The lowest point was reached in 1916, when only 23 million ounces were produced. With the gradual stabilization of the Mexican government since that date the output of silver has been rising rapidly. By 1926 silver production for the first time intersected the extension of the line of growth computed on the basis of pre-revolution data.

The United States, the second largest silver-producing country, in 1925-29 produced an annual average of 62 million ounces, or 24 per cent of the world output. The production trend is slightly upward, rising at a compound interest rate of 0.4 per cent per year. The chart on page 62 shows a fairly close relationship between silver production and the output of lead and copper. This is not surprising, in view of the fact that silver produced in this country, as we shall presently see, is largely a by-product of the base metals. The period 1908-15, which saw a rapid increase in the output of lead and copper, was followed by a steady increase in the production of silver; and the period 1915-21, which witnessed a severe

SILVER PRODUCTION IN THE UNITED STATES COMPARED
WITH THE PRODUCTION OF LEAD AND COPPER,
1900-32^a
(Silver in fine ounces and lead and copper in short tons)



^a The silver figures, which represent mine production, are from: 1900-27, Merrill, *U. S. Bureau of Mines Economic Paper 8*, p. 18; 1928-31, *Annual Report of the Director of the Mint*, 1932, p. 36; 1932, Handy and Harman, *Review of the Silver Market*, 1932, p. 24. The copper data, representing smelter production in the United States, are from: 1900-27, C. E. Julihn, "Summarized Data of Copper Production," *U. S. Bureau of Mines Economic Paper 1*, 1928, p. 15; 1928-29, *Mineral Resources of the United States*, U. S. Bureau of Mines, 1929, Pt. I, p. 535. The lead figures, which represent domestic production of refined pig lead, are from: 1900-27, L. A. Smith, "Summarized Data of Lead Production," *U. S. Bureau of Mines Economic Paper 5*, 1929, p. 14; 1928-29, *Mineral Resources of the United States*, 1929, Pt. I, p. 233. Copper and lead production data for 1930-32 were supplied to the writer through the courtesy of Dr. O. E. Kiessling of the U. S. Bureau of Mines.

depression in the non-ferrous metal industries, also witnessed a decline in the silver output. The increase in the production of lead and copper in 1922 and 1923 was accompanied by recovery in the output of silver. Since

1923, when the high point of 73 million ounces was reached, silver output has been declining.

Silver production in Canada shows three distinct trends. With the discovery of the Cobalt mines in Ontario in 1903 output began to rise rapidly, attaining the high point of 33 million ounces in 1910. In 1912 production began a gradual descent, reaching the bottom of the trough in 1920-21. Since then, in consequence of the increasing output of the Sullivan mine at Kimberley, the trend has been upward. For the period 1925-29 Canada produced an annual average of 22 million ounces, or 9 per cent of the world output.

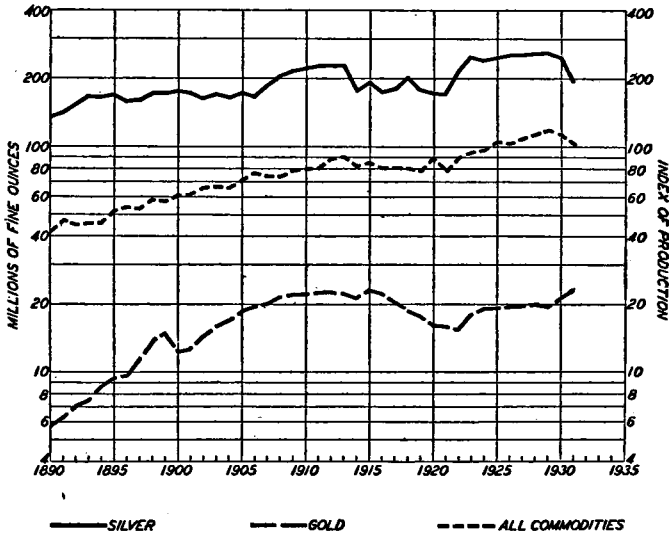
Peru has annually produced an average of over 20 million ounces, or 8 per cent of the world total. The output varied from period to period, but the trend is unmistakably a persistently rising one. The compound interest curve computed on the basis of the production from 1885 to 1929 gives an average rate of increase of 5.7 per cent.

It may perhaps be instructive for us to digress and compare the world mine production of silver with the world output of all commodities and of gold. Advocates of bimetallism and symmetallism have contended that the use of silver and gold as monetary metals would result in a more stable world price level than the utilization of gold alone. The implicit argument for this view is that should gold fail to keep pace with world economic growth, the insufficiency of the gold supply would be supplied by silver. There is, of course, the possibility, which is too frequently overlooked, that relative to economic progress, there might conceivably be for a particular period a superabundance of gold. The inclusion of silver with gold would in such a case cause a greater

rise of the general level of prices than would otherwise occur.

WORLD PRODUCTION OF SILVER, OF GOLD, AND OF ALL COMMODITIES, 1890-31^a

(Silver and gold production data are in millions of fine ounces. The all commodities curve is the index of world physical volume of production, with average for 1923-25 = 100)



^aSource: World mine production of silver, 1890-1925, Merrill, *U. S. Bureau of Mines Economic Paper 8*, p. 6; 1926-31, *Annual Report of the Director of the Mint*, 1932, p. 151. World gold production, 1890-1927, R. H. Ridgway, "Summarized Data of Gold Production," *U. S. Bureau of Mines Economic Paper 6*, 1929, p. 6; 1928-31, *Annual Report of the Director of the Mint*, 1932, p. 151. The index of world physical volume of production was prepared by Carl Snyder and furnished through the courtesy of the Federal Reserve Bank of New York.

From the chart on this page it will be observed that, while world silver production is more in line with world

production of all commodities than is the world production of gold, it nevertheless grows at a less rapid rate than the physical volume production of all commodities. The compound interest rate of growth for silver, for the years 1890-1929, is 1.25 per cent as compared with 2 per cent for other commodities for approximately the same period.¹ If, as it is generally contended,² the test for an ideal monetary commodity is that its supply should conform closely to world economic growth, silver as well as gold falls short of the mark. A glance at the accompanying chart will show that the silver supply varies with world production of all commodities equally as much as does gold or the combination of gold and silver.³ It would seem, therefore, that if the supply of gold

¹ The equations for the lines of secular trends are as follows:

World production of silver, fitted to the five-year averages of the data from 1890 to 1929, origin at 1892: $y = 152.72 (1.0125)^x$, where y is in millions of ounces and the unit of x is one year.

Index of world physical volume of production, fitted to the five-year averages of the index numbers with 1923-25 base, from 1897 to 1931, origin at 1914: $y = 81.57 (1.0199)^x$, where the unit of x is one year.

² Gustav Cassel, "The Supply of Gold," *Interim Report of the Gold Delegation of the Financial Committee*, League of Nations Document No. C. 375. M. 161. 1930. II, pp. 71-78; Joseph Kitchin, "The Supply of Gold Compared with the Prices of Commodities," the same, pp. 79-87; L. C. Wilcoxon, "World Prices and the Precious Metals," *Journal of the American Statistical Association*, June 1932, pp. 129-40; G. F. Warren and F. A. Pearson, *Prices*, 1933, Chap. V.

³ The ratio of the gold supply to physical volume of production is often taken as the theoretical index of prices with which the actual index of prices roughly agrees. Substantially the same curve may be obtained by taking the ratio of the gold supply to a compound interest curve which increases at a certain rate, usually at 3 per cent per year, to represent economic progress. The general formula is:

$$\frac{G}{A(1+i)^x} = P$$

In this formula G is the gold supply; i , the annual rate of increase of the gold supply required to maintain the price level constant; A , an arbitrary constant (stock of gold assumed at the origin); x , the number of years from the origin; and P , the derived theoretical price index. The

and silver were no more than sufficient to support economic production, say, in the seventies, it must have been inadequate in subsequent years. The intimate connection between the gold supply and the price level which some economists believe to have existed may well be questioned. But assuming that there is such a close relationship, it might still be doubted whether the inclusion of silver as a monetary metal would stabilize to an appreciable extent the major movements of prices, with which the gold supply is said to be closely connected.⁴

latter method of deriving an index of prices was employed by Cassel and Kitchin (*Interim Report of the Gold Delegation of the Financial Committee*, pp. 71-85), while the former was utilized by Warren and Pearson (*Prices*, p. 80).

When the theoretical index computed by either method is superimposed upon an actual index of prices, such as the Bureau of the Labor Statistics index of wholesale prices in the United States or the Jevons-Sauerbeck-Statist index of English commodity prices, it will be found that the long-time, decade-to-decade variations of one curve move in rough conformity with the other. From this it is generally concluded that there is a causal relationship between the gold supply and the general price level. Predictions respecting the course of the price level are made on the basis of the estimated future gold supply.

It is instructive to note that the ratio of the silver supply to the physical volume of production or to a compound interest curve is in close agreement with the computed index of prices as represented by the ratio of the gold supply to physical production or to a compound interest curve. Since the seventies silver has not been used as a monetary metal to any large extent in the Western World and therefore could not have been an important factor in determining the general price level in terms of gold, yet if one is to conclude that there is a causal connection between the gold supply and the price level, one can also say from a comparison of the curves that there is a causal relationship between the silver supply and the price level. One can perhaps predict the future of the price level on the basis of the silver supply with as much precision as one can on the basis of the gold supply.

⁴ There is of course no close correlation between the gold supply and the year-to-year movements of general commodity prices. Professor Cassel and other economists, however, claim that the relationship between the gold supply and the "secular" or the long-time, decade-to-decade oscillations of prices does exist. See Cassel, *Interim Report of the Gold Delegation of the Financial Committee*, p. 73.

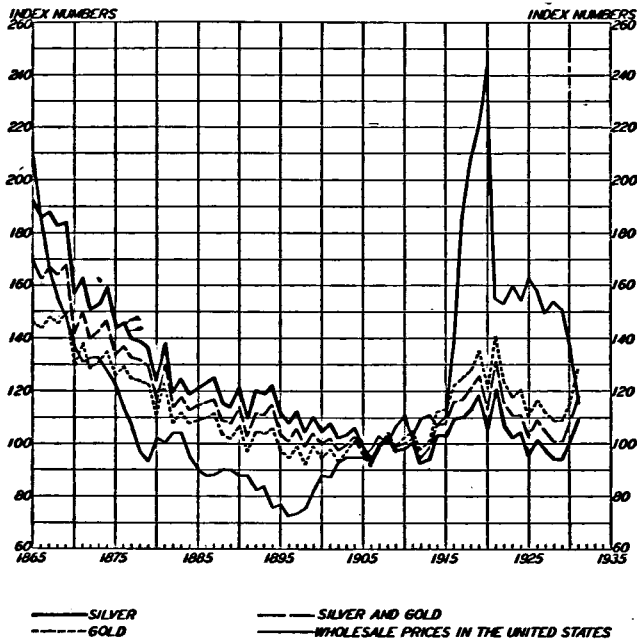
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THE PRODUCTION OF SILVER

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THEORETICAL PRICE INDEXES COMPUTED ON THE BASIS OF THE WORLD SUPPLY OF GOLD, OF SILVER, AND OF GOLD AND SILVER COMBINED, 1865-1931

(The index in each case is a ratio of two indexes; the numerator is an index of world supply of the metal indicated, the denominator is an index of physical volume of world production of all commodities. All series are on a 1900-14 base.)^a



^a The figures for gold supply are from the following sources: 1865-1925, estimated by Gustav Cassel (*Interim Report of the Gold Delegation of the Financial Committee*, pp. 76-77); 1926-31, estimated by the writer on the basis of gold production data compiled by the Bureau of the Mint (*Annual Report of the Director of the Mint*, 1932, p. 151) and by employing Professor Cassel's method.

The figures for silver supply have been estimated by the writer on the assumption that 0.2 of 1 per cent of the total stock of the world is lost

Whereas Mexico mines more silver than any other country, the United States is the largest producer of refined silver. Its annual output for the period 1921-30 amounted to over 50 per cent of the world refinery production. As shown in the table on page 69, Mexico, with over 20 per cent, is next in importance, and Germany and Canada, contributing 7 and 5 per cent respectively, are third and fourth.

While silver mines and refineries are scattered over the world, their capital control is concentrated in a few countries. It will be seen from the table on page 70 that in 1929 American interests controlled 66 per cent of the mine production in the world, or 75 per cent in Mexico, 34 per cent in Canada, 87 per cent in Peru, 89 per cent in Central America, 83 per cent in Chile, and all in the United States. British capital controlled 21

through wear or wastage each year. This rate of loss is estimated by Professor Cassel to be that for gold. The annual figures for the silver supply are arrived at by subtracting the computed yearly losses from and adding the year's production to the total stock. These figures, therefore, represent the world silver supply at the end of each year. The basic production data, from which the supply figures were derived, are from the following sources: previous to 1872, estimates of Adolph Soetbeer; 1872-1931, *Annual Report of the Director of the Mint*, 1932, pp. 151-53.

The gold and silver figures are combined into a single series by converting the fine ounces of both metals into dollars at the value ratio of approximately 16 to 1, that is, gold is taken at \$20.67 per ounce and silver at \$1.30.

The actual supply figures are converted into relatives with the respective averages for 1900-14 = 100.

The index of world physical volume of production was furnished through the courtesy of the Federal Reserve Bank of New York. It was converted from the original base, 1923-25, to the 1900-14 base by the writer.

The index of wholesale prices in the United States is from "Wholesale Prices, 1930," *U. S. Bureau of Labor Statistics Bulletin No. 543*, p. 39. It is converted from the 1926 base to the 1900-14 by the writer.

REFINERY PRODUCTION OF SILVER OF THE WORLD AND THE PRINCIPAL PRODUCING COUNTRIES, 1921-30*
(In millions of fine ounces and as percentage of world production)

Calendar Year	World (Quantity)	United States		Mexico		Germany		Canada	
		Quantity	Per Cent	Quantity	Per Cent	Quantity	Per Cent	Quantity	Per Cent
1921.....	182.0	103.2	56.7	39.2	21.5	13.9	7.6	10.2	5.6
1922.....	205.3	112.0	54.6	49.1	23.9	14.9	7.3	10.5	5.1
1923.....	237.4	136.7	57.6	54.2	22.8	11.5	4.8	11.8	5.0
1924.....	235.2	133.7	56.8	51.6	21.9	12.7	5.4	12.0	5.1
1925.....	234.0	124.7	53.3	54.3	23.2	15.4	6.6	12.0	5.1
1926.....	247.7	132.3	53.4	59.6	24.1	13.8	5.6	15.0	6.1
1927.....	246.1	122.7	49.9	61.1	24.8	17.1	6.9	15.3	6.2
1928.....	269.4	139.5	51.8	63.3	23.5	23.3	8.6	13.5	5.0
1929.....	282.8	147.3	52.1	61.4	21.7	28.6	10.1	14.5	5.1
1930.....	264.7	134.0	50.6	60.0	22.7	25.7	9.7	15.0	5.7

* Compiled from *Year Books* of the American Bureau of Metal Statistics.

per cent of the total mine output, or 20 per cent in Mexico, 66 per cent in Canada, and all in Australasia, India, Burma, Cape Colony, and the Transvaal. Thus almost 90 per cent of the world mine production is controlled by American and British capital.

CAPITAL CONTROL OF MINE AND REFINERY PRODUCTION OF SILVER, 1929^a

Producing Countries Grouped to Show Nationality of Capital Control	Mine Production			Refinery Production		
	In Millions of Ounces	As Percentage of Domestic Production	As Percentage of World Production	In Millions of Ounces	As Percentage of Domestic Production	As Percentage of World Production
CONTROLLED BY AMERICAN CAPITAL.....						
United States.....	172.7		62.2	205.9		72.8
Mexico.....	61.2	100.0	23.4	147.3	100.0	52.1
Canada.....	81.0	74.5	37.6	58.6	95.6	20.7
Peru.....	7.8	33.8	3.0	—	—	—
Central America.....	18.8	87.4	7.2	—	—	—
Chile.....	2.5	89.0	1.0	—	—	—
Others.....	1.1	82.5	.4	—	—	—
	.3	—	.1	—	—	—
CONTROLLED BY BRITISH CAPITAL.....						
Canada.....	56.8		21.1	32.1		11.4
Mexico.....	15.3	66.0	5.7	14.5	100.0	5.1
Australasia.....	21.5	19.8	8.2	—	—	—
India and Burma.....	10.4	100.0	4.0	9.2	100.0	3.3
Cape Colony and Transvaal.....	7.3	100.0	2.8	7.3	100.0	2.6
Others.....	1.0	100.0	.4	1.1	100.0	.4
	1.3	—	.5	—	—	—
CONTROLLED BY GERMAN CAPITAL.....						
Germany.....	5.1	100.0	1.9	28.6	100.0	10.0
	5.1	100.0	1.9	28.6	100.0	10.0

^a These figures were supplied to the writer by Dr. William P. Rawles of the Mineral Inquiry, a committee "organized by the American Institute of Mining and Metallurgical Engineers to make factual studies of the mineral resources of the United States and the world in their political and international relations." See W. P. Rawles, *The Nationality of Commercial Control of World Minerals*, 1933, pp. 31-34.

Likewise over 80 per cent of the refined silver produced in 1929 was the output of refineries controlled by American and British interests. American controlled refineries produced 73 per cent of the world total, including practically all of that of Mexico. All the refined silver that was produced in Canada, Australia, Burma, and the Transvaal in 1929 was the output of British controlled refineries, which contributed 11 per cent of the refined silver of the world.

This concentration of capital control perhaps explains why there has been such a vociferous demand, on the part of certain groups in the United States and Great Britain, for national and international action to raise the price of silver.

II. SILVER AS A MAIN PRODUCT AND AS A BY-PRODUCT

In view of the decline in consumption and the consequent fall in the price of silver the natural expectation would be that production would decline until equilibrium between supply and demand was attained. The great concentration of capital control of silver production also suggests the possibility of limiting output by agreement on the part of producers. But it is contended that such a large proportion of the output of silver is a by-product of the base metals that the demand for lead, copper, and zinc, rather than the demand for silver itself, actually conditions the supply. It is accordingly necessary to determine to what extent silver is a main product, to what extent it is a by-product of the base metals, and to what extent the by-product nature of silver tends to prevent a reduction in its output despite the decline in demand.

The chart on page 73 presents a graphic picture of the proportions of the mine production of silver in the

United States derived from the principal classes of argentiferous ores during 1905-30. The product from dry and siliceous ores and placers, which are sometimes known as "straight silver" ores (with the exception of a by-product of gold practically the entire output is silver), varies from 52 to 18 per cent of the United States production. Since 1921, when the high point of 52 per cent was reached, the trend has been persistently downward to 18 per cent in 1930.

Thus in recent years about 80 per cent of the silver produced in the United States has been a by-product⁵ of copper, lead, zinc, and complex ores.⁶ The proportion of silver derived from copper-silver ores was rather steady throughout 1905-20, averaging about 28 per cent of all silver produced in the United States. With the exception of 1921, when there was a severe depression in copper production, the amount of silver contributed by these ores has been growing since 1920. In 1930 they yielded 29 per cent of the silver produced. The proportion of silver obtained from lead-silver ores shows little variation throughout the period covered by the chart. In recent years it appears to have decreased, but if lead-

⁵ A "by-product" may be defined as the less important of two joint products, measured in terms of value. So defined it is conceivable that the main product may become the by-product with a change in the prices of the two products. For instance, a lead mine which derives the larger proportion of its revenue from lead and the smaller proportion from silver may with a shift in the prices of the metals become a silver mine, or vice versa, even though there may be no change in the output of the metals.

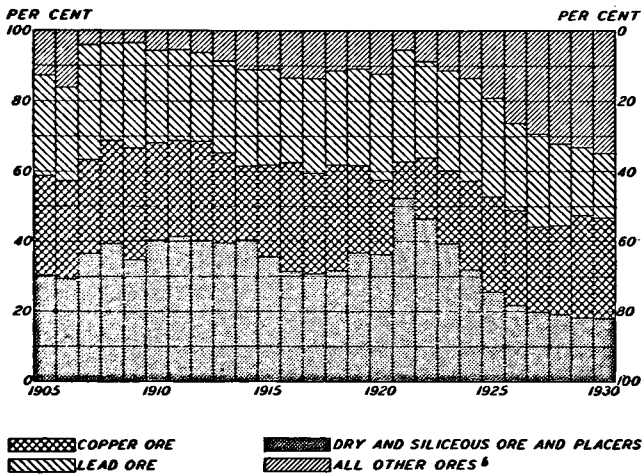
⁶ The Bureau of Mines in a study of the economic relations of silver to other metals in silver-bearing ores in the United States for the year 1928 shows that 90 per cent of the total output of copper, 85 per cent of that of lead, and 36 per cent of that of zinc has some by-product of silver. See C. W. Merrill, "Economic Relations of Silver to Other Metals in Argentiferous Ores," *U. S. Bureau of Mines Economic Paper 10*, 1930, p. 20.

zinc-silver ores (in which lead is the principal source of revenue) had been included under lead-silver ores, the proportion of silver would have shown a considerable increase. The quantity of silver produced from zinc-silver ores is negligible. The growth in the proportion of silver extracted from the miscellaneous ores since 1921 is to be attributed to the development of selective flotation, which has made available many complex ores, among which the most important with respect to silver is the lead-zinc-silver group.

To ascertain what effect the price of silver has on sil-

SILVER PRODUCTION IN THE UNITED STATES, BY SOURCES, 1905-30*

(Production from all ores for the specified year = 100)



* Basic data are from: *Mineral Resources of the United States, 1922, Pt. I, p. 627; 1930, Pt. I, p. 840.*

^b Includes zinc, copper-lead, copper-lead-zinc, and lead-zinc ores.

ver production, comprehensive data respecting the cost of producing silver from the various kinds of silver-bearing ores are indispensable. Such data are wanting. There is a set of confidential reports on cost submitted by the principal producers to the United States Senate Commission of Gold and Silver Inquiry which was appointed in 1923, but this source of information is not available for public scrutiny. However, H. A. C. Jenison, who as an expert of the Commission had access to the data, based an estimate of the cost of producing silver from the principal argentiferous ores upon these reports. The following table gives his estimate of the probable percentage of silver production from the various ores which would become unprofitable when the price of silver reached the specified prices per fine ounce:⁷

	50 Cents	33 1/3 Cents	10 Cents
Dry and siliceous ores	16	80	100
Copper-silver ores	26	80	87
Lead-silver ores	28	36	75
All ores	20	58	79

Without the detailed statistics upon which these figures are based, it is not possible to appraise their reliability. They should, at any rate, be accepted with extreme caution, for several reasons. (1) The estimates were based on cost data for 1919-24, furnished by a small number of mining companies. In the case of the lead-silver ores, the cost of producing silver was determined

⁷ H. A. C. Jenison, "Memorandum on the Effect upon Copper, Lead and Zinc Mining Industries of Successive Decreases in the Prices of Silver Which Would be Caused by the Introduction of the Gold Standard in India," *Report of the Royal Commission on Indian Currency and Finance*, 1926, Vol. III, pp. 561-73.

from data for 1919-22 supplied by only five mining companies. (2) At the time the cost was calculated the price level was considerably higher than it is at the present time and metallurgical technology was less advanced. (3) The estimates for copper-silver and lead-silver ores were made on the assumption that the price of the respective base metal was to remain constant.

At the present price of silver it appears from these estimates that over half of the silver produced in the United States yields no profit. It seems quite probable, as we shall see later,⁸ that the greater part of the silver produced from dry and siliceous ores affords no profit, if it does not cause actual loss. There is considerable doubt, however, of the trustworthiness of the estimates for copper-silver mines. It does not seem credible that exactly the same proportion of these mines and of straight silver mines should become unprofitable when silver brings $33\frac{1}{3}$ cents. Other data, which we shall examine below, indicate that copper-silver mines are less dependent on silver for revenue than other mines which produce silver-bearing ores. The proportion of lead-silver mines becoming unprofitable with the reduction in the price of silver is more conservative and perhaps more acceptable.⁹

The table on pages 76-77 gives such data as are available on silver production from argentiferous ores in the four principal producing countries in the world. The extent to which silver is a main product or a by-product may be seen from the first section of this table. It will be

⁸ See pp. 79-80.

⁹ As a source of revenue, silver is more important in the lead-silver than in the copper-silver mines. It will be shown later that lead-silver mines rely on silver for revenue to the extent of 13 per cent and copper-silver mines to the extent of 3 per cent.

SILVER PRODUCTION FROM ARGENTIFEROUS ORES OF THE WORLD AND THE PRINCIPAL PRODUCING COUNTRIES^a
I. From All Ores, Classified According to Principal Revenue-Producing Metal^b

Principal Revenue-Producing Metal	United States		Mexico		Canada		Peru		World	
	In Millions of Ounces	Percentage Distribution	In Millions of Ounces	Percentage Distribution	In Millions of Ounces	Percentage Distribution	In Millions of Ounces	Percentage Distribution	In Millions of Ounces	Percentage Distribution
Silver.....	11.0	19.4	71.3	75.7	12.0	54.6	15.0	62.5	112.6	48.5
Lead.....	19.9	34.8	11.4	12.1	5.6	25.5	0.7	2.7	54.8	23.6
Copper.....	15.9	27.9	1.7	1.8	0.8	3.6	8.3	34.4	33.7	14.5
Zinc.....	8.4	14.7	5.5	5.9	0.9	4.0	0.1	0.2	15.3	6.6
Gold.....	1.8	3.2	4.2	4.5	2.7	12.3	0.1	0.2	12.3	5.3
Tin.....	—	—	—	—	—	—	—	—	3.6	1.5
Total.....	57.0	100.0	94.1	100.0	22.0	100.0	24.2	100.0	232.3	100.0

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II. From Ores in Which Silver Contributes over 50 Per Cent of the Revenue, Classified According to the Per-Ton Value of the Ores^a

Ores Classified According to Their Per-Ton Value	United States		Mexico		Canada		Peru		All Other		World	
	In Millions of Ounces	As Percentage of Domestic Silver Output	In Millions of Ounces	As Percentage of Domestic Silver Output	In Millions of Ounces	As Percentage of Domestic Silver Output	In Millions of Ounces	As Percentage of Domestic Silver Output	In Millions of Ounces	As Percentage of Silver Output ^d	In Millions of Ounces	As Percentage of World Silver Output
All grades....	10.0	17.5	69.0	73.3	21.9	50.7	5.2	21.7	3.3	9.3	98.6	42.4
Under \$10...	3.0	5.3	45.8	48.7	0.7	3.2	0.2	0.8	—	—	49.7	21.4
Under \$20...	9.5	16.7	56.2	59.7	4.6	21.0	3.0	12.5	3.0	8.5	76.3	32.8

^a Compiled from Merrill, *U. S. Bureau of Mines Economic Paper 10*. These data were originally obtained from the production records of a large number of mines. Unfortunately statistics covering the same year are not available for all the countries, but the data given total to 91 per cent of the average annual world production during 1926-28. The figures for the various producing areas are those for the following periods: United States, 1928; Mexico, 1926; Canada, annual average for 1927-28; Peru, 1928; "All Other" and world, annual average for 1924-29.

^b "Principal revenue-producing metal" is defined as that metal which accounts for the greater part of the total revenue from a silver-bearing ore when the value of the recoverable metal content is calculated at the following prices: gold, \$20.67 a fine ounce; silver, 50 cents a fine ounce; copper, 18 cents a pound; lead, 6.6 cents a pound for United States mines and 5 cents a pound elsewhere; zinc, 6.4 cents a pound for United States mines and 5 cents a pound elsewhere; tin, the actual price received for the tin concentrates.

^c In calculating the value of the metal content of the ores the prices listed in footnote *b* were used. The data in this section of the table differ somewhat from corresponding figures in the upper section of the table, where classification is according to the principal revenue-producing metal. Where the argentiferous ores contain only two metals the two sets of figures are identical. But where silver and two or more base metals are mined from ores in which the base metals singly account for a smaller proportion of the revenue than silver but collectively account for a greater proportion, a discrepancy appears. In such cases, particularly where the revenues from several joint products are more or less equal, it is difficult to distinguish the main from the by-product. Fortunately, Peru is the only country for which there is a conspicuous difference between the two sets of figures, and so for our purpose silver produced from ores in which silver is the principal revenue-producing metal is practically equivalent to that produced from ores in which it contributes over one-half of the revenue.

^d The total silver output in all countries other than the four principal producing countries, from which this percentage was computed, was 35.3 million ounces.

noted that 48 per cent of the world total, or 76 per cent of the Mexican, 62 per cent of the Peruvian, 55 per cent of the Canadian, and 19 per cent of the American, may be considered as being derived from ores in which silver is the principal revenue-producing metal. The other percentages indicate the proportions of silver produced from ores in which other metals contribute the greater share of the revenue. Such silver may be regarded as by-product silver.

A decline in the price of silver will of course have its greatest effect where silver accounts for the larger share of the revenue from an ore; but the most serious effect will fall upon those mines which have relatively high production costs, or which produce silver under less favorable conditions. In the absence of data on cost of production from ores having a high silver content we must resort to a classification of silver production based on the grade of ore from which silver is derived in order to estimate the consequence of a fall in the price of silver on the production of silver from these ores. The Bureau of Mines has made such a classification, which consists in segregating the output of the world and of the principal producing countries from ores in which silver contributes over one-half of the revenue according to the per-ton value of the ore. The second section of the table on pages 76-77 is computed from this source. Silver produced from ores in which over 50 per cent of the revenue is obtained from silver accounts for 42 per cent of the world production. Half of this silver is derived from ores which, with silver at 50 cents an ounce, are worth less than 10 dollars per ton, and more than three-fourths from ores valued at less than 20 dollars per ton. At the present price it is very questionable whether producers are mak-

ing profits on silver obtained from ores valued at less than 20 dollars per ton, to say nothing of ores worth less than 10 dollars per ton.

The Mexican mines are most seriously affected by low silver prices, for about 73 per cent of the Mexican silver is derived from ores depending principally upon silver for revenue,¹⁰ 49 per cent from ores worth less than 10 dollars per ton, and 60 per cent from ores valued at less than 20 dollars per ton. At the present price of silver it is evident that a large part of the silver output is being produced at a loss.

About half of the Canadian silver is from ores for which silver is the principal revenue-producing metal, but only one-fifth is from ores valued at less than 20 dollars a ton. Only 22 per cent of the Peruvian production is derived from ores in which silver yields over 50 per cent of the revenue, and only one-eighth of it from ores worth less than 20 dollars a ton. The proportion of silver produced from Peruvian ores in which silver contributes the principal part of the revenue but less than 50 per cent, as already pointed out,¹¹ is much larger; but since such silver is derived from ores in which the combined revenues of the base metals form such a large part, the effect of the decrease in silver prices would have been relatively slight. Only 18 per cent of the output in the United States is from ores for which silver is the principal single source of revenue, and practically all of it is extracted from poor grades of ores. Such silver is evidently produced from dry and siliceous ores, and the

¹⁰ According to the Bureau of Mines 62 per cent of the silver produced in Mexico is derived from ores in which silver contributes over 70 per cent of the revenue. Such ores are sometimes referred to as straight silver ores. See Merrill, *U. S. Bureau of Mines Economic Paper 10*, p. 18.

¹¹ See footnote c to table on p. 77.

conclusion arrived at above that the greater proportion of the silver produced in the United States from these ores is unprofitable at the present level of silver prices is thus confirmed.

In summarizing the effect of the decline in the price of silver on the production of silver from high-silver-revenue ores we may say: The greatest effect falls on Mexico, about 60 per cent of whose silver shows no profit, if not a loss. In view of the fact that such a large proportion of the mines produce low-grade ores, selective mining cannot be widely resorted to. In the absence of government interference, and with the present low level of silver prices, many of the mining companies in Mexico will sooner or later have to restrict operations, if not to abandon some of their mines. But so long as the Mexican government forces the mine operators to continue production a large curtailment of the output is not to be expected. Canada, which produces one-half of its silver from high-silver ores, derives only 21 per cent of it from low-grade ores. A fall in the price of silver would probably have the result of limiting extraction to high-grade ores, of which Canada has a greater proportion than any other principal producing country. In the United States, where poor high-silver-revenue ores yield nearly all the silver produced from high-silver-revenue ores, low prices for silver would tend to discourage production, as recourse to selective mining would not be feasible.¹² Restriction of production to high-grade ores would to some extent be resorted to in Peru, but since only a small proportion of the silver produced there is

¹² Two kinds of selective mining are possible. One is to restrict production to high-grade mines and the other is to extract silver selectively from high-grade areas within low-grade mines. The latter kind of selective mining is possible in this country though it may not be profitable.

from low-grade ores, the effect of low prices for silver on production is relatively slight. Of the world production of silver 42 per cent is derived from high-silver-revenue ores, of which the poor grades supply 33 per cent.

It is clear from the foregoing analysis that widespread selective mining is not likely. Barring interference with the economic process by government decrees, many of the mines now producing silver from poor high-silver-revenue ores would sooner or later have to curtail output. Possibly because of the large amount of money invested in these mines some of them might continue to produce silver without profit for some time to come. But to the extent that mines in Mexico, which account for about 75 per cent of the silver produced in the world from high-silver-revenue ores of low grade, are required by the government to continue mining operations, a large curtailment of silver output from high-silver-revenue mines is not to be anticipated.

Let us next consider the effect of fluctuations in silver prices on the production of by-product silver. The extent to which silver may be regarded as a by-product of the other metals was shown in the table on page 76. Such silver, it may be recalled, is that which is produced from ores in which some other metal accounts for the principal part (not necessarily over 50 per cent) of the revenue. The table on page 82 shows the value of argentiferous ores in which some metal other than silver is the principal source of revenue, together with the value of by-product silver produced from these ores.

Over 80 per cent of the silver produced in the United States is of by-product nature (table on page 76), 35 per cent coming from lead-silver ores, 28 per cent from

RELATION BETWEEN REVENUE FROM BY-PRODUCT SILVER AND TOTAL REVENUE FROM PRODUCING ORES^a

Producing Ores Grouped by Countries of Origin	Total Revenue (In millions of dollars)	Revenue from Silver		Producing Ores Grouped by Countries of Origin	Total Revenue (In millions of dollars)	Revenue from Silver	
		In Millions of Dollars	As Percentage of Total Revenue			In Millions of Dollars,	As Percentage of Total Revenue
United States . . .	459.0	23.2	5.1	Peru	33.7	4.7	13.9
Lead	79.8	10.0	12.5	Lead	4.0	0.4	10.0
Copper	301.2	8.0	2.7	Copper	26.5	4.2	15.8
Zinc	36.0	4.3	11.9	Zinc	3.2	0.1	3.0
Gold	41.9	0.9	2.1	Gold	—	—	—
Mexico	68.0	11.5	16.9	World	1,031.6	58.2	5.6
Lead	26.2	5.7	21.8	Lead	171.0	27.4	16.0
Copper	19.0	0.9	4.7	Copper	433.3	16.9	3.9
Zinc	13.0	2.8	21.5	Zinc	87.8	7.7	8.8
Gold	9.8	2.1	21.4	Gold	339.5	6.2	1.8
Canada	92.1	5.1	5.5				
Lead	18.3	2.8	15.3				
Copper	24.1	0.4	1.7				
Zinc	9.6	0.5	5.2				
Gold	40.1	1.4	3.5				

^a Computed from Merrill, *U. S. Bureau of Mines Economic Paper 10*. See footnote *a* to table on pp. 76-77.

copper-silver ores, 15 per cent from zinc-silver ores, and 3 per cent from gold-silver ores. The table on page 82 shows that silver yields 13 per cent of the total revenue from lead-silver ores, 3 per cent from copper-silver ores, 12 per cent from zinc-silver ores, 2 per cent from gold-silver ores, and 5 per cent from all ores taken together. As so small a proportion of the revenue from these ores is derived from silver, it seems unlikely that price changes would have much effect on the output of by-product silver of the United States.

By-product silver comprises about one-fourth of Mexican silver output. Its production is seriously affected by fluctuations in silver prices because silver contributes 17 per cent of the revenue derived from ores of which it is a by-product. The greatest effect falls on silver produced from lead- and zinc-silver ores, which accounts for 18 of the 25 per cent of the by-product output, but which represents 22 per cent of the revenue from these ores.

About half of the silver produced in Canada is a by-product of other metals, 26 per cent coming from lead-silver ores and 12 per cent from gold-silver ores. Since silver contributes but 6 per cent of the total revenue from such ores and only 15 per cent of the revenue from lead-silver ore (where the silver revenue is highest), a low price for the by-product would have a relatively slight effect on production.

In Peru about 40 per cent of the silver produced is a by-product of other metals. Sixteen per cent of the revenue from copper-silver ores, which supply most of the by-product silver, is derived from it. Consequently changes in silver prices would somewhat affect production from these ores. About 40 per cent of all the silver

produced is mined as a joint product of lead and zinc. Although this silver only contributes 40 per cent of the total revenue from the three ores, it is the principal single source of revenue since the other 60 per cent comes from both lead and zinc. Production of such silver would therefore be affected by low silver price.

We may conclude that fluctuations in the price of silver would not have a serious effect on the world output of by-product silver, which supplies over half of the total silver production. Ores which yield silver as a by-product depend on it for but 6 per cent of their total revenue. Lead-silver ores, which account for the largest proportion of by-product silver and which rely upon silver for 16 per cent of their revenue, would suffer most from a decline in silver price. Copper-silver ores, which contribute the next largest proportion of by-product silver, would be least affected, as only 4 per cent of their revenue is derived from silver; but possibly low prices for silver might cause some operators to discontinue the recovery of silver from those ores which yield only a negligible amount. Mexico, which must rely relatively more on by-product silver for revenue than the other principal producing countries, would be most affected; and the United States, which is relatively less dependent, would be least affected. It is clear from this analysis that prices of the main products—lead, copper, and zinc—would have a greater effect on the production of by-product silver than the price of silver itself. The output of silver from joint-product mines would therefore be largely determined by the demand for the base metals.

III. THE FUTURE OF SILVER PRODUCTION

World silver production for 1930, a year in which the average price of silver fell to 38 cents from 53 cents

the previous year, increased to a figure 1.7 per cent above its projected trend line.¹⁸ Production in Peru declined to a point 33 per cent, in the United States to 22 per cent, and in Mexico to 5 per cent below their respective extended trends, while Canadian production rose to a point 7 per cent above its projected trend. During 1931, when the average price of silver fell to 29 cents, world production dropped 22 per cent below its projected trend line, and production in the United States to 53 per cent, in Peru to 63 per cent, in Mexico to 24 per cent, and in Canada to 20 per cent below their respective extended trends. Production statistics for the year 1932, when the average price of silver sank to the record low of 28 cents, are not available. Based on estimates of silver production by Handy and Harman percentage deviations below the respective extended lines of growth for 1932 are found to be as follows: world production, 36 per cent; United States, 64 per cent; Mexican, 38 per cent; and Canadian, 32 per cent. This severe shrinkage in production is not surprising. Indeed, the decline would have been greater had not the Mexican government forced its operators to continue production.

Should the price of silver remain at the present low level, further reduction of the world output may be expected in 1933. Many of the straight silver mines, which have been continuing production on a small scale, will soon cease operation. Mexican output will further decline despite government opposition. In view of existing large stocks of copper and the agreement among copper producers of the world to curtail production, a trade recovery is not likely to increase the output of silver from copper-silver ores in the near future. On the other hand, if business conditions should improve, an ex-

¹⁸ See note to chart on p. 59 for trend-line equations.

pansion of lead mining might result. It is very probable that there would then be an increase in the production of silver from lead-silver mines in the United States, Canada, and Mexico, even if there were no improvement in the price of silver. The lead-silver ores

PERCENTAGE DEVIATION OF SILVER PRODUCTION FROM COMPUTED TREND FOR PRINCIPAL PRODUCING COUNTRIES AND THE WORLD, 1930-32^a

Producing Area	Silver Production (In millions of ounces)			Percentage Deviation from Trend ^b		
	1930	1931	1932	1930	1931	1932
United States...	50.6	30.8	23.4	-22.3	-52.9	-64.4
Mexico.....	105.4	86.1	71.7	-5.2	-24.2	-38.3
Canada.....	26.4	20.6	18.3	7.3	-19.5	-31.5
Peru.....	15.5	9.0		-32.9	-63.1	...
World production	248.7	192.7	160.6	1.7	-22.2	-35.9

^a Data for 1930-31 are from *Annual Report of the Director of the Mint*; for 1932 from Handy and Harman, *Review of the Silver Market*, 1932.

^b See note to chart on p. 59 for trend-line equations.

of these countries contain a relatively large amount of by-product silver and supply most of the silver derived from these ores. But this augmentation of the world silver supply, should it eventuate, would compensate only to a small extent the decrease in the output of silver from straight silver and copper-silver ores. It seems probable, therefore, that, barring a substantial recovery in the price of silver, for some years to come silver production in practically every principal producing country will be below its normal line of growth.

CHAPTER III

THE PRICE OF SILVER

In recent discussions of the silver question much stress has been laid on the drastic decline in the price of silver. It is repeatedly asserted that this decline is responsible for the world economic crisis; that it has reduced purchasing power in India and China until approximately 800 million people there, who hold the largest stocks of silver in the world,¹ are unable to purchase commodities from industrial countries; and that it has caused such heavy losses in the silver-producing countries that their economies have been seriously affected. These assertions, coming at a time of unprecedented world depression when every nation is experiencing monetary difficulties, are fast gaining credence, although wholly without scientific proof.² In this chapter we shall therefore: (1) compare the price level of silver with the general commodity and other price levels and determine to what extent the price of silver has declined; (2) examine the effect of the decrease in the price of silver on the principal silver-producing countries; and (3) appraise the influence of the depreciation of silver on the foreign trade of China and India, the principal silver-consuming countries.

I. THE PRICE OF SILVER AND THE PRICES OF OTHER COMMODITIES

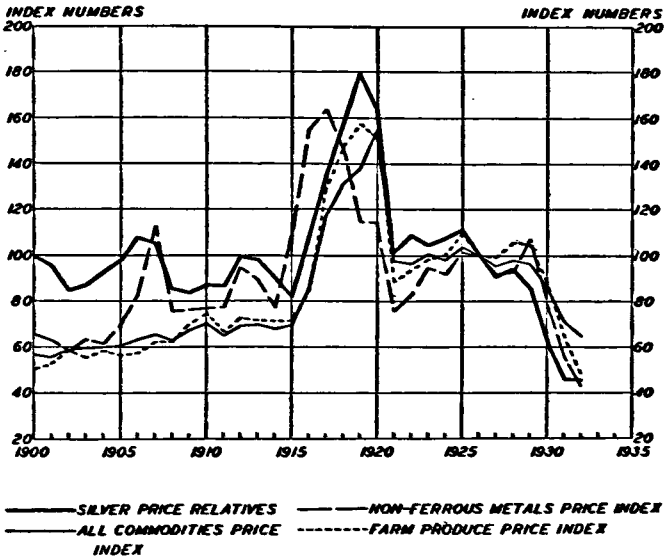
The chart on page 88 shows the course of silver prices in comparison with wholesale commodity prices, non-

¹ It is estimated by Kann that India holds 4,300 million ounces of silver and China 2,500 million ounces. See E. Kann, *Finance and Commerce*, Shanghai, Jan. 22, 1930.

² That many prominent business men and bankers are entertaining these beliefs is apparent from statements made at the hearings on the effect of

PRICE OF SILVER IN NEW YORK COMPARED WITH PRICES OF
ALL COMMODITIES, NON-FERROUS METALS, AND FARM
PRODUCE IN THE UNITED STATES*

(For each series 1926 = 100)



* The silver price relatives represent the average price of silver in New York per fine ounce, as compiled by the Director of the Mint. (*Annual Reports of the Director of the Mint*, 1932, p. 127.) The indexes of wholesale commodity and farm produce prices are those of the Bureau of Labor Statistics. The index of non-ferrous metals prices has been computed by the writer. See Table VIII, p. 150.

ferrous metal prices, and farm product prices in the United States during 1900-32, the year 1926 being taken as 100 in each case. Silver has been often pointed out as

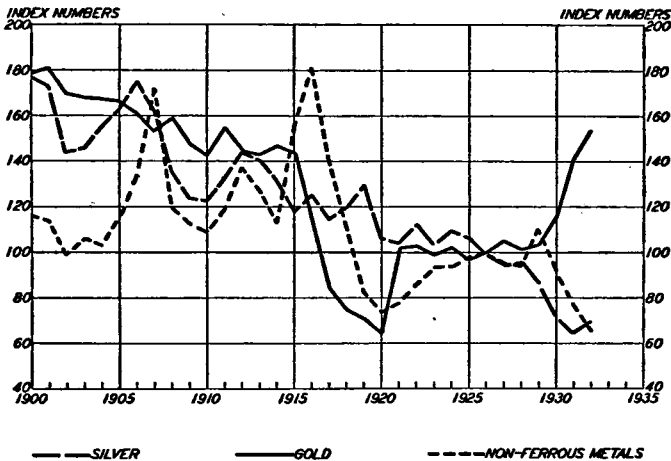
low silver. See 72 Cong. 1 sess., *The Effect of Low Silver*, Hearings on H. res. 72 before the Committee on Coinage, Weights, and Measures, and H. R. 1320.

one of the most unstable commodities. It is therefore interesting to note that it has shown less variation in price than the non-ferrous metals, whether the pre-war years or the years since the war are compared. If the period since the close of the war only is taken, the prices of farm produce are more stable than the price of silver. A study of the four curves since 1926, when silver began its drastic decline, reveals that commodities at wholesale have also been falling in price, though at a much slower rate than silver; that farm product and non-ferrous metal prices fluctuated more than silver in the early part of the period; and that non-ferrous metals beginning in 1930 and farm products in 1931 plunged downward at a more rapid rate than silver. It will be observed that the price of silver in 1932 remained at approximately the same level it attained in 1931, while general commodity prices and particularly prices of farm products and non-ferrous metals have continued their steep descent since 1931.

The fact that commodities in general have been accompanying silver in its downward movement since 1926 indicates that the relative value of silver has not actually declined to the extent shown in the chart, for if commodities in general are falling a producer of silver is able to buy more goods with the proceeds derived from his product than if the general price level has remained constant or has risen. The important element in the price of any commodity is its purchasing power over goods in general. In the chart on page 90 the purchasing power indexes of silver, of gold, and of the non-ferrous metals are compared. It will be observed that the trend for both gold and silver is downward. The gold curve declines until 1921, when there is a rise followed by a period of relative stability until 1926, when the present continuous

ascent begins. The silver curve exhibits a persistent fall to a new low in 1931. It begins, however, to reverse its direction in 1932. The purchasing power of the non-ferrous metals does not indicate any pronounced trend.

PURCHASING POWER OF SILVER COMPARED WITH PURCHASING
POWER OF GOLD AND NON-FERROUS METALS,
1900-32*
(1926 = 100)



* The indexes of the purchasing power of silver and of non-ferrous metals are derived by dividing the silver price relatives and the index of non-ferrous metal prices by the all commodities wholesale price index of the Bureau of Labor Statistics. The purchasing power of gold is the reciprocal of the Bureau of Labor Statistics all commodities wholesale price index. See Table IX, p. 151, for the indexes of purchasing power.

Measured from their respective averages, it is found that the purchasing power of gold is more unstable than the purchasing power of silver or non-ferrous metals. The

standard deviations* computed from the averages of the respective indexes of purchasing power and reduced to percentages of the respective averages are as follows:

Silver	23.7
Gold	25.5
Non-ferrous metals	23.6

According to these coefficients, silver is more stable than gold and as unstable as the non-ferrous metals. Inspection of the curves on page 90 reveals that the non-ferrous metal curve fluctuates more violently than the other two. It is evident that the coefficients indicate the extent of the fluctuation but not the rate of the short-time erratic movements. Of two indexes of purchasing power which deviate from their respective norms to the same extent, the one which shows greater short-time fluctuations is the more unstable, for obviously violent oscillations in purchasing power affect a commodity more seriously than gradual changes. For our purpose, therefore,

* If the purchasing power of a commodity should remain unchanged over an interval of time, the index would register 100 throughout the period covered (if the base year is within the period). The extent to which the index numbers deviate from the base may therefore be taken as an indication of the instability of the purchasing power of that commodity. A more precise way of measuring instability is offered by the standard deviation, the deviations here being measured from the average for the series rather than from an arbitrarily chosen base. To make the standard deviations of the several indexes comparable, they are reduced to percentages of the averages of the respective indexes. The formula is:

$$\frac{1}{M} \sqrt{\frac{1}{N} \sum_{i=1}^N d_i^2}$$

where $\sum_{i=1}^N d_i^2$ is the sum of the squares of the deviations from M , the mean of the specified index of purchasing power for the period 1900-32, and where N is the number of index numbers utilized in the computation of the standard deviation.

the following fluctuation-rate coefficients computed for different periods are important.⁴

	1900-32	1900-14	1915-32
Silver	15.2	15.1	15.2
Gold	15.0	11.1	17.5
Non-ferrous metals ..	27.4	34.0	20.5

It will be seen from these coefficients that when the whole period is considered the purchasing power of gold is practically as variable as that of silver. However, during 1900-14 gold fluctuated somewhat less than silver in terms of purchasing power, and during 1915-32 silver somewhat less than gold.⁵

⁴ The fluctuation rate of these changes was determined by taking the square root of the mean squared second order difference. The formula used is

$$\sqrt{\frac{1}{N-2} \sum_{i=1}^{N-3} \Delta_i''^2}$$

where $\sum_{i=1}^{N-3} \Delta_i''^2$ represents the sum of the squares of the second or-

der difference and where N is the number of index numbers or items included in the computation of the second order difference. The second order difference may be obtained either directly by subtracting twice the second item from the sum of the first and third items of a series and repeating the process by subtracting twice the third from the second and fourth, etc., or indirectly by computing the first difference which is obtained by subtracting each item of a series from the one directly following; and then, by the same procedure, taking the differences of the first differences. For a discussion of the derivation of this formula and of the efficacy of the "fluctuation-rate coefficient" as a measure of the rate of dispersion in an ordered statistical series, see W. L. Crum, "A Measure of Dispersion for Ordered Series," *Journal of the American Statistical Association*, December 1921, pp. 969-75.

⁵ The fact that, in terms of purchasing power, gold is more unstable than silver leads one to question whether a country like China should abandon the silver for the gold standard. To be sure, the adoption of the gold exchange standard would give stability to the exchange rates between that country and countries on the gold standard. But if the purchasing power

Turning again to the chart on page 90, to the period since 1926, it will be noted that while the purchasing power of silver has continued its downward trend, that of gold has not only risen but has, beginning in 1930, risen at a more rapid rate than the purchasing power of silver has declined. As a matter of fact, the purchasing power of silver seems to have reached the trough in 1930 and has since begun its upward movement, while that

of gold continues to rise, and if the demand for gold by some of the gold or gold exchange standard countries should increase, thereby driving the purchasing power of gold still higher, it may be far worse to achieve stabilized exchange rates under the gold standard than to endure fluctuating rates under the silver standard.

As a matter of fact silver prices in China have been considerably more stable than gold prices in the United States, a representative gold standard country. The following indexes of wholesale prices in North China and the United States (prepared by the Nankai Institute of Economics,

Year	North China	United States	Year	North China	United States
1913	67	70	1923	90	101
1914	67	68	1924	94	98
1915	69	70	1925	97	104
1916	74	86	1926	100	100
1917	80	118	1927	103	95
1918	82	131	1928	108	97
1919	81	139	1929	111	95
1920	89	154	1930	116	86
1921	89	98	1931	123	73
1922	86	97	1932	113	65

Tientsin, and the U. S. Bureau of Labor Statistics respectively, 1926 = 100) show that, while gold prices of general commodities in the United States have fluctuated violently silver prices in North China have risen persistently until 1932.

Since rising—particularly steadily rising—prices tend to stimulate business activity, encourage production, and increase real income, China from the pre-war years to the present must have been enjoying prosperity. During the same period the Western World has experienced rising prices during the war boom, a severe deflation and business depression in 1921, and the depressing effects of declining prices since 1929. If the history of silver and gold prices should repeat itself, it would certainly be desirable for China to retain the silver standard.

of gold is apparently continuing its steep ascent. The persistent decline in the price of silver since 1926, discerned in the chart on page 88, is therefore to be ascribed in the years 1926-29 quite as much to the fall in the purchasing power of silver as to the rise in that of gold; and in the period since then more to the rise in that of gold than to the fall in that of silver. The non-ferrous metals show more variation in purchasing power throughout the period than either of the other two metals. In 1930, as shown by the chart on page 90, these metals and silver began a downhill race and in 1932 the purchasing power of non-ferrous metals was actually lower than that of silver.*

It is clear from the foregoing analysis that silver is by no means the only commodity which has experienced a long-time decline in purchasing power. Other commodities, for instance gold and the non-ferrous metals, have from time to time sustained greater losses. The accompanying table shows the extent to which certain commodities have depreciated more than silver in both purchasing power and price.

The commodities listed in the table are but a few of the more important ones which have declined more than silver in price and purchasing power. The importance of silver to the United States may be gauged by its relative position among the 550 commodities sold at wholesale. Of the aggregate value in exchange derived from these commodities, silver contributes *only one-tenth of 1 per cent*. If the wholesale value in exchange of silver had been compared with the total value in exchange of all commodities marketed at wholesale in the United States

*The index numbers of the purchasing power for 1932 are: non-ferrous metals, 66; silver, 70.

THE PRICE OF SILVER

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DECLINE IN PURCHASING POWER AND PRICE OF SILVER IN THE UNITED STATES COMPARED WITH THAT OF CERTAIN OTHER COMMODITIES, 1926 TO 1932

Commodity	Average Prices for Three Months (June-August) 1932 ^a		Estimated Wholesale Value in Exchange, 1926 ^b	
	As Percentage of Respective 1926 Average	Converted to a Purchasing Power Index (With 1926 as base)	In Millions of Dollars	As Percentage of Aggregate Value of 550 Commodities
Silver.....	44.4	68.8	44	0.1
Tobacco leaf.....	41.3	64.0	121	0.3
Lamb, western, fair to good.	40.6	62.9	122	0.3
Zinc pig slab.....	40.1	62.2	80	0.2
Automobile tires and tubes.	39.9	61.9	765	1.7
Copper ingots, electrolytic.	37.1	57.5	304	0.7
Lead pig, de-silverized.....	35.6	55.2	119	0.3
Hogs, fair to good, light butcher.....	35.2	54.6	1,213	2.7
Cotton, middling, Galveston.....	35.1	54.4	790	1.8
Hides and skins.....	35.1	54.4	344	0.8
All grains.....	34.4	53.3	1,603	3.6
Tin pig.....	32.1	49.8	111	0.3
Silk and rayon.....	27.7	42.9	684	2.6
Potatoes, white, New York.	25.0	38.8	83	0.2
Gasoline, natural, Oklahoma.....	24.0	37.2	178	0.4
Rubber, crude, New York..	6.6	10.2	357	0.8
All commodities (550 in 1926).....	64.5		44,288	100.0

^a Data are from *Wholesale Prices*, July and August 1932 (Bureau of Labor Statistics monthly publication). The purchasing power index is computed by dividing each specified price relative by 64.5, the wholesale price index number for all commodities.

^b The figures of value in exchange represent the estimated wholesale values in exchange in the United States in 1926 of each commodity or group of commodities. Data are from "Wholesale Prices, 1913 to 1928," *U. S. Bureau of Labor Statistics Bulletin No. 493*, pp. 225-26. The wholesale value in exchange in 1926 of the 550 commodities included in the revised index of wholesale prices of the Bureau of Labor Statistics is estimated to be \$44,288,295,000.

for any particular year it would have been found to be even less important. Surely it cannot be considered an important commodity. Moreover, it has suffered no greater depreciation in price and purchasing power than have some far more important commodities.

In summary it may be stated that silver, though unstable in price, is more stable than many commodities. Since 1926 the wholesale price level has accompanied the price of silver in its descent, and during the present depression non-ferrous metals and farm products have declined in price at an even faster rate than silver. While the purchasing power of silver depreciated throughout 1900-32, that of gold also declined until 1920. In general silver has not a more variable purchasing power than gold. In fact, since 1915 gold has undoubtedly been the more unstable of the two. The purchasing power of the non-ferrous metals has fluctuated more widely and has fallen at a more rapid rate during the past two years than that of silver. Indeed, in 1932 a large number of commodities much more important to the national income than silver have depreciated much more than it has in purchasing power and in price.

II. THE PRICE OF SILVER AND THE PRINCIPAL SILVER-PRODUCING COUNTRIES

The effect of the decline in the price of silver on a silver-producing country can best be gauged by the importance of silver to its national economy. In this section we shall compare the value of the output of silver in the principal silver-producing countries with the value of all minerals produced; and, where data are available, with the value of all production, or with the national income.

As shown by the accompanying table, the value of the

output of silver constitutes but six-tenths of 1 per cent of the total revenue contributed by all minerals produced in the United States. It is less important than the other principal non-ferrous metals and far less important than any of the other principal mineral industries. Compared with the total output of all commodities, silver production would appear to be an infinitesimal item indeed.

VALUE OF PRINCIPAL MINERALS PRODUCED IN THE UNITED STATES, 1925-29^a
(Five-year averages)

Mineral	In Millions of Dollars	As Percentage of All Minerals Produced
Silver.....	37.2	0.6
Aluminum.....	42.6	0.7
Copper.....	263.5	4.6
Gold.....	47.1	0.8
Lead.....	92.9	1.6
Zinc.....	80.6	1.4
Ferro-alloys.....	62.3	1.1
Iron.....	705.7	12.3
Cement.....	275.5	4.8
Clay products.....	400.9	7.0
Bituminous coal.....	1,032.0	18.0
Anthracite coal.....	400.4	7.0
Natural gas.....	332.1	5.8
Natural gasoline.....	134.6	2.3
Petroleum.....	1,248.2	21.8
Sand.....	113.7	2.0
Stone.....	192.1	3.3
All minerals (including those not listed).....	5,738.6	100.0

^a Compiled from *Mineral Resources of the United States*.

According to estimates of the National Bureau of Economic Research, less than 3 per cent of the income of the United States is derived from the mining industries.⁷ As less than 1 per cent of the total revenue from the min-

⁷ The percentage ratio of the "realized income of mines, quarries and oil wells" to the total "realized income of the United States" for the years 1923-25 is 2.83. The income data for this computation are taken from W. I. King, *National Income and Its Purchasing Power*, 1930, p. 94.

ing industries comes from silver, it is obvious that its production is of relatively minor importance to the country. It is also patent, since the United States produces one-fourth of the world supply, that world silver production taken as a whole is of little significance to the world at large.

In Canada, as the accompanying table shows, silver yields less revenue than any of the principal non-ferrous metals except zinc. It represents but 0.35 per cent of the value of all commodities produced.⁸ Thus, while silver

VALUE OF PRINCIPAL MINERALS PRODUCED IN CANADA, 1925-29^a
(Five-year averages)

Mineral	In Millions of Dollars ^b	As Percentage of All Minerals Produced
Silver.....	13.1	5.0
Copper.....	24.4	9.4
Lead.....	18.2	7.0
Zinc.....	10.1	3.9
Nickel.....	19.0	7.3
Gold.....	37.8	14.6
Fuels.....	69.6	26.8
Cement, clay, and stone....	46.1	17.8
All minerals (including those not listed).....	259.6	100.0

^a Compiled from the *Canada Year Book*, 1932.

^b Conversion to American dollars at the annual average rate of exchange is made for the year 1929 only. In the years 1925-28 the Canadian dollar was practically at par with the American dollar.

⁸ This percentage figure was obtained by taking the ratio of the value of silver production to the net value of the total production for the years 1925-29. The Dominion statisticians estimate annually the "gross" and "net" values of production in Canada. "Net" value figures, which are used in our computation, represent the amounts derived from production after the values of the materials consumed in the productive process are eliminated.

The term "production" as employed by the Dominion statisticians may be defined as the creation of "form utilities," and includes such processes as the growing of crops, extraction of minerals, fabrication of manufactures, etc. "Place and time utilities," such as transportation and merchandising,

production is relatively more important to Canada than it is to the United States, it is not of much consequence to the Canadian economy.

Mexico is a country seriously affected by a fall in the price of silver because it produces the largest portion of the silver produced in the world and because a consider-

VALUE OF PRINCIPAL MINERALS PRODUCED IN MEXICO, 1925-28^a
(Four-year averages)

Mineral	In Millions of Dollars ^b	As Percentage of All Minerals Produced
Silver.....	61.9	24.5
Lead.....	36.1	14.3
Zinc.....	18.4	7.3
Copper.....	18.1	7.2
Gold.....	15.0	5.9
Coal.....	3.7	1.5
Iron.....	2.5	1.0
Petroleum.....	95.0	37.5
All minerals (including those not listed).....	252.8 ^c	100.0

^a Data for all minerals except petroleum are from *Anuario de Estadística Minera*, Secretaría de Industria, Comercio y Trabajo, Mexico. Data for petroleum are from *Boletín del Petróleo*, Secretaría de Industria, Comercio y Trabajo, Mexico.

^b Values originally in Mexican pesos were converted to dollars at the average rate of exchange for each year.

^c This value figure does not include the production of all minerals. According to reports to the U. S. Department of Commerce by its representatives in Mexico, small quantities of cement, clay products, sand, and stone, for which no official data are available, are produced in Mexico. *The Statistical Year-Book of the League of Nations*, 1932, p. 128, also shows that Mexico produces annually a small amount of cement.

and "service utilities," such as the services of the doctor and the lawyer, are excluded. The Dominion statisticians estimate that the money value of the productive activities excluded is approximately 36 per cent of the net value of production. Should the value of the silver output be compared with the value of the total productive activity of Canada, which is approximately equivalent to the national income, it would be found that silver produces but two-tenths of 1 per cent of the total revenue. The production data of Canada were taken from the *Canada Year Book*, Dominion Bureau of Statistics, 1932.

able part of its income is obtained from this source of production. As the following table indicates, almost one-fourth of the income from all minerals is derived from silver. Since statistics of the national income or of the total production of Mexico are not available, it is not possible to measure the relative importance of silver to the Mexican economy. As silver exports comprise 17 per cent⁹ of total exports, other things being equal, the reduction in the price of silver has undoubtedly had an adverse effect on Mexico's balance of payments,¹⁰ although the loss has been shared by foreign investors who own most of the Mexican silver mines.¹¹ It has had a particularly unfavorable effect on income from trade with the United States, to which country the greater part of the silver produced is exported. This silver constitutes 31 per cent of the total imports of the United States from Mexico.¹² But while Mexico may sustain some loss of income from its silver exports, the loss is relatively inconsequential to the world. Even the United States, with which Mexico

⁹ This figure represents the average for the five-year period 1925-29 and was obtained by taking the ratio of the exports of silver to the total exports for the period. The export data are from the following sources: 1925-27, *Commerce Yearbook*, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, 1929, Vol. II, p. 445; 1928-29, records of the Division of Regional Information, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

¹⁰ The fall in the price of silver would have an adverse effect on the balance of payments (no account being taken of fixed charges such as interest on bonded indebtedness) only to the extent that the price of silver fell relatively more than the prices of other export-import commodities. As prices of export and import commodities in general have also fallen, though not perhaps to the same extent as the price of silver, it is evident that the unfavorable effect of the decline in the price of silver on the balance of payments of Mexico or any other important silver-producing country must have been considerably minimized.

¹¹ See pp. 70-71.

¹² This figure represents the average for 1925-29; based on data from *Commerce Yearbooks*, 1925-30.

transacts over 60 per cent¹³ of its foreign trade, is little affected since only 3 per cent¹⁴ of the foreign trade of this country is transacted with Mexico. Thus the depreciation in the value of the Mexican output of silver is of relatively minor significance to world economy.

In Peru the value of the silver output comprises 13 per cent of the revenue produced by all minerals but only a negligible portion of the revenue from all commodities.

VALUE OF PRINCIPAL MINERALS PRODUCED IN PERU, 1925-28^a
(Four-year averages)

Mineral	In Millions of Dollars ^b	As Percentage of All Minerals Produced
Silver.....	12.6	13.1
Copper.....	15.4	16.1
Vanadium.....	4.2	44.4
Lead.....	1.8	1.9
Gold.....	2.0	2.1
Petroleum.....	54.9	57.3
All minerals (including those not listed).....	95.8	100.0

^a *Extracto Estadístico del Perú*, Bureau of Statistics, Peru, 1927-30.

^b Value figures, originally in Peruvian pounds, were converted into dollars at the average rate of exchange for each year.

Peru is essentially an agricultural country and derives the larger part of its national income from agriculture rather than from the extraction of minerals. Statistics of silver exports are not available, but even if all the silver produced in Peru were exported it would represent

¹³ For the period 1925-29 Mexico's exports to the United States represent 64 per cent of its total exports, and its imports from the United States 69 per cent of its total imports. Basic data are from *Commerce Yearbooks*, 1925-30.

¹⁴ For the five-year period 1925-29 exports to Mexico from and imports from Mexico into the United States respectively represent 2.6 per cent of the total exports and 3.4 per cent of the total imports of this country. Basic data are from *Commerce Yearbooks*, 1925-30.

only 12 per cent¹⁵ of total exports. The reduction in the price of silver evidently would not have a serious adverse effect on Peru's balance of payments.¹⁶ And the Peruvian volume of foreign trade is so small¹⁷ that should the value of Peru's silver output dwindle to nothing, or even should its balance of payments be completely wiped out, the effect on the world would be immaterial.

The conclusion to be drawn is that the effect of the decline in the price of silver varies in the principal silver-producing countries. The output of silver in the United States and Canada contributes but meager amounts to the national income and is of minor importance in the production schemes of these two countries. Therefore the decline in silver price has had a relatively inconsequential effect on the American and Canadian national economies. In Mexico and Peru silver exports comprise a relatively large part of the foreign trade. Consequently a falling silver price has relatively a more adverse effect on their balance of payments. But as the foreign trade of these two countries constitutes only an insignificant share of world trade, their trade balances are of no importance to the world.

III. THE PRICE OF SILVER AND THE PRINCIPAL SILVER-CONSUMING COUNTRIES

It is generally contended that the recent serious fall in the price of silver has reduced Chinese and Indian

¹⁵ The percentage ratio of the value of silver output to the value of the total exports of Peru for 1925-29 is 11.7. Data for silver production are from *Annual Report of the Director of the Mint*, 1932, and for total exports from *Commerce Yearbooks*, 1925-30.

¹⁶ See footnote 10, p. 100.

¹⁷ For the years 1925-29 Peru's total imports amounted on the average to 73 million dollars annually, the equivalent of 1.5 per cent of the total annual exports of the United States.

purchasing power in foreign markets and so in no small measure has aggravated the present world depression. In this section we shall examine such pertinent data as are available with the view of ascertaining whether or not this contention has any basis.

A. China

As China is a silver standard country, the gold value of its silver coin varies directly with the gold value of silver bullion. Has not, therefore, the decline in the gold price of silver reduced the purchasing power of China in foreign markets? If China were to purchase foreign commodities with silver, its ability to buy abroad would, of course, be affected. But China has continued to import large quantities of silver despite the world depression, floods and famine, civil wars, and other disturbances in Shanghai and Manchuria. Evidently China has a favorable balance of payments with which to import merchandise and silver. It does not seem, therefore, that China's purchasing power in foreign markets has suffered appreciably as a result of the fall in the price of silver, inasmuch as China not only has not been purchasing foreign goods with silver but has been persistently importing silver on net balance.¹⁸

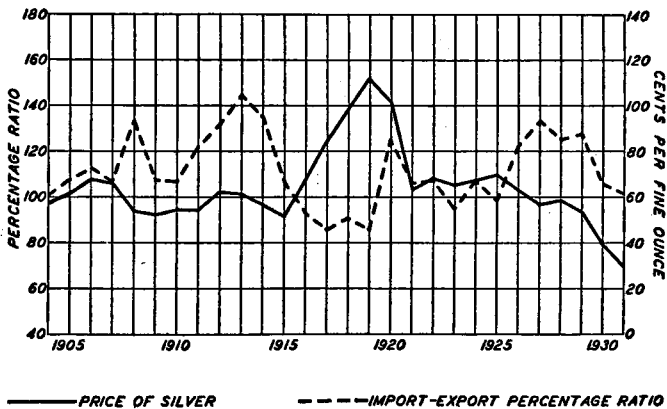
The price of silver in New York and the percentage ratio of the index of the physical volume of imports into China to the index of the physical volume of exports from China for the period 1900-31 are presented graphically in the chart on page 104. They show the relation-

¹⁸ In 1932, a year of profound chaos in China, the net imports of silver into China, according to the estimates of Handy and Harman, amounted to 40 million ounces. *Review of the Silver Market, 1932*, p. 25. China's increased ability to buy foreign goods may be partly explained by the fact that it has not in recent years been paying some of its private foreign debts.

ship between the price of silver and China's ability to purchase foreign commodities. In general the ratio tends to vary inversely with the price of silver. This means that imports relative to exports tend to increase in physical volume when the price of silver is relatively low and

COMPARISON OF THE PRICE OF SILVER IN NEW YORK WITH
THE IMPORT-EXPORT RATIO FOR CHINA, 1900-31^a

(The import-export ratio is derived from physical volume indexes of Chinese imports and exports, with the respective 1923-25 averages = 100)



^a Figures for silver prices are from the *Annual Report of the Director of the Mint*, 1932, p. 127. Basic data for the import-export percentage ratio curve are presented in Table VII, p. 149.

to decrease when it is relatively high. If the ability of China to purchase in foreign countries were determined by the price of silver, one would expect to find a direct correlation between the price of silver and the ratio; that is, a decline in the price of silver would be accompanied by a decrease in imports relative to exports and

vice versa. It is patent that China's capacity to purchase merchandise from foreign markets, so far as its imports (in gold value as well as in quantities) indicate, has been enhanced rather than curtailed by the recent serious fall in the price of silver.

VARIATIONS IN THE FOREIGN TRADE OF CHINA AND THE UNITED STATES AND IN THE TRADE BETWEEN THESE COUNTRIES, 1925-32

Value figures, in dollars, as percentages of the respective 1923-25 averages)

Calendar Year	China ^a		United States ^b		Imports from China into United States ^b	Exports to China from United States ^b
	Imports	Exports	Imports	Exports		
1925.....	101	104	109	108	107	90
1926.....	108	105	114	106	91	106
1927.....	89	101	108	107	96	80
1928.....	107	112	106	113	89	133
1929.....	102	104	113	115	105	119
1930.....	76	66	79	84	64	87
1931.....	61	49	54	53	42	94
1932.....	44 ^c	27 ^c	34	35	16	54

^a Basic data are from the *Foreign Trade of China*, Chinese Maritime Customs. The original figures in Haikwan taels were converted into dollars at the average rate of exchange for each year.

^b Basic data are from *Commerce Yearbooks*, 1925-32.

^c Statistics of the imports and exports of China for 1932 are not complete. Figures of imports into and exports from the Manchurian ports cover only the first six months. During 1928-31 imports into and exports from these ports on the average comprised 15 and 33 per cent respectively of China's total imports and exports.

A comparison of the foreign trade of China and the United States during the period 1925-32, when silver experienced its most drastic price decline, may throw some further light on the effect of the price of silver upon China's ability to purchase abroad. The data for such a comparison are given in the table on this page.

In terms of gold values, China's foreign trade has indeed declined in recent years; but so has that of the United States, a country on the gold standard. And while

IMPORT-EXPORT RATIOS FOR CHINA AND THE UNITED STATES AND FOR CHINA'S TRADE WITH THE UNITED STATES, 1923-31^a
 Computed from the Specified Indexes of Physical Volume of Trade
 (Average 1923-25=100)

Calendar Year	China			United States			China's Trade with the United States		
	Import Index	Export Index	<i>Import Index as a Percentage of Export Index</i>	Import Index	Export Index	<i>Import Index as a Percentage of Export Index</i>	United States Exports to China (Index)	United States Imports from China (Index)	<i>Export Index as a Percentage of Import Index</i>
1923.....	96	101	95	100	90	111	110	105	105
1924.....	106	101	105	97	102	95	103	80	129
1925.....	98	98	100	103	108	95	87	116	75
1926.....	116	104	111	110	115	96	97	97	100
1927.....	98	114	86	112	124	90	88	109	81
1928.....	117	115	102	113	130	87	139	100	139
1929.....	125	110	113	129	133	97	130	119	109
1930.....	117	97	121	109	108	101	118	91	130
1931.....	119	97	123	98	86	114	—	—	—

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^a The indexes of Chinese imports and exports for 1923-30 are those of Franklin L. Ho, *Quarterly Journal of Economics and Statistics*, March 1932, pp. 128-49, Nankai Institute of Economics, Tientsin. The index numbers for 1931 have been computed by the writer. (For further explanation regarding Ho's and the writer's indexes see Table VII, p. 149.) Indexes of imports and exports of the United States are those of the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce. The methods used in computing these indexes are described in *Commerce Yearbook*, 1925, pp. 76-77. The indexes of the exports to China from the United States and of imports from China into the United States are from F. D. Graham, "The Fall in the Value of Silver and Its Consequences," *Journal of Political Economy*, August 1931, p. 433. All the indexes have been converted to the common base 1923-25 by the writer.

in 1932 the imports and exports of the United States fell to approximately the same level, in China exports dropped far below imports.¹⁹ The fact that in 1932 the gold value of Chinese imports from the United States was 54 per cent of the gold value of annual imports from that country during 1923-25, while the corresponding figure for United States imports from China was only 16 per cent, would seem to indicate that Chinese imports have been well sustained. As international trade is fundamentally barter, China's ability to import foreign goods is to a large extent dependent upon its ability to export domestic goods. The decline in foreign demand for Chinese goods, rather than the decline in the price of silver, may therefore be said to have reduced the gold value of Chinese imports during the past few years.

As a matter of fact, the most potent force working upon the gold value of Chinese imports was the decline of commodity prices in terms of gold. As shown by the table on page 106, in physical quantities China imported 19 per cent more goods in 1931 than it did on an average during 1923-25. On the other hand, exports declined in physical as well as pecuniary volume during 1930-31. Thus in recent years, while the price of silver was falling drastically, there was a considerable increase in the ratio of the physical volume of Chinese imports to exports.

In contrast with the sustained high level of the physi-

¹⁹ Figures for Chinese exports and imports during 1932 would have been somewhat larger had the imports into and exports from the Manchurian ports in the last half of the year been included. Owing to the conquest of the three Manchurian provinces and the establishment of the puppet government of "Manchukuo" by Japan, statistics of the foreign trade of the Manchurian ports are available only for the first six months of 1932.

cal volume of China's imports, the physical volume of imports into the United States shows a decrease in recent years. While the physical volume of purchases of the United States from all countries has experienced only a slight absolute reduction, United States demand for Chinese commodities has fallen sharply. The physical volume of China's purchases from this country, on the other hand, has remained large. The percentage ratios in the last column of the table on page 106 indicate the extent to which Chinese imports from the United States have exceeded Chinese exports to the United States. Index numbers of the physical volume of Chinese imports from the United States and Chinese exports to the United States for the years 1931-32 are not available, but as the gold value of the imports was far greater than that of the exports for these two years (see the table on page 105), the 1931-32 ratios of the physical volume of Chinese imports from the United States to the physical volume of Chinese exports to this country must have been much higher than the ratio of 1930. It is clear from the foregoing analysis that the reduction in the price of silver has not only had no observable adverse effect on China's ability to import foreign goods, but that China's capacity to purchase commodities from foreign markets would obviously have been even greater had foreign countries been able to buy more from China.

Indexes of import and export prices in Shanghai, the United States, Canada, and India, together with the percentage ratios of the index of import prices to the index of export prices of each locality are shown in the table on page 109. Similar data for other Chinese ports are not available, but as Shanghai is the most important trading center in China, prices there may be taken to repre-

IMPORT-EXPORT PRICE COMPARISONS FOR SHANGHAI, THE UNITED STATES, CANADA, AND INDIA
 Computed from the Specified Price Indexes
 (1926=100)

Calendar Year	Shanghai			United States			Canada			India		
	Import Price Index	Export Price Index	Import Index as a Percentage of Export Index	Import Price Index	Export Price Index	Import Index as a Percentage of Export Index	Import Price Index	Export Price Index	Import Index as a Percentage of Export Index	Import Price Index	Export Price Index	Import Index as a Percentage of Export Index
1925....	102	97	105	102	109	94	106	103	103	108	111	98
1926....	100	100	100	100	100	100	100	100	100	100	100	100
1927....	107	106	101	92	94	99	96	98	98	94	95	98
1928....	103	105	98	90	94	97	97	94	103	96	95	101
1929....	108	105	102	85	95	89	93	93	100	91	89	102
1930....	127	108	117	69	86	81	87	80	110	87	74	117
1931....	150	108	140	53	67	79	72	65	112	78	57	137

* Indexes of import and export prices are from: Shanghai, *The Shanghai Market Price Report, 1925-32*, National Tariff Commission, Shanghai; United States, *Commerce Yearbook, 1925*, pp. 76-77 and later volumes; Canada, *Prices and Price Indexes 1913-29*, Canada Dominion Bureau of Statistics, p. 216, and *Canada Year Book, 1932*, p. 700. For commodities included in the Canadian indexes, see *Price and Price Indexes, 1913-26*, pp. 169-70. The indexes for India have been computed by the writer by dividing the relatives of value (in rupees) of India's imports and exports by the writer's indexes of the physical volume of imports and exports respectively.

sent those of other ports. An inspection of the Chinese indexes discloses that during the years 1929-31 export prices (in terms of silver) have fallen relatively to import prices. This is in accord with international trade theory, which postulates that a continuous dislocation of the gold-silver exchange ratio, in consequence of a persistent decline in the price of silver, would result in raising import prices relatively to export prices.²⁰ This uninterrupted decline in export prices relative to import prices means that the terms of trade have been moving against China, that a greater quantity of commodities has been exported in exchange for a given volume of foreign goods. This means, of course, that China's ability to purchase foreign products has been impaired.²¹

²⁰ Silver prices of imports and exports will tend to rise with the fall in the gold price of silver, but the increase in the silver prices of imports will be relatively greater than that of exports. The gold prices of commodities produced in gold standard countries, where wages and other incomes are more or less fixed in terms of gold, and imported into a silver standard country will tend to remain unchanged, while the silver prices of these commodities will advance almost immediately in correspondence with the fall in the gold value of silver. On the other hand, silver prices of commodities produced in and exported from a silver standard country, where wages and other costs are more or less established in terms of silver, will tend to respond sluggishly to the fall in the gold value of silver. They will tend to rise, but less in proportion to the new gold value of silver and less rapidly than the rise in the silver prices of imports. These general statements are subject to qualifications too complicated to be discussed in a footnote. For an excellent exposition of some of these qualifications the reader is referred to Graham, *Journal of Political Economy*, August 1931, pp. 443-45. See also Taussig, *International Trade*, Chaps. 26 and 27 for a theoretical analysis of the effects of dislocated exchanges on the terms of trade between countries.

²¹ It may seem that China's purchasing power abroad will be adversely affected in another direction. Because silver prices of China's domestic goods and wages tend to remain unchanged while the silver prices of most of its imports and exports rise in response to the fall in the gold price of silver, the ratio of Chinese merchandise exports to imports may show an increase. The rise in the silver prices of imports acts as a tariff against the importation of foreign products and stimulates domestic production. Thus purchases of foreign commodities by Chinese consumers tend to diminish.

But only to the extent that the differential in Chinese export and import prices is the result of the dislocation of the gold-silver exchange can it be said that the purchasing power of China in foreign countries has been curtailed by the fall in the price of silver.

Factors other than depreciation in the price of silver have accentuated the extent and the degree to which the terms of trade have become more disadvantageous to China. A comparison of the price indexes on page 109 indicates that the terms of trade went against Canada and India as well as China during 1929-31, while they changed in favor of the United States.²² As the exchange rates between both Canada and India and the principal countries with which they traded remained practically

On the other hand, the increase in silver prices of exports has a tendency to encourage the exportation of Chinese goods. The immediate effect is a diversion of exportable goods from the domestic market, where silver prices are relatively low, to the foreign market, where silver prices are relatively high. The effect over a longer period of time is a shift from production for domestic consumption to production for the export trade.

Thus merchandise exports increase relatively to merchandise imports. Indeed the continual rise in silver prices of exportable commodities may stimulate business activity to such an extent as to bring about an increase in the absolute volume of Chinese imports as well. In that event the national purchasing power of China will not have diminished but may well have increased. The relative rise in merchandise exports naturally leads to an accumulation of gold proceeds, which the Chinese usually convert into purchasing power for the purpose of acquiring silver.

The ultimate outcome of all these influences will be a tendency for Chinese national purchasing power abroad to shift from merchandise to silver. China's imports of merchandise will be reduced somewhat, while its imports of silver will be increased to some extent. But there is no reason to believe that China's national purchasing power in foreign markets will be adversely affected. See Graham, *Journal of Political Economy*, August 1931, pp. 450-53; Taussig, *International Trade*, pp. 346-47.

²² It should be remembered that India, Canada, and the United States were on the gold or gold exchange standard until September 1931, October 1931, and March 1933 respectively.

constant until the suspension of gold payments by England in September 1931, the movements of the terms of trade against them cannot be attributed to disturbances of their exchange ratios. Neither can the favorable terms of trade for the United States since 1929 be wholly accounted for by the depreciation of other currencies in terms of the dollar;²⁸ for it was not until the latter part of 1931, when some of the important countries abandoned the gold standard, that the trade of this country was much affected by exchange dislocations. Evidently, then, the movement of the terms of trade against China, India, and Canada and to the advantage of the United States must have been due to causes other than the dislocation of exchanges.

International trade theory postulates that the extent to which changes in the terms of trade result from exchange disturbances is dependent upon the conditions of demand in the trading countries. During 1930-31 demand for raw materials fell relatively to demand for fabricated articles. The accompanying table of price indexes of primary and secondary goods evidences the truth of this statement. Since the United States is principally an exporter of manufactured commodities and an importer of raw materials, and China, India, and Canada are predominantly exporters of raw materials and importers of finished products, it is clear that the terms of trade changed in favor of those countries which imported raw materials and exported finished goods and against those countries which imported manufactured commodities and exported raw products, regardless of the monetary standards they had maintained.

²⁸ The currencies of the following countries had depreciated in terms of the dollar prior to 1931: Argentina, Brazil, Uruguay, Spain, Turkey, and China. Trade between the United States and these countries, however, was relatively insignificant.

THE PRICE OF SILVER

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COMPARISON OF WHOLESALE PRICE INDEXES OF RAW MATERIALS AND OF FINISHED PRODUCTS IN THE UNITED STATES, 1926-31^a
(1926=100)

Year	Index of Raw Materials Price	Index of Finished Products Price	Ratio of Index of Raw Material Price to Index of Finished Product Price
1926.....	100	100	100
1927.....	97	95	102
1928.....	99	97	102
1929.....	98	96	102
1930.....	84	88	95
1931.....	66	75	88

^a The index numbers are those of the Bureau of Labor Statistics, U. S. Department of Labor.

In conclusion, it may be said that the unfavorable exchange rate resulting from the depreciation in the price of silver may have slightly diminished the foreign purchasing power of China, even as the suspension of gold payments may have had a slightly adverse effect upon the foreign purchasing power of such gold standard countries as Canada and India. But the recent shift in the terms of trade against China, as well as Canada and India, must be attributed mainly to the decrease in world demand for the raw products which constitute the greatest part of the exports of China, as well as of Canada and India.

B. India

In popular discussions of the effect of the fall in the price of silver on the Orient, India and China are usually linked together as if they were both on the silver standard. As a matter of fact, from 1901 until September 21, 1931, India was on the gold exchange standard. Since the suspension of the gold standard by England on the latter date, India has been on the sterling exchange standard. Unlike the value of Chinese silver coins, which

varies directly with the gold or commodity value of silver bullion, the value of Indian rupees is entirely independent of the silver content. Since the adoption of the Indian Currency Act of 1927 the rupee has been tied to the pound sterling at the statutory value of 1s. 6d.²⁴ Hence it circulates in India at the equivalent of approximately 18 pence and exchanges for foreign trade purposes for precisely 18 pence irrespective of the value of its silver content.²⁵ A decline in the price of silver would therefore have no unfavorable effect on the purchasing power of India, even though it should affect the purchasing power of China adversely.

It is frequently contended, however, that while the purchasing power of the monetary stock of silver in India may not be affected by a decline in the price of silver, the purchasing power of the large hoards of silver accumulated by the Indian people is affected. To be sure, if an Indian hoarder should go into the present market and sell silver bought when the price was high, he would receive fewer rupees than he originally paid out; but it does not necessarily follow that the purchasing power of

²⁴ The Act of 1927 had in reality created a gold bullion exchange standard, for the Indian government was obliged to buy gold in minimum quantities of about 15 ounces and to sell either gold or gold sterling exchange on London in quantities of not less than 1,065 tolas (about 400 ounces) at the fixed rate of 8.47512 grains troy of fine gold per rupee. The rupee was thus made the equivalent of 18 British pence. The United States equivalent of the face value of a rupee in India was \$0.365. See *Monetary Units and Coinage Systems of the Principal Countries of the World*, Bureau of the Mint, U. S. Treasury Department, 1929, p. 30. Since September 1931, the dollar equivalent of a rupee has varied with the dollar equivalent of the pound sterling. In October 1932, for instance, when the pound sterling dropped to \$3.40, the dollar equivalent of a rupee was about 26 cents.

²⁵ An Indian rupee contains 0.35375 ounce of fine silver, which at the current price of 27 cents per fine ounce is worth about 9 cents. Its face value is thus considerably more than the value of its silver content.

his silver hoard has depreciated. For only to the extent that the price of silver has fallen relatively more than general commodity prices would there be any reduction in the purchasing power of his silver hoard. In the years 1931-32 the price of silver in India fell relatively less than prices of Indian commodities in general because it was artificially supported by an import duty.²⁶ This means that the purchasing power of silver within India actually increased. (See the percentage ratios of the price of silver in Bombay to wholesale prices in Calcutta given in the table on page 116.) Therefore, should an Indian hoarder have been compelled to dispose of his silver in India,²⁷ he not only would have suffered no loss but would have gained in terms of purchasing power.²⁸ But even if he should have experienced a loss, the national purchasing power would not have been affected in any way;²⁹ for so long as the silver is sold and bought in India what one Indian loses another gains.

National purchasing power is reduced only when silver is shipped abroad in exchange for commodities, and then

²⁶ In February 1930 the Indian government imposed a duty of 4 annas (then about 9 cents) on each troy ounce of silver imported. In March 1931 the duty was increased to 6 annas (then about 14 cents) and in September 1931 it was raised to 7.5 annas (the equivalent of 12 cents at the average rate of exchange in 1932, or 17 cents at par of exchange). See Bratter, *U. S. Bureau of Foreign and Domestic Commerce Trade Promotion Series No. 139*, pp. 43-44.

²⁷ As India has consistently been a net importer of silver on private account practically all of the "distress sales" of silver in 1932 must have been made within India. But even if an Indian had to dispose of his silver outside of India in 1932, or if the duty on silver had been completely abolished, he would probably have sustained no diminution of purchasing power. See the last column of the table on p. 116.

²⁸ Prices of commodities in the interior of India probably move more sluggishly than those in a city like Calcutta, so that if an Indian were to sell his silver and spend the proceeds in the village, his gain in purchasing power would be relatively less.

²⁹ Graham, *Journal of Political Economy*, August 1931, pp. 437-38.

only to the extent that the price of silver falls more than the prices of imported commodities fall. Since finished goods, India's chief import, have fallen less in price than silver has, a loss in purchasing power would result from a transfer of silver to foreign countries.⁸⁰ But as India

THE PRICE OF SILVER IN BOMBAY AND NEW YORK COMPARED WITH WHOLESALE PRICES OF GENERAL COMMODITIES IN CALCUTTA, 1926-32
(1926=100)

Calendar Year	Wholesale Prices in Calcutta ^a	Silver Price in Bombay ^b	Silver Price in Bombay as a Percentage of Wholesale Prices in Calcutta	Silver Price in New York ^c	Silver Price in New York as a Percentage of Wholesale Prices in Calcutta
1926.....	100	100	100	100	100
1927.....	100	91	91	91	91
1928.....	98	93	95	94	96
1929.....	95	85	89	85	89
1930.....	78	75	96	62	79
1931.....	61	68	111	46	75
1932.....	45	61	136	46	102

^a Compiled from *Indian Trade Journal*. Since the suspension of gold payments by Great Britain toward the end of September 1931, India has not been on the gold exchange standard. To make the index numbers subsequent to the suspension comparable with the earlier index numbers, which were on a gold basis, the index numbers from October 1931 on have been adjusted by multiplying them by the corresponding index numbers of the rates of exchange of the rupee in terms of the dollar.

^b The relatives for 1927-30 were computed from data taken from the *Annual Market Reviews* published by Premchand Roychand and Sons, Bombay. The original figures represent the average price in Bombay per 100 tolas (ready). The relatives for 1931-32 were computed from data compiled from *Cotton and Finance*, Bombay. They represent the annual average of monthly prices. The original figures were quotations in Bombay at the end of each month per 100 tolas (spot). Like the index of wholesale commodity prices, the monthly relatives from September 1931 on were adjusted to make allowance for the decline in rupee exchange rates on the United States in consequence of the abandonment of the gold standard by England.

^c Computed from data obtained from *Annual Report of the Director of the Mint*, 1932, p. 127.

⁸⁰ The government of India has been exporting some demonetized silver in recent years and has suffered a loss on such sales. These exports are equivalent to only a small part of the net imports of silver on private account.

has been consistently a net importer of silver,³¹ it is most unlikely that there has been any loss through the sale of silver abroad. And even if economic necessity should force India to export silver for the purpose of acquiring commodities, the resultant loss of national purchasing power would be offset by the exportation of gold, which is appreciating in value. Attention should be called to the fact that India's holdings of gold exceed its hoards of silver in value.³² Therefore, should large quantities of silver be exported at low prices, India could protect itself against serious loss of national purchasing power unless, of course, gold should also depreciate in value. It is significant that since the suspension of gold payments by England, while the Indians have been importing silver continuously for hoarding, large quantities of gold have been exported on private account.³³

³¹ According to the Indian official foreign trade report, *Accounts Relating to the Sea-borne Trade and Navigation of British India*, during the year 1932 India's imports of silver on private account practically balanced its exports on private account. However, because of the heavy tariff on silver, large quantities were either smuggled in or brought in from China across the land border of Burma, where no custom existed. The official statistics of silver imports therefore do not account for all the silver that was brought into India and the actual amount consumed in 1932 is unknown. It is estimated by Handy and Harman that 12 million ounces were absorbed by the Indians in 1932. See *Review of the Silver Market*, 1932, pp. 14-15.

³² Actual statistics of the gold and silver holdings of India are not available. It is estimated that at the present time India holds about 4 billion ounces of silver which, calculated at 50 cents per ounce, is worth 2 billion dollars, or, at the present price of 25 cents per ounce, 1 billion dollars. The estimated gold hoards are approximately 125 million ounces which, computed at the price of \$20.67 per ounce, are valued at about 2.6 billion dollars. See Shirras, *Indian Finance and Banking*, pp. 12-13; Bliss, *U. S. Bureau of Foreign and Domestic Commerce Trade Information Bulletin No. 457*, p. 3; Bratter, *U. S. Bureau of Foreign and Domestic Commerce Trade Promotion Series No. 139*, p. 51.

³³ Until 1931 India had been absorbing 5 million ounces of gold annually for hoarding purposes. In 1931, however, there was a net export of about this same amount of hoarded gold, practically all of which

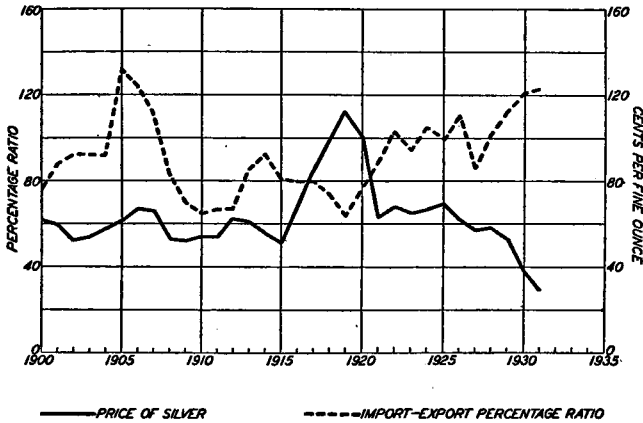
On grounds of theory, therefore, there is no reason to believe that the depreciation in the price of silver has had any unfavorable effect on India's purchasing power in foreign markets. This conclusion is affirmed by statistics of India's foreign trade. The chart on page 119 shows the course of the price of silver and the percentage ratio of the index numbers of the physical volume of Indian imports to the index numbers of the physical volume of Indian exports for 1904-31. If a low price for silver would affect India's capacity to purchase foreign merchandise adversely, a high price should improve it. One would therefore expect a close direct correlation between the movements of the price of silver and the ratio of Indian imports to exports. But the chart shows that the ratio of imports to exports tends to vary on the whole inversely rather than directly with the price of silver.

A closer examination of the relation between the price of silver and India's ability to buy foreign commodities as measured by the import-export ratio for the period 1926-31 is instructive. The price of silver fell during 1926 and 1927 while the ratio of imports to exports rose; the former increased in 1928, while the latter decreased; again the former declined in 1929 and continued to do so for the next two years, while the latter moved upward in 1929 but dropped steadily in 1930 and 1931. Thus throughout this period of severe depreciation in the price of silver we find only two instances where the movements of the silver price and of the ratio are in the same direction. The decline in the ratio in 1930 and 1931,

was exported after the suspension of gold payments. The outflow of gold has continued to the present time. In 1932 approximately 10 million ounces were exported on private account. See *Accounts Relating to the Sea-borne Trade and Navigation of British India, 1931*, and monthly issues for the year 1932.

COMPARISON OF THE PRICE OF SILVER IN NEW YORK WITH THE IMPORT-EXPORT RATIO FOR INDIA, 1904-31^a

(The import-export ratio is derived from physical volume indexes of Indian imports and exports, with the respective 1923-25 averages = 100)



^a Figures for silver prices are from the *Annual Report of the Director of the Mint*, 1932, p. 127. The physical volume indexes of Indian imports and exports, from which the import-export percentage ratios are derived, were computed by the writer. See Table XI, p. 154.

however, is attributable to two factors other than the reduction in the price of silver: the tightening of the boycott against foreign goods by Indian patriots⁵⁴ and the movement of the terms of trade against India.⁵⁵ As we have already pointed out, these unfavorable terms of trade were the result of a decline in the world demand for raw materials, India's chief exports, relative to the

⁵⁴ Gandhi began his "civil disobedience" campaign in the middle of March 1930 with his journey to the sea to produce salt in defiance of the decree which ordained that salt should be a state monopoly.

⁵⁵ See the table on p. 109.

demand for manufactured goods, India's chief imports. As a consequence of the fall in the demand for raw materials in relation to the demand for finished products, export prices declined relatively to import prices; and a greater quantity of exports was required to exchange for a given quantity of imports. The inevitable outcome was a decline in the import-export ratio.

C. Summary

It may be concluded that the recent serious fall in the price of silver has not had the alleged effect of depreciating the purchasing power of the two principal silver-consuming countries. In spite of the fact that India and China have been buying at a disadvantage in foreign markets because the demand for their exports has fallen relatively to their demand for imports, and in spite of civil disturbances and economic distress, the merchandise imports of these two countries have been well maintained. Moreover, the Chinese have been persistently importing silver on net balance and the Indians have continued to import silver for hoarding purposes. Any absolute decline in either merchandise or silver imports into these two countries is to be accounted for by the diminution of the demand for their export products. Instead of attributing the world depression to the inability of the millions of Orientals to buy from the Occidental countries in consequence of the fall in the price of silver, one should perhaps attribute a large measure of what brightness there is in this gloomy world today to the sustained capacity of China and India to purchase commodities from the depressed countries of the Western World.

CHAPTER IV

SUMMARY AND CONCLUSION

Our study of the use of silver for monetary purposes indicates that the monetary demand for silver in the near future is not likely to increase. Since 1920 there has been a general tendency for the nations of the world to debase and demonetize their silver coins. This largely explains the decline in recent years of silver in circulation and of the silver holdings of central and other banks and government treasuries. Debasement and demonetization are still in process, and it is to be expected that silver in circulation and in the vaults of the central banks and other institutions will be further reduced. It is not improbable that some of the countries which have as yet kept the quantity and fineness of their silver intact may find it necessary, for reasons of economy, to debase and demonetize their silver.

The monetary use of silver is largely restricted to subsidiary coinage. But the demand for silver from this source is limited by the fact that many countries have reduced the fineness of their subsidiary coins. Moreover, it should be remembered that only a part of the silver obtained from debasement and demonetization has been disposed of, that the accumulation of silver from these sources is increasing, and that this unsold silver will emerge from time to time to compete with new silver in world markets until the supply is exhausted.

Nor is the prospect for a marked expansion in the industrial consumption of silver promising. Of the three industries which consume most of the silver industrially used in the United States, the chemical industry (includ-

ing the photographic) alone shows a rising trend. The plated silverware industry has shown no growth for the past 13 years, while the sterling silverware industry, which has been using as much silver as both of the other two industries, has remained constant since 1925. Old or secondary silver, which at the present time provides over 25 per cent of the silver consumed industrially, has rapidly increased in importance; and in the future will probably displace even more new silver in the arts and industries. Unless the consumption of silver by the chemical industry continues to grow at a rapid rate, with the demand of the plated and the sterling silverware industries remaining constant as it has been, and with the increasing and persistent return of monetary silver to industrial employment, it is possible that the amount of new silver industrially consumed may decline absolutely.

India's demand for silver for hoarding and other private purposes has been remarkably constant, bearing practically no relationship to the varying merchandise trade balance, which is commonly regarded as an index of its capacity to consume silver. Since 1921 the private consumption of silver in India has averaged 85 million ounces annually, or about 35 per cent of the silver production of the world. It seems probable, in view of the steadiness of the amount consumed in the past three decades, that India's private demand for silver will remain at the present level. But it should be recalled that, until the end of the World War, the Indian government had been consuming annually about 40 million ounces of silver for coinage purposes, that since 1922 it has not only ceased to consume any new silver for monetary purposes but has actually begun to withdraw silver coin from circulation. For the past four years the Indian

government has been selling annually, it is estimated, about 30 million ounces of demonetized silver. This means that unless the Indian Treasury discontinues its sales of surplus silver the private consumption of new silver will fall short of the normal quantity and, until it resumes its coinage of silver, India's total consumption of new silver will not attain its former high level.

China's demand for silver has been increasing and it seems probable that it will continue to increase in the near future. Since 1918 the net imports of silver into China have shown an upward trend and, while China's merchandise trade balance has been habitually unfavorable, it is during this recent period that it has been most adverse. Whatever the invisible items may be which enable China to settle its adverse balance and to pay for the growing imports of silver, there is no reason to believe that they will not continue to permit it to import silver, provided the need for the metal is sufficiently great. And so far as need for silver is concerned, there is no doubt that it is increasing. The continuous flow of silver into China since 1918 has mostly gone into monetary use, and the desire for hard money is likely to continue to increase. Reform proposals which will affect the desire for silver, such as the scheme of the Commission of Financial Experts, are not likely to be adopted. Moreover, should the present low level of silver prices continue, China would need more silver for monetary purposes for, as silver in China tends to circulate at its bullion value, a fall in the price of silver would, other things being equal, require an additional amount of silver corresponding proportionally with the decline in the value of silver.

Turning to the production side of the silver question

we find that the output of the world as a whole and of Mexico, the United States, Canada, and Peru, the four principal producing countries, which account for over 80 per cent of the world production, all show rising trends. But it seems probable that the production of the leading producing countries, and of the world, will fail to maintain past rates of growth for at least a few years to come. In 1930, while world production as a whole was slightly above the extension of its computed trend, the outputs of the United States and of Peru fell far below their respective historical lines of increase. In 1931 world production was over 22 per cent, that of the United States was 53 per cent, that of Peru was 63 per cent, that of Mexico was 20 per cent, and that of Canada was 24 per cent below their respective projected trend lines. According to reliable estimates production in 1932 for the principal producing countries and for the world as a whole underwent even more severe reduction than in 1931. The indications are that 1933 will witness further shrinkage in world production and that for some years to come world production will probably fall below its previous trend of growth.

What then is the outlook of silver today? During the five-year period 1925-29 China absorbed for all purposes, on the average, 100 million ounces of silver per year. India utilized annually for private purposes 90 million ounces, and it is estimated that industries and arts in the Occidental countries used annually about 50 million ounces.¹ Owing to the continual debasement of

¹ For the years 1925-29 the United States consumed on the average 29 million ounces of new silver annually, and it is estimated by the Director of the Mint that Great Britain, France, Sweden, and Switzerland utilized during the same period about 20 million ounces of old and new silver annually, which, if we assume that the proportion of old ma-

coins by a large number of countries it is not possible to ascertain the net amount of silver consumed each year for subsidiary coinage, but it may perhaps be conservatively estimated at 20 million ounces.² If we assume then that the average amount consumed during the five-year period is the normal consumption, the total annual requirement is well over 200 million ounces. Thus even if the two Oriental countries should consume somewhat less than their averages of the period, the combined requirements of the world would be likely to exceed the current decreased output. With production curtailed to the present extent, and with the possibility of further reduction in the near future, barring developments which would affect demand unfavorably, such as a prolonged war involving China or a widespread revolution in India, an improvement in the price of silver is almost certain to occur sooner or later. If the countries of the world should be restored to normal economic conditions, if India³ and those countries which are in the process of de-

terial consumed is the same as that used in the United States, that is, 25 per cent, would amount to about 15 million ounces. Thus these five countries used yearly over 40 million ounces for industrial purposes. The estimate of 50 million ounces as the annual industrial requirement for the Western World seems therefore to be a conservative figure. Kitchin, who estimated that 57 million ounces were consumed annually in the industrial arts by the Occidental countries during 1925-29, looked forward to an increase to 60 million ounces toward 1935. See the (London) *Economist*, Mar. 28, 1931, pp. 661-64.

² Kitchin estimated that coinage purchases by Occidental countries averaged 27 million ounces yearly for the period 1925-29. The same.

³ The Royal Commission on Indian Currency and Finance in 1926 recommended the gradual disposal of 600 million from the total of 850 million rupees then held in the Indian paper currency reserve. The reserve was to be reduced to 700 million by the end of the third year; to 500 million by the end of the sixth; to 350 million by the end of the tenth year; and to 250 million thereafter. Although by the end of 1932, according to estimates, the Indian government had sold approximately 450 million rupees, the silver reserve, instead of diminishing, has actually

monetizing silver should cease to sell their surplus silver, and if those countries which have as yet maintained the quantity and quality of their coins⁴ should refrain from debasement and demonetization, the improvement would present itself fairly soon. But, even if the sale of demonetized silver should continue, it would only mean that the rise of the price of silver would be deferred or checked until the limited stock is exhausted.

The question arises as to whether in the event of a business revival, which would presumably call for an expansion of the output of copper and lead, the production of by-product silver would go on increasing irrespective of demand. As the silver produced from straight silver ores forms quite a large proportion of the total silver production, it is not likely that supply would exceed demand even if by-product production should increase enormously. Moreover, the output of by-product silver is not entirely independent of demand. Recovery of silver from some of the copper-silver and lead-silver ores which yield only a small quantity of silver may be

increased to 1,100 million rupees. The Indian government has not announced whether it will merely sell the 150 million rupees that remain to be disposed of, or whether it will sell the surplus silver that is being accumulated beyond the stipulated reserve requirement. As has already been pointed out, in so far as the continuous flow of the rupees back to the reserve is caused by such temporary occurrences as crop failures and business depression, the restoration of normal conditions will necessitate an outflow of silver from the reserve to circulation. As part of the surplus silver owes its origin to such temporary causes, the disappearance of these causes will undoubtedly bring about an outflow of silver, so that it is unlikely that the Indian Treasury will continue to dispose of its entire surplus silver reserve.

⁴ Spain, which has one of the largest supplies of monetary silver, may dispose of its silver holdings. There has been some agitation to place the Bank of Spain under the control of the government and to have the bank hold its entire reserve in gold. See *Commerce Report*, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Dec. 21, 1931, p. 656.

discontinued unless an improvement in price permits the operators to profit by such recovery. Extraction of silver from copper-silver and lead-silver ores of which the silver contents are relatively large, however, would probably increase with the expansion of the production of the main products.

In summarizing we may state that the future prospect for silver is fairly bright. When the present world-wide depression gives place to a revival, demand for silver is almost certain to re-assert itself. Production has undergone considerable curtailment and will undergo further reduction, particularly if the demonetized silver continues to appear in the market. It may therefore be expected that an improvement in the price of silver will sooner or later manifest itself. Our inquiry into the price of silver may be briefly summed up in the following terms.

1. The reduction in the price of silver has none of the alleged cataclysmal effects of depreciating the purchasing power of India and China in foreign markets.⁶ Despite the world depression, civil perturbations, and economic distress, and notwithstanding the fact that they have to purchase foreign commodities at a relative disadvantage and that there has been a severe decline in the demand for their export products on the part of Western countries, these two principal silver-consuming countries have not only maintained their merchandise imports in pecuniary and physical volume at a relatively high level but China has been a consistent importer of silver and India has continued to import silver for private purposes throughout the present period of the sharp drop in the price of silver.

⁶ Compare pp. 105-07 and 118-20.

2. The silver price level is more stable than that of many important commodities, such as the non-ferrous metals with which silver is produced as a by-product. It is even less variable than that of agricultural products, if the period of comparison is confined to the years since the end of the World War; and certainly during the present depression the price of silver has declined less rapidly than the prices of non-ferrous metals and agricultural products. At the present time there are many important commodities—important from the standpoint of the magnitude of revenues which they yield—whose prices have fallen relatively more than the price of silver.

3. The purchasing power of silver does not fluctuate more than that of gold; it is in fact more stable than that of gold if the comparison be restricted to the war years and since.

4. From the standpoint of the national economic life, the consequences of the recent serious fall in the price of silver in two principal silver-producing countries—the United States and Canada—are negligible. The output of silver constitutes so small a part of the national production of these two countries that, even were the price of silver to dwindle further, the effect on their national incomes would be trifling. The decline in the price of silver has had a relatively more serious effect on the national economies of Mexico and Peru, the other two principal silver-producing countries, because silver contributes a relatively large share to their national income and because silver exports comprise a relatively greater part of their foreign commerce. But as the productive capacity of these two countries is small compared to that of the entire world, and as their foreign commerce makes up so insignificant a share of world trade,

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the loss incurred by them as a result of the depreciation in the price is of no importance to world economy. Silver is in fact one of the insignificant among many commodities which have suffered severe price reduction.

In conclusion, one further observation may be made. As the price of silver will probably show an improvement with the recovery of trade, the problem of price depreciation will to some extent find its own solution. Even if the price of silver should remain low, silver as a problem to this country and to the world at large is so very insignificant compared to the many formidable problems which are facing the nations of the world today that it could well be neglected. While this study has not concerned itself with all the aspects of the silver situation, we may nevertheless safely venture the opinion that, so far as the United States and those countries which neither hold nor produce much silver are concerned, the policy which should commend itself with respect to silver as a commodity is *laissez faire*.

(Please see next page.)

NOTE ON THE SILVER PROVISIONS IN THE FARM RELIEF ACT OF 1933¹

Title III of the Farm Relief Act includes two provisions which deal with silver. One of these authorizes the President of the United States in his discretion to

fix the weight of the silver dollar in grains nine-tenths fine at a definite fixed ratio in relation to the gold dollar at such amounts as he finds necessary . . . and to provide for the unlimited coinage of such gold and silver at the ratio so fixed.

This provision authorizes the introduction of bimetallism in the United States. As our study is concerned with the commodity and not the monetary aspect of silver, an inquiry into the possibilities and the merits of the unlimited coinage of silver with a fixed ratio to gold is clearly beyond the scope of this volume. The provision, therefore, has its bearing on our study only to the extent that the admission of silver to full coinage privileges would affect the demand for and the price of silver. If the United States alone were to establish the bimetallic standard, the ratio of silver to gold to be adopted would have to be near the present market ratio of approximately 60 to 1. For unless the ratio chosen were sufficiently high to prevent the operation of Gresham's Law, the adoption of bimetallism by the United States would result in driving gold out of the country and placing it virtually on a silver standard. It follows that, if this country alone were to introduce bimetallism, the ratio between silver and gold to be established could not diverge far from the actual market ratio, and that therefore the effect on the price of silver would be small.

¹ 73 Cong., Public No. 10.

On the other hand, if many countries agree to reintroduce the long-abandoned bimetallic standard, the adoption of a lower ratio would be more feasible and the effect on the price of silver would be relatively greater. But what chance is there of inducing a large number of countries to enter into a bimetallic scheme with a ratio that is markedly remote from the present market ratio? The important commercial countries would be most reluctant to agree to any low ratio of silver to gold, such as the much advocated 16 to 1. For, apart from the fact that the commodity value of their gold stocks might diminish in consequence of the rise in general prices, the financial ministers of these countries recognize the possibility that the rise in the gold price of silver might stimulate the production of silver to such an extent as to make the bimetallic system unworkable.

The consequences of elevating the price of silver from the present low level of 30 cents to the proposed high level of \$1.30 per fine ounce are of course difficult to predict. During 1920-30 the world output of silver increased continuously in spite of the fact that the price of silver declined persistently. In view of the abundance of argentiferous ores which could be mined, the adoption of a ratio of 16 to 1 would probably result in an enormous increase in silver output, unless, of course, the rise in the price of general commodities should be relatively greater than the rise in the price of silver.³ If the gold price of

³ If general commodity prices should go up, the costs of production would be increased and the relative advantage of silver mining thus reduced. Silver produced from straight silver ores is especially influenced by the course of general prices, for if the costs of mining should remain constant or rise less in proportion to the increase in the price of silver, the profit of extracting such ores would be enhanced. The output of by-product silver would be affected by general prices as well as by the prices of the main products. If prices of general commodities should

silver should be raised, thus lowering the value of gold in relation to silver, the people of China and India who have been consuming approximately 65 per cent of the annual world production of silver might substitute gold for silver for hoarding purposes.³ Moreover, some experts are of the opinion that there will be a decrease in the output of gold in the near future.⁴ In consequence of the remonetization of silver and the resultant rise in general prices, gold production would be likely to decline further. If the output of silver should enormously increase on the one hand and the supply of monetary gold should severely decline on the other because of the increased consumption by India and China for hoarding purposes and the decrease in production, gold would be driven out of circulation and the bimetallic standard would in effect degenerate into a silver standard. Particularly would this be liable to happen if only a few countries should adopt such a bimetallic scheme.

If bimetallism should be introduced by the more important commercial countries, the ratio of silver to gold

rise relatively less than prices of non-ferrous metals with which silver is produced as a by-product, the output of by-product silver would increase, even if the price of silver should remain relatively low. On the other hand, if the price of silver should go up more than in proportion to the rise in general prices, by-product silver would be produced even if the prices of the associated metals should remain low, in which case the by-product ores would be worked mainly for their silver content. Consumers of the non-ferrous metals would therefore be benefited.

³ During 1926-30 India imported annually approximately 70 million dollars of gold for private purposes, or 17 per cent of the annual world gold production for the same period (see Table XII, p. 155). Reliable statistics of the gold imported into China are not available. The Chinese Maritime Customs shows an almost continuous outflow of gold from China during 1920-32. Probably this gold was originally brought into the country by emigrants returning from abroad and was not reported by the customs authorities.

⁴ See *Report of the Gold Delegation of the Financial Committee*, League of Nations Document No. C.502.M.243.1932.IIA, p. 30.

to be adopted would probably not diverge far from the present market ratio.⁶ In that event, the effect of the re-admission of silver to free coinage on the price of silver would not of course be great. It is doubtful, however, if many countries would be willing to adopt bimetallism even at a ratio that is in the neighborhood of the present market ratio.

The second silver provision under the Farm Relief Law authorizes the President,

⁶ The remonetization of silver at a high ratio of silver to gold, with the present content of gold coins unchanged, would not of course attain the avowed object of bimetallism—the raising of world prices to a relatively high level. With silver even at 50 cents an ounce—a ratio of 40 to 1—the addition of the annual output of silver to the world supply of metallic money would be exceedingly small. Assuming that one-half of the annual world production of silver should go into monetary use in the Western World, and assuming further that because the proposed ratio is somewhat under the market ratio, silver production would be stimulated to the extent of increasing from the peak output of 260 million ounces in 1929 to 300 million ounces, the annual addition to the metallic stock of money, with silver at 50 cents an ounce, would be equivalent to only 75 million dollars or approximately 35 per cent of the annual gold production available for monetary use.

It is, however, highly improbable that such a large proportion of the silver production would be available for monetary utilization in the Western World in view of the large total demand for the metal by India, China, and other Oriental countries for hoarding and other uses and of the Western nations for industrial consumption. Between 1921 and 1931 India absorbed for hoarding and other private purposes annually on the average 85 million ounces, or approximately 35 per cent of the annual world production of silver. During the same period China consumed for monetary and other purposes yearly on the average 75 million ounces, or about 30 per cent of the annual world output. The industrial consumption of the Western World required annually about 50 million ounces, or about 20 per cent of the annual world production. Unless silver mining should be unduly stimulated, an eventuality that would not be likely to occur with silver at 50 cents an ounce, the additional amount of silver available to the Western World for monetary use would be meager.

Perhaps an addition of 40 or 50 million dollars, or 20 or 25 per cent of the annual supply of monetary gold, would be a better estimate. If the estimate is based on a ratio nearer to the present market ratio instead of the assumed ratio of 40 to 1, the addition to the supply of metallic money would be inconsequential.

for a period of six months from the date of the passage of this Act, to accept silver in payment of the whole or any part of the principal or interest now due, or to become due within six months after such date, from any foreign government or governments on account of any indebtedness to the United States, such silver to be accepted at not to exceed the price of 50 cents an ounce in United States currency. The aggregate value of the silver accepted under this section shall not exceed \$200,000,000.

Since the debtor nations produce practically no silver and hold no surplus stocks of the metal, this provision will not enhance their ability to pay.⁸ They must, if they choose to make payments in this form, either transfer funds or establish credits abroad with which to purchase silver. If the payments were to be made gradually, the silver could be derived from current output, in which case the silver would be purchased in this and other silver-producing countries. If, however, the United States should agree to accept a large payment of silver at one time, the silver would have to be obtained from the Indian Currency Reserve, the only large surplus stock of silver available for sale. The United States Treasury also holds a large stock of silver which, however, cannot be sold except by an Act of Congress. It is perhaps not inconceivable that Congress might be willing to sell this silver to the debtor nations in order to make it possible for them to pay in silver to this country!

Whether the silver were obtained from current production or from existing stocks, the result would be a rise in the price of silver. Silver producers would be benefited. But, with the increase in the price of silver,

⁸If the debtor nations were permitted to buy silver at the present market price and pay it to the United States at the maximum price of 50 cents per fine ounce, their debt burden would, of course, be diminished to some extent. But if the debts are to be reduced, why not make the reduction directly?

production of the metal would be stimulated. Unless, therefore, the United States continued to take silver in payment of debts, or unless the leading commercial nations could be induced to adopt bimetallism or some other scheme which would greatly increase the use of silver, the acceptance of 200 million dollars' worth of silver in payment of war debts would not permanently solve the problem of silver depreciation.

And what is the United States going to do with the silver it acquires? We have already shown that the Treasury now holds over 400 million ounces of silver which are rendering no indispensable economic service.⁷ Practically every gold standard country has either demonetized or debased its silver coin. The United States also should, in the interest of economy, dispose of its present holdings rather than add more silver to its already superabundant stock.

Since the debtor nations must transfer funds abroad to purchase the silver for the purpose of paying their debts to the United States, since the acceptance of a limited amount of silver in payment of debts by this country would not solve the problem of silver depreciation, and since economy would demand that the Treasury dispose of its present silver holdings rather than make further acquisitions, we are forced to the conclusion that, from the standpoint of national welfare, it would be far more desirable to have the debtor nations, if they are able to do so, transfer the funds directly to the United States Treasury to relieve the American taxpayers in general.

⁷ See pp. 15-18.

NOTE ON THE LONDON AGREEMENT ON SILVER AND ON THE SILVER PURCHASE POLICY OF THE UNITED STATES

At the World Monetary and Economic Conference held in London in July 1933 an agreement with respect to silver was reached by the delegations of eight nations.¹ These nations were the five silver-producing countries—Mexico, the United States, Canada, Peru, and Australia—and the three large holders of silver—China, British India, and Spain.

Under this agreement the governments of the five producing countries covenant not to sell any silver, but to purchase, or otherwise arrange for withdrawing from the market, in the aggregate 35 million fine ounces of silver from the mine production of these countries in each calendar year for a period of four years, beginning with 1934. The United States as its share of the aggregate agrees to take 24,421,410 ounces annually from its mines, thus leaving 10,578,590 ounces to be taken up by the other four countries.²

The governments of the three silver-holding coun-

¹ See U. S. Department of State, *Treaty Information Bulletin No. 47*, August 31, 1933, pp. 17-21. In order that the agreement may become effective, ratification by the respective countries must take place on or before April 1, 1934. The governments of India and of the United States are the only two which have ratified to date.

Contingent upon this agreement, the delegations of 64 governments unanimously adopted a resolution proposed by the United States delegation whereby these governments agreed, during the period ending Jan. 1, 1938 to "refrain from new legislative measures which would involve further debasement of their silver coinage below a fineness of 800/1000"; to replace, so far as practicable, low-value paper money with silver coins; and to "refrain from measures which could appreciably affect the silver market."

² The annual quotas allotted to the other four countries are as follows: Mexico, 7,159,108 ounces; Canada, 1,671,802 ounces; Peru, 1,095,325 ounces; and Australia, 652,355 ounces.

tries, on the other hand, agree to limit their sales during a four-year period commencing with 1934. China is not to dispose of any of its silver, while India is not to sell more than 35 million ounces per year on the average, and Spain not more than 5 million. India, however, reserves the right to sell additional silver to any government for the purpose of transfer to the United States government in payment of war debts.

What will be the effect on the world gold price of silver of this agreement, if it is ratified and executed? The 10.6 million ounces which Mexico, Canada, Peru, and Australia agree to purchase or otherwise withdraw from the market annually comprise such a small part of the annual silver output of the world that their influence on price will be negligible. Likewise the limitation upon sales agreed to by the silver-holding countries will exercise little influence. India concedes practically nothing because, with the exception of silver sold to European countries for war debt payments to the United States, its annual sales of silver since 1927 have never exceeded the amount allowed under the agreement. Likewise neither Spain nor China concedes much, since neither has ever sold any demonetized silver. In fact, China has none to sell.

The chief influence of the London Agreement on the silver market must therefore be attributed to the relatively large purchases of silver which are to be made by the United States. The policy of the United States was defined in a Presidential Proclamation issued on December 21, 1933.⁸ By this proclamation the government ratified the London Agreement and in addition agreed to purchase all silver newly mined in the United States

⁸ "Coinage of Silver," *Presidential Proclamation No. 2067*.

from December 21, 1933 to December 31, 1937 at a price which works out at approximately 64.6 cents an ounce. The President, however, reserves the right "to revoke or modify this proclamation as the interests of the United States may seem to require." Since the price is based on the statutory value of gold, a reduction of the gold content of the dollar, by raising the price of gold, would automatically increase the price of silver, unless action were taken to change the established mint ratio.⁴

The effect of this announcement is to make silver produced in the United States a different commodity from old silver or that of foreign origin. The effect on the world price of silver not eligible for tender to the United States government is problematical. Obviously, the world market should be strengthened by the withdrawal of the entire output of all United States mines together with such non-eligible silver as may be unloaded on the Treasury by the "bootleg" route. Apparently, however, these factors had been discounted in the 18 per cent rise in silver prices which occurred between July 1, 1933 and the date of the President's proclamation, for during the four weeks following the proclamation the rise amounted to only 4 per cent.⁵

Even with the United States mines completely out of

⁴ The proclamation authorizes the Treasury to deduct and retain as seigniorage one-half of the newly mined silver purchased and to coin the other half at the established ratio of 15.988 ounces of silver to 1 ounce of gold. As the statutory value of a fine ounce of gold is still \$20.6718, the statutory value of a fine ounce of silver is \$1.2929. The silver producer therefore receives one-half of \$1.2929 or \$0.64645 for every fine ounce of silver delivered to the Treasury.

⁵ The New York price of spot silver has been as follows in cents per ounce: July 1, 1933—36 $\frac{3}{8}$; Dec. 18—43 $\frac{5}{8}$; Dec. 20—43; Jan. 17, 1934—44 $\frac{7}{8}$.

These figures are, of course, influenced by the exchange depreciation of the dollar, since silver is a commodity which has a world price. The London price rose from July 1, 1933 to Dec. 30 by only 3 per cent.

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the world market, silver prices are subject to the depressing influence of the very large speculative stocks which are held in New York and other markets.⁶ The market, moreover, is severely restricted by the fact that under existing world conditions India and China cannot market enough of their staple exports to enable them to buy silver in their accustomed quantities.

⁶ It is estimated that speculators hold over 175 million ounces in New York and over 20 million ounces in London. See Handy and Harman, *Review of the Silver Market*, 1933, p. 39.

STATISTICAL DATA

I. CHANGES IN THE FINENESS OF SILVER COINS OF SPECIFIED COUNTRIES*
With the Dates of the Original and Present Decrees

Country	Original Fineness (In thousandths)	Present Fineness (In thousandths)
Austria.....	800 (1923 ^b)	640 (December 1924)
Belgium.....	900 and 835 (1865)	0 (October 1926)
Bolivia.....	833 (1908)	800 (July 1928)
Brazil.....	900 (1905)	500 (January 1923)
British East Africa.....	917 and 800 (Unknown)	250 (1921)
Bulgaria.....	900 and 835 (1880)	500 ^d (1929)
Canada.....	925 (1910)	800 (May 1920)
Ceylon.....	917 and 800 (1892)	917 and 550 ^e (August 1919)
Chile.....	720 (1926)	400 (June 1932)
Costa Rica.....	900 (1900)	900, 650 and 500 ^f (July 1923)
Czechoslovakia.....	900 (1923)	700 and 500 (June 1928)
Danzig.....	750 (1923)	500 (February 1932)
Ecuador.....	900 (1898)	720 (March 1927)
Finland.....	868 and 750 (1877)	h (December 1925)
France.....	900 and 835 (1803)	680 (July 1928)
French Indo-China.....	900 and 835 (1898)	900 and 680 (June 1921)
Germany.....	900 (1909)	500 (August 1924)
British Empire.....	925 (1870)	500 (March 1920 ^g)
Greece.....	900 and 835 (1868)	500 (May 1928)
Guatemala.....	900 and 835 (1910)	720 (November 1924)
Honduras.....	900 and 835 (Unknown)	720 (April 1926)
Hungary.....	900 and 835 (1892i)	640 (November 1925)
Irish Free State.....	925 (1870 ^m)	750 (August 1927)
Italy.....	900 and 835 (1865)	835 and 800 (June 1927)
Japan ⁿ	800 (1879)	720 (April 1922)
Latvia.....	900 and 835 (1925)	835 (March 1929)
Lithuania.....	900 (1922)	500 (April 1925)
Mexico.....	900 and 800 (1904)	900 and 720 (October 1919)
The Netherlands ^o	945 and 640 (1901)	720 and 640 (November 1919)
Persia.....	900 (Unknown)	828 (March 1930)
Peru.....	900 (1897)	500 (September 1922)
Poland.....	900 (1919)	750 and 500 (November 1927)
Portugal.....	900 and 835 (1911)	650 ^p (June 1921)
Siam.....	900 and 800 (1908)	900 and 650 (April 1928)
Straits Settlements.....	900 and 600 (1908)	900 and 500 (May 1920)
Switzerland.....	900 and 835 (1865)	835 ^q (June 1931)
Union of South Africa.....	925 (r)	800 (1922)
Uruguay.....	900 (1890)	800 (November 1929)

* Compiled from *Annual Reports of the Director of the Mint*, and the 1912, 1916, and 1929 issues of *The Monetary Systems of the Principal Countries of the World*, Director of the Mint.

^b Prior to the enactment of the law of Dec. 21, 1923, Austria used the monetary system of Austria-Hungary, whose decree of 1892 established the fineness of silver coins at 0.900 and 0.835.

^c No silver coin since 1917.

^d An intervening law of 1928 had reduced the fineness to 0.680.

^e The fineness of the rupee remains at 0.917 but that of all other silver coins was reduced from 0.800 to 0.550.

^f The fineness of the colon remains at 0.900 but that of all other silver coins was reduced to 0.650 and 0.500.

^g The law of 1923 did not provide for silver coin; a law of June 1928 authorized 0.700 and 1.500 fine silver coins; a law of September 1929 provides for the replacement of nickel-bronze coin by 0.500 fine silver coin.

^h No silver coin provided for.

ⁱ All French colonies, except Syria and French Indo-China, use the monetary system of France.

^j Nickel, aluminum, iron, and zinc coins were demonetized by this law.

^k Includes commonwealths using the British system of coinage only.

^l Previous to 1925 Hungary used the silver coins of Austria-Hungary, which were 0.900 and 0.835 fine according to the law of 1892.

^m British Coinage Act of 1870.

ⁿ Chosen and Taiwan use the monetary system of Japan.

^o Dutch East Indies, including Java, Dutch Guiana, and Curacao use the monetary system of The Netherlands. All silver florins, which were originally 0.945 fine, were reduced to 0.720. Other silver coins remain unchanged at 0.640.

^p Intervening laws of May 1911 and June 1914 had reduced the fineness to 0.835.

^q The five-franc silver pieces, which were originally 0.900 fine, were reduced to 0.835 by law of June 1931. All Swiss silver coins are now 0.835 fine.

^r Used monetary system of Great Britain.

II. STANDARD SILVER DOLLARS AND SILVER CERTIFICATES IN THE TREASURY, IN THE BANKS, AND IN CIRCULATION IN THE UNITED STATES, JUNE 30, 1900-32
(In millions of dollars)

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Year	Total Stock of Silver Dollars ^a	Silver Dollars and Silver Certificates ^a		Silver Dollars			Silver Certificates		
		In Treasury	Outside Treasury	Outside Treasury	In Banks ^b	In Circulation ^c	Outside Treasury	In Banks ^b	In Circulation ^c
1900.....	566.1	15.7	550.4	141.9	24.0	117.9	408.5	60.2	348.3
1901.....	568.2	24.0	544.2	114.6	29.3	85.3	429.6	56.5	373.1
1902.....	570.1	24.8	545.3	98.6	29.1	69.5	446.7	79.3	367.4
1903.....	573.6	26.9	546.7	91.6	26.4	65.2	455.1	79.8	375.3
1904.....	572.9	25.9	547.0	84.4	24.5	59.9	462.6	93.8	368.8
1905.....	568.2	29.0	539.2	83.1	24.1	59.0	456.1	99.0	357.1
1906.....	568.3	25.3	543.0	71.0	25.7	45.3	472.0	106.1	365.9
1907.....	568.3	10.2	558.1	87.7	24.8	62.9	470.4	99.6	370.8
1908.....	568.3	21.4	546.9	81.3	43.6	37.7	465.6	150.4	315.2
1909.....	568.3	13.7	554.6	76.3	24.5	51.8	478.3	184.3	294.0
1910.....	568.3	13.2	555.1	76.1	28.7	47.4	479.0	188.3	290.7
1911.....	568.3	37.2	531.1	75.7	29.0	46.7	455.4	208.0	247.4
1912.....	568.3	26.0	542.3	73.3	27.1	46.2	469.0	205.9	263.1
1913.....	568.3	23.4	544.9	74.7	30.4	44.3	470.2	200.5	269.7
1914.....	568.3	28.3	540.0	61.4	30.8	30.6	478.6	206.8	271.8
1915.....	568.3	30.1	538.2	56.2	26.6	29.6	482.0	196.8	285.2
1916.....	568.3	9.8	558.5	68.6	36.3	32.3	489.9	170.0	319.9
1917.....	568.3	17.3	551.0	73.8	30.1	43.7	477.2	121.0	356.2
1918.....	499.5	77.5	422.0	42.8	19.8	23.0	379.2	98.4	280.8
1919.....	308.1	56.5	251.6	82.5	24.7	57.8	169.1	60.1	109.0

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1920.....	268.9	14.9	254.0	135.7	79.8	55.9	118.3	90.0	28.3
1921.....	288.8	10.6	278.2	76.7	25.4	51.3	201.5	104.3	97.2
1922.....	381.2	7.9	373.3	69.2	26.3	42.9	304.1	97.2	206.9
1923.....	491.9	12.4	479.5	67.8	23.0	44.8	411.7	110.6	301.1
1924.....	503.8	17.9	485.9	77.5	35.5	42.0	408.4	114.5	293.9
1925.....	522.1	2.4	519.7	71.0	31.5	39.5	448.7	142.2	306.5
1926.....	533.5	6.0	527.5	69.6	32.9	36.7	457.9	164.4	293.5
1927.....	537.9	5.2	532.7	63.1	29.5	33.6	469.6	176.7	292.9
1928.....	540.0	7.2	532.8	61.1	26.7	34.4	471.7	157.4	314.3
1929.....	540.0	18.4	521.6	51.6	... ^d	... ^d	470.0	... ^d	... ^d
1930.....	540.0	6.6	533.4	44.9	...	...	488.5	...	...
1931.....	540.0	3.9	536.1	41.5	...	...	494.6	...	...
1932.....	540.0	12.6	527.4	39.0	...	...	488.4	...	...

^a Data were compiled from *Circulation Statement of U. S. Money*, U. S. Treasury Department, June 30 of each year.

^b Figures of the holdings of Federal Reserve Banks are included in these estimates. They were furnished through the courtesy of the Division of Research and Statistics of the Federal Reserve Board. No complete figures for banks other than Federal Reserve Banks are available. The *Annual Reports of the Comptroller of the Currency* give separately the gold coin, silver coin, and other kinds of money held by these banks; but they include an "unclassified cash" item. The amount of silver dollars and certificates in this item was estimated by assuming that "unclassified cash" contains silver dollars and certificates in the same proportion as do the classified items. See Y. S. Leong, "An Estimate of the Amount of Money Held by Banks and of the Amount of Money in General Circulation in the United States," *Journal of Political Economy*, April 1930, pp. 164-93, for the method employed.

^c Estimated by subtracting the amount held by all banks (including the Federal Reserve Banks) from the total amount outside the Treasury.

^d Since 1929 the Comptroller of the Currency has not been classifying the silver money held by banks separately but has included such silver holdings under "all other cash in vault." Consequently it has not been possible to estimate the silver dollars and certificates held by banks for the years 1929-32.

III. METALLIC HOLDINGS OF BANKS OF ISSUE OF SPECIFIED COUNTRIES, 1900-31*
(In millions of dollars)

Year	Austria-Hungary ^b		Belgium ^c		Bulgaria ^d		Denmark		Finland ^f		France ^g		Germany ^h	
	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver
1900.....	186.3	48.3	17.6	2.3	1.4	1.0	19.7	—	4.1	0.5	450.2	211.9	119.2	54.6
1901.....	226.1	55.0	16.6	4.0	1.4	1.2	19.5	—	4.1	0.6	472.7	211.7	150.6	55.3
1902.....	224.4	60.3	16.0	5.6	1.0	2.9	19.9	—	4.1	0.6	486.2	212.0	130.2	56.2
1903.....	224.8	59.3	17.6	5.0	1.4	1.5	21.4	—	4.1	0.6	455.7	212.5	132.9	55.6
1904.....	233.6	59.7	18.3	4.8	2.1	1.5	22.2	—	4.4	0.4	513.1	212.7	168.8	51.8
1905.....	217.6	58.9	18.9	4.1	4.0	2.0	25.1	—	4.5	0.3	555.5	207.5	142.0	49.2
1906.....	225.4	49.5	20.1	3.9	5.3	2.1	26.1	—	5.1	0.3	522.2	192.7	114.7	43.8
1907.....	222.7	57.0	20.6	5.1	5.3	2.8	19.3	—	4.9	0.3	519.3	178.4	120.0	49.9
1908.....	239.6	59.4	21.7	8.8	4.8	2.9	17.9	1.5	4.6	0.5	673.2	170.4	183.0	50.5
1909.....	274.3	58.9	21.1	9.6	6.0	3.3	18.1	1.7	3.2	0.6	673.0	168.5	162.2	54.9
1910.....	267.5	56.9	24.3	12.4	6.1	2.6	19.7	1.8	4.2	0.6	632.9	159.4	157.5	62.2
1911.....	261.7	55.9	36.5	8.7	7.7	3.7	19.8	1.7	6.9	0.5	615.7	155.4	175.6	67.6
1912.....	245.1	46.5	41.5	10.4	9.8	3.2	20.4	1.7	6.8	0.4	616.6	129.5	185.0	60.8
1913.....	251.4	50.7	48.1	10.8	10.7	4.5	19.7	1.6	7.0	0.4	678.9	123.5	278.7	65.9
1914.....	213.7	25.4	51.0	5.7	10.6	4.4	24.5	0.7	8.2	0.3	802.6	68.7	498.5	8.3
1915.....	138.8	13.4	50.7	1.2	11.9	4.3	29.8	0.8	8.2	0.3	968.0	60.9	582.4	6.4
1916.....	58.8	11.9	50.7	1.2	13.1	4.1	42.9	0.4	8.2	0.2	652.9	56.9	600.4	3.9
1917.....	53.7	11.4	50.7	1.4	12.2	3.9	46.6	0.7	8.2	0.2	639.7	47.6	573.2	35.7
1918.....	53.1	11.0	51.1	2.7	12.4	3.7	52.1	0.6	8.2	0.1	664.0	61.4	538.9	4.8
1919.....	45.1	10.0	51.4	2.8	7.1	3.3	60.8	0.9	8.2	0.1	694.8	51.7	259.5	4.9
1920.....	...	...	51.4	3.4	7.2	3.3	61.0	0.7	8.2	0.1	685.5	51.4	260.0	1.4
1921.....	...	...	51.4	4.1	7.3	4.0	61.2	1.0	8.2	1.7	690.1	54.0	237.1	2.8
1922.....	...	...	51.9	4.2	7.4	3.6	61.2	1.0	8.4	1.6	708.4	55.8	239.4	16.5
1923.....	...	...	52.2	4.2	7.6	3.3	56.2	3.9	8.2	1.9	709.4	57.2	111.2	—
1924.....	...	...	52.6	4.9	7.8	3.3	56.2	5.0	8.4	2.3	710.4	59.0	180.9	11.1
1925.....	...	...	52.9	8.0	8.0	3.4	56.1	5.5	8.4	1.9	711.0	61.8	287.8	15.7
1926.....	7.4	0.5	86.2	16.4	8.5	3.4	56.0	4.0	8.3	—	711.1	65.8	436.2	3.8
1927.....	11.9	0.2	99.9	0.1	9.5	3.5	48.8	2.9	8.0	—	954.0	66.2	444.2	7.5
1928.....	23.7	0.3	125.6	0.3	9.5	3.6	46.3	2.1	7.7	—	1,253.5	—	650.1	15.2
1929.....	23.7	0.4	163.3	0.3	10.0	1.2	46.2	1.6	7.6	—	1,633.4	8.7	543.8	18.8
1930.....	30.2	0.4	190.8	0.5	10.5	1.1	46.1	1.4	7.6	—	2,100.2	23.0	527.8	30.9
1931.....	26.7	3.6	354.4	5.6	10.9	3.6	38.7	1.5	7.7	1.1	2,699.4	37.8	234.4	14.9

Year	Italy, Naples, Sicily ¹		Japan ²		Java ¹		The Netherlands ¹		Norway ^{2a}		Portugal ²		Roumania ²	
	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver
1900.....	77.8	11.8	32.9	1.0	...	...	23.6	27.1	7.8	—	5.2	9.1	7.7	0.9
1901.....	80.7	13.0	34.3	1.2	...	...	27.7	30.4	8.2	—	5.2	7.8	9.5	0.8
1902.....	86.9	13.4	53.9	0.5	...	...	23.7	32.0	8.3	—	5.2	6.5	14.3	0.7
1903.....	116.4	21.1	58.3	—	...	...	20.2	31.4	6.7	—	5.2	7.1	14.3	0.6
1904.....	120.8	18.5	41.6	1.8	...	...	27.2	30.6	6.8	—	5.2	6.8	10.8	0.6
1905.....	155.5	20.9	59.4	0.3	...	...	31.9	29.7	7.6	—	5.2	7.7	15.1	0.2
1906.....	179.3	25.9	73.4	0.1	...	...	26.7	27.8	8.3	—	5.4	6.8	16.1	0.1
1907.....	217.4	27.2	80.6	—	...	...	36.9	22.0	7.3	—	5.5	5.2	18.7	0.2
1908.....	227.5	25.5	84.5	0.2	...	...	40.6	19.7	7.9	—	5.7	4.4	17.6	0.1
1909.....	232.3	24.0	110.0	0.4	...	...	48.6	14.3	8.1	—	5.8	7.2	18.6	—
1910.....	238.5	20.2	110.9	0.2	17.3	12.4	50.2	10.1	9.2	0.4	6.6	5.1	27.8	—
1911.....	244.7	24.3	114.2	0.2	16.6	11.0	56.4	4.7	16.2	0.2	6.5	6.0	30.5	—
1912.....	248.3	27.9	123.7	0.1	16.1	6.8	65.0	3.3	10.2	—	8.6	34.3	30.3	0.2
1913.....	266.8	22.3	112.0	0.2	10.4	11.0	60.9	3.9	11.9	0.4	8.1	9.4	29.2	0.3
1914.....	270.6	25.2	109.4	—	15.1	10.3	83.7	1.0	10.3	0.3	8.6	6.0	29.7	—
1915.....	264.1	24.6	123.8	0.1	12.1	12.8	172.5	2.5	13.8	—	9.2	3.7	42.6	—
1916.....	224.2	21.8	204.7	—	29.5	9.6	236.2	2.8	33.0	—	9.3	3.6	95.3	—
1917.....	208.2	24.5	323.8	—	31.5	7.4	280.7	2.8	31.2	—	9.3	13.6	34.5	—
1918.....	203.4	22.6	357.3	—	43.4	5.8	277.2	3.9	32.7	0.3	9.3	18.6	34.5	—
1919.....	200.4	22.2	475.2	—	69.1	1.2	256.2	4.2	39.6	0.3	9.3	19.9	34.5	—
1920.....	206.1	22.1	556.5	—	88.2	3.8	255.7	6.6	39.5	0.2	9.3	20.5	34.8	—
1921.....	212.0	22.0	610.8	—	58.7	11.9	243.6	2.3	39.5	0.2	9.3	20.2	34.8	—
1922.....	219.4	22.3	605.5	15.4	61.3	22.8	233.9	2.7	39.5	0.2	9.3	19.7	42.1	0.1
1923.....	218.1	24.1	602.3	27.8	62.9	25.0	233.9	3.7	39.5	5.9	9.3	5.1	46.4	0.1
1924.....	221.0	23.9	585.7	12.2	53.7	21.0	202.9	8.3	39.5	6.3	9.3	1.9	47.8	2.6
1925.....	221.6	24.1	575.8	14.6	76.3	16.2	178.1	8.2	39.5	2.0	9.3	1.2	49.6	0.9
1926.....	223.5	20.3	561.8	16.0	79.3	11.6	166.2	11.1	39.5	—	9.3	0.6	50.8	2.0
1927.....	242.0	25.0	541.9	11.8	71.6	7.2	160.8	11.1	39.5	—	9.3	0.6	50.8	—
1928.....	265.7	5.4	540.9	13.1	68.3	8.3	174.7	8.8	39.4	—	9.3	1.0	49.3	0.7
1929.....	273.0	10.4	542.5	11.0	56.1	11.8	179.9	9.8	39.3	—	9.3	—	55.1	—
1930.....	278.6	... ^p	411.8	25.7 ¹	55.7	16.3	171.3	9.6	39.2	—	9.3	—	55.7	1.8 ¹
1931.....	295.9	... ^p	234.1	25.4 ¹	45.2	19.0	356.7	10.0	41.2	—	12.6	—	58.1	2.2 ¹

III. METALLIC HOLDINGS OF BANKS OF ISSUE OF SPECIFIED COUNTRIES, 1900-31 (Continued)
(In millions of dollars)

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Year	Russia ^a		Spain ^b		Sweden ^a		Switzerland ^b		Total	
	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver
1900	353.9	23.8	67.6	79.6	12.5	1.1	19.3	2.2	1,406.8	475.2
1901	341.1	26.1	67.6	83.3	14.2	1.1	21.1	2.1	1,500.6	493.6
1902	351.4	26.9	69.4	95.0	12.8	1.4	20.2	1.7	1,527.9	515.7
1903	362.7	29.5	70.3	92.1	15.9	2.0	20.8	2.3	1,548.7	520.6
1904	447.8	32.4	71.9	78.7	17.0	1.1	20.7	1.6	1,732.3	503.0
1905	379.4	16.8	72.5	110.2	18.4	1.1	20.6	1.8	1,733.2	510.7
1906	609.0	14.6	74.4	116.8	19.4	0.8	21.2	1.8	1,952.1	487.0
1907	488.0	28.0	75.5	123.9	18.9	0.9	25.5	1.7	1,886.4	502.6
1908	555.3	36.2	76.3	156.4	21.0	1.2	28.9	1.8	2,210.1	539.5
1909	587.0	38.4	77.8	148.6	21.6	1.2	26.3	3.1	2,294.0	534.7
1910	633.0	31.6	89.6	148.1	21.5	1.4	30.0	2.0	2,336.8	527.4
1911	646.9	33.0	108.2	145.5	22.8	1.3	31.0	1.8	2,411.9	521.5
1912	683.2	34.4	123.6	142.3	26.8	1.3	33.4	2.5	2,494.4	505.6
1913	872.4	31.9	92.4	138.8	27.4	1.4	32.8	4.1	2,818.8	481.1
1914	891.5	23.3	110.6	136.8	29.1	0.5	45.9	4.8	3,213.6	321.7
1915	830.6	18.9	167.3	145.3	33.4	0.6	48.3	9.9	3,507.5	305.7
1916	759.0	60.7	241.4	143.0	49.2	0.6	66.6	10.1	3,375.4	330.9
1917	666.5	79.8	379.4	127.9	65.5	0.4	69.0	10.1	3,483.9	367.4
1918	...	...	429.5	124.3	76.5	0.1	80.0	11.4	2,923.6	271.3
1919	...	...	471.5	122.0	75.4	0.3	99.8	14.5	2,857.9	258.3
1920	...	...	473.8	111.1	75.5	0.7	104.8	23.7	2,917.5	249.0
1921	...	...	484.6	120.9	73.6	3.0	106.1	21.3	2,928.3	269.4
1922	2.6	—	487.0	125.0	73.4	5.1	103.3	20.4	2,954.0	316.4
1923	45.0	0.6	487.7	125.5	72.9	3.4	103.7	17.9	2,866.5	311.6
1924	73.0	—	489.2	126.0	63.5	1.1	97.6	17.1	2,899.5	305.1
1925	93.9	—	489.5	126.2	61.6	1.2	90.1	17.6	3,015.8	309.7
1926	84.6	—	493.3	130.3	60.2	1.2	91.1	14.1	3,176.6	302.6
1927	97.0	10.7 ^u	502.3	132.2	61.7	0.9	99.8	12.1	3,464.6	294.1
1928	91.9	22.8 ^u	493.8	134.7	63.2	0.7	102.9	8.8	4,015.8	225.9
1929	147.0	17.8 ^u	495.1	135.9	65.6	0.6	114.8	4.6	4,412.2	232.9
1930	248.9	11.5 ^u	470.5	135.3	64.5	0.7	137.6	0.7	4,856.3	v
1931	328.3	11.7 ^u	433.6	99.9	55.2	1.1	453.0	0.7	5,686.1	v

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- ^a The silver figures in this table represent the face value of the silver coins held by the banks.
- ^b Compiled from *Annual Reports of the Director of the Mint*. Figures for 1900-19 have been converted at \$0.2026 per crown, and for 1926-31 at \$0.1407 per schilling. Subsequent to 1920 Austria and Hungary had separate national banks. Data for silver holdings are not available for either bank during 1920-25 or for the Hungarian bank thereafter. The figures for 1926-31 are those for the Austrian National Bank only.
- ^c Data for 1900-09 were compiled from *Bulletin de statistique et de législation comparée* (Paris) and converted at \$0.193 per franc; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the National Bank of Belgium*. Figures for 1910-26 were converted at \$0.193 per franc, and for 1927-31 at \$0.0278 per franc.
- ^d Data for 1900-09 were compiled from *Bulletin de Statistique* and converted at \$0.193 per franc; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the National Bank of Bulgaria*. Figures for 1910-28 were converted at \$0.193 per lev, and for 1929-31 at \$0.0072 per lev.
- ^e Data for 1900-09 were compiled from *Bulletin de Statistique* and converted at \$0.193 per franc; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the National Bank of Denmark*, and converted at \$0.2679 per krone.
- ^f Data for 1900-09 were compiled from *Bulletin de Statistique* and converted at \$0.193 per franc; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the Bank of Finland*. Figures for 1900-25 were converted at \$0.193 per markka, and for 1926-31 at \$0.0252 per markka.
- ^g Data for 1900-09 were compiled from *Bulletin de Statistique* and converted at \$0.193 per franc; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the Bank of France*. Figures for 1910-27 were converted at \$0.193 per franc and for 1928-31 at \$0.0392 per franc.
- ^h Data were compiled from *Annual Reports of the Director of the Mint and Annual Reports of the Reichsbank* and were converted at \$0.2382 per mark.
- ⁱ Includes some minor coins.
- ^j Data for 1900-26 were compiled from *Annuario Statistico Italiano*, Central Statistical Office (Rome) and converted at \$0.193 per lira; for 1927-31 from *Annual Reports of the Director of the Mint* and annual reports of the three banks. Figures for 1927 were converted at \$0.193 per lira, and for 1928-31 at \$0.0526 per lira.
- ^k Data were compiled from *Annual Reports of the Director of the Mint and Annual Reports of the Bank of Japan* and converted at \$0.4985 per yen.
- ^l Data were compiled from *Annual Reports of the Director of the Mint, Annual Reports of the Bank of Java, and Annual Reports of the Bank of The Netherlands*, and converted at \$0.402 per florin. Data for Java are not available prior to 1910.
- ^m Data were compiled from *Annual Reports of the Director of the Mint and Annual Reports of the National Bank of Norway* and converted at \$0.268 per krone.
- ⁿ Data for 1900-09 were compiled from *Bulletin de Statistique* and converted at \$0.193 per franc; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the Bank of Portugal* and converted at \$1.08 per escudo.
- ^o Data for 1900-12 were compiled from *Bulletin de Statistique* and converted at \$0.193 per franc; for 1913-31 from *Annual Reports of the Director of the Mint and Annual Reports of the National Bank of Roumania*. Figures for 1913-28 were converted at \$0.193 per lei, and for 1929-31 at \$0.00598 per lei.
- ^p Data not available.
- ^q Data for 1900-06 were compiled from *Annual Reports of the Director of the Mint* and converted at \$0.5145 per ruble; for 1907-17 from *Bulletin de Statistique* and converted at \$0.193 per franc. No data are available for the years 1918-21. Figures for 1922-31 were compiled from *Annual Reports of the Director of the Mint* and converted at \$5.1457 per chervonetz. They represent the holdings of the State Bank of U.S.S.R., which superseded the Imperial Bank of Russia.
- ^r Data for 1900-09 were compiled from *Bulletin de Statistique*; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the Bank of Spain*. All figures were converted at \$0.193 per franc or peseta.
- ^s Data were compiled from *Annual Reports of the Director of the Mint and Annual Reports of the Bank of Sweden* and converted at \$0.268 per krone.
- ^t Data for 1900-09 were compiled from *Bulletin de Statistique*; for 1910-31 from *Annual Reports of the Director of the Mint and Annual Reports of the National Bank of Switzerland*. All figures were converted at \$0.193 per franc.
- ^u Includes some platinum.
- ^v Total silver holdings not given because some banks classified minor coins with silver coins.

IV. METALLIC COMPOSITION OF THE PAPER CURRENCY RESERVE OF INDIA
1901-32*

(In millions of dollars)

March 31	Gold	Silver	Total	March 31	Gold	Silver	Total
1901.....	31.6	40.9	72.5	1918....	100.5	39.4	139.9
1902.....	38.5	40.6	79.1	1919....	63.8	136.5	200.3
1903.....	54.0	39.9	93.9				
1904.....	59.1	42.0	101.1	1920....	174.5	145.5	320.0
1905.....	58.8	41.5	100.3	1921....	88.2	239.3	327.5
1906.....	59.5	49.6	109.1	1922....	88.8	282.9	371.7
1907.....	58.5	50.0	108.5	1923....	88.8	317.7	406.5
1908.....	35.1	91.9	127.0	1924....	81.5	292.0	373.5
1909.....	9.5	113.9	123.4	1925....	81.5	280.1	361.6
				1926....	81.5	310.0	391.5
1910.....	47.6	107.2	154.8	1927....	81.5	381.3	462.8
1911.....	61.5	95.4	156.9	1928....	108.6	388.2	496.8
1912.....	116.4	56.5	172.9	1929....	117.6	364.6	482.2
1913.....	140.6	60.0	200.6				
1914.....	115.3	74.9	190.2	1930....	117.8	405.0	522.8
1915.....	55.8	118.0	173.8	1931....	94.4	455.5	549.9
1916.....	88.2	86.0	174.2	1932....	19.2	405.8	425.0
1917.....	68.2	70.1	138.3				

* These figures represent the gold coin and bullion and silver coin and bullion held in the Paper Currency Reserve either in India or in England on March 31 of each year. The original figures in rupees have been converted into dollars at \$0.365 per rupee. Data for 1901-30 are from *Statistical Abstracts for British India with Statistics, Where Available, Relating to Certain Indian States*, Department of Commercial Intelligence and Statistics, Calcutta; 1931-32, *Reports of the Controller of the Currency*, Calcutta.

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V. GOLD AND SILVER HELD BY THE BANKS IN THE UNITED STATES, 1900-29^a
(In millions of dollars)

June 30	Gold Coin, Bullion, and Certificates	Silver (Excluding subsidiary coin)			June 30	Gold Coin, Bullion, and Certificates	Silver (Excluding subsidiary coin)		
		Silver Dollars	Silver Certificates	Total			Silver Dollars	Silver Certificates	Total
1900...	334.1	24.0	60.2	84.2	1916..	1,050.6	36.3	170.0	206.3
1901...	341.4	29.3	56.5	85.8	1917..	2,028.7	30.1	121.0	151.1
1902...	348.8	29.1	79.3	108.4	1918..	2,103.2	19.8	98.4	118.2
1903...	350.6	26.4	79.8	106.2	1919..	2,087.7	24.7	60.1	84.8
1904...	421.0	24.5	93.8	118.3					
1905...	425.8	24.1	99.0	123.1	1920..	1,831.4	79.8	90.0	169.8
1906...	442.6	25.7	106.1	131.8	1921..	2,346.2	25.4	104.3	129.7
1907...	519.5	24.8	99.6	124.4	1922..	2,952.0	26.3	97.2	123.5
1908...	651.6	43.6	150.4	194.0	1923..	3,040.9	23.0	110.6	133.6
1909...	720.0	24.5	184.3	208.8	1924..	3,173.5	35.5	114.5	150.0
					1925..	2,847.9	31.5	142.2	173.7
1910...	692.0	28.7	188.3	217.0	1926..	2,907.5	32.9	164.4	197.3
1911...	783.2	29.0	208.0	237.0	1927..	3,082.3	29.5	176.7	206.2
1912...	792.5	27.1	205.9	233.0	1928..	2,573.5	26.7	157.4	184.1
1913...	793.6	30.4	200.5	230.9	1929..	2,830.8			
1914...	824.8	30.8	206.8	237.6					
1915...	1,065.7	26.6	196.8	223.4					

^a Figures for standard silver dollars and certificates and for gold coin, bullion, and certificates in all banks cover the gold and silver holdings (excluding subsidiary silver coin) of the Federal Reserve Banks and all other banks in the United States. The source of the silver figures is indicated in the footnotes to Table II, pp. 140-41.

The data of gold money held by the Federal Reserve Banks were the revised figures of the Division of Research and Statistics of the Federal Reserve Board and were furnished through the courtesy of that organization. The Comptroller of the Currency in his annual reports classifies the "cash in vault" of banks other than Federal Reserve Banks into gold coin, gold certificates, and other kinds of money, but the cash holdings of these institutions are not completely segregated. It was accordingly necessary to estimate the amounts of gold coin and certificates included under the caption "unclassified cash." The estimate is made on the assumption that the unclassified item contains gold coin and certificates in the same proportion that the gold coin and certificates bear to the classified cash. (See footnote 6, p. 141.)

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VI. GOLD AND SILVER COIN HELD BY BANKS IN GREAT BRITAIN AND IRELAND, 1907-31^a
(In millions of dollars)

June 30	Gold	Silver	Total	June 30	Gold	Silver	Total
1907.....	162.1	24.8	186.9	1920....	394.7	72.5	467.2
1908.....	245.3	33.1	278.4	1921....	395.7	84.2	479.9
1909.....	239.4	34.6	274.0	1922....	388.8	78.8	467.6
				1923....	372.3	68.6	440.9
1910.....	215.1	34.1	249.2	1924....	348.4	68.6	417.0
1911.....	262.8	29.2	292.0	1925....	317.3	71.5	388.8
1912.....	294.9	29.2	324.1	1926....	340.2	76.4	416.6
1913.....	338.2	35.0	373.2	1927....	363.0	78.4	441.4
1914.....	403.0	39.9	442.9	1928....	366.5	66.7	433.2
1915.....	536.3	48.7	585.0	1929....	429.7	61.8	491.5
1916.....	423.9	47.7	471.6				
1917.....	479.4	55.0	534.4	1930....	582.0	70.6	652.6
1918.....	423.9	39.9	463.8	1931....	319.7	76.9	396.6
1919.....	453.6	73.5	527.1				

^a Data are from *Annual Report of the Deputy Master and Comptroller of the Royal Mint*, 1931, pp. 18 and 20.

The gold figures represent the holdings of gold coin by all banks (including the Bank of England) in Great Britain and Ireland. They do not, however, include the gold bullion held by the Bank of England. The amount of gold coin and bullion held in the issue department of the Bank of England on June 30, 1931 was approximately 790 million dollars. See *Federal Reserve Bulletin*, May 1932, p. 311. The silver figures include the silver holdings of all banks in Great Britain and Ireland, including the silver coin in the banking department but excluding that in the issue department of the Bank of England. The issue department held on June 30, 1931 about 4 million pounds sterling or 19 million dollars in silver coin. See the same, p. 21; also *Report of the Committee on Finance and Industry* (Cmd 3897), 1931, pp. 302-03. The original figures for both gold and silver coin, which were in pounds sterling, have been converted into dollars at \$4.8666 per pound.

VII. INDEX NUMBERS OF THE PHYSICAL VOLUME OF IMPORTS AND EXPORTS FOR CHINA, 1900-31*
(Average for 1923-25=100)

Year	Imports	Exports	Year	Imports	Exports
1900.....	30.9	40.5	1917.....	64.3	79.9
1901.....	39.0	44.1	1918.....	57.8	77.8
1902.....	44.2	48.0	1919.....	66.0	103.2
1903.....	40.6	44.1			
1904.....	43.2	47.2	1920.....	66.4	88.0
1905.....	60.3	46.1	1921.....	82.9	93.6
1906.....	59.5	47.6	1922.....	98.9	96.2
1907.....	55.3	49.5	1923.....	96.3	101.3
1908.....	45.4	53.8	1924.....	106.1	100.7
1909.....	48.1	68.5	1925.....	97.5	98.0
			1926.....	116.0	104.1
1910.....	49.4	75.9	1927.....	97.6	113.6
1911.....	50.5	75.3	1928.....	117.0	115.1
1912.....	51.7	76.5	1929.....	124.5	109.8
1913.....	62.4	73.7			
1914.....	57.1	61.8	1930.....	116.5	96.5
1915.....	57.5	71.2	1931.....	119.1	96.7
1916.....	60.3	75.4			

* The index numbers for 1900-30 were prepared by Franklin L. Ho. The early version, which originally appeared in *Index Numbers of the Quantities and Prices of Imports and Exports and of the Barter Terms of Trade in China, 1867-1928* (a bulletin issued in 1930 by the Nankai University Committee on Social and Economic Research, Tientsin), was revised and extended to include 1930 by Dr. Ho. The revised indexes were published in "Revised Index Numbers of Quantities and Prices of Imports and Exports and of the Barter Terms of Trade in China, 1867-1930," *Quarterly Journal of Economics and Statistics* (a periodical published in the Chinese language), Tientsin, March 1932, pp. 128-49. The "ideal formula"

$$\sqrt{\frac{\sum Q_1 P_0 \sum Q_0 P_1}{\sum Q_0 P_0 \sum Q_1 P_1}}$$

was used in computing the indexes. The index numbers, which were originally based on the year 1913, have been converted to a 1923-25 base by the writer.

The writer has also constructed indexes of the physical quantity of Chinese imports and of exports by the "aggregative" method for the period 1923-31. Comparison of Ho's revised indexes with those of the writer shows that they are in close agreement. Certain defects in Ho's unrevised indexes prompted the writer to construct the new indexes. It is gratifying to note that these defects were corrected in Ho's revision. For the sake of comparability Ho's figures have been used throughout the period 1900-30. The index numbers for 1931 are those of the writer. They have been adjusted for the slight downward bias noted between 1923 and 1930.

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VIII. INDEX NUMBERS OF WHOLESALE PRICES OF NON-FERROUS METALS IN
THE UNITED STATES, 1900-32^a
(1926=100)

Year	Index Numbers	Year	Index Numbers	Year	Index Numbers
1900	65.3	1911	77.2	1922	82.9
1901	63.0	1912	94.5	1923	94.8
1902	58.1	1913	89.6	1924	92.1
1903	63.4	1914	77.2	1925	101.3
1904	61.4	1915	108.9	1926	100.0
1905	69.4	1916	154.9	1927	91.4
1906	82.5	1917	163.9	1928	93.0
1907	112.3	1918	145.3	1929	107.3
1908	75.6	1919	114.7	1930	79.1
1909	76.1	1920	114.3	1931	55.5
1910	76.9	1921	76.0	1932	42.9

^a The following price series were included in the index: electrolytic copper ingot, refinery; hot rolled copper sheet, New York; bare copper wire, mill; desilverized pig lead, New York; lead pipe, New York; tin pig, New York; zinc sheet, LaSalle, Ill.; and zinc slab, New York. Prices for 1900-31 were compiled from *U. S. Bureau of Labor Statistics Bulletin No. 440*, pp. 150-55; *Bulletin No. 493*, pp. 153-55; *Bulletin No. 521*, p. 30; *Bulletin No. 543*, p. 66; *Bulletin No. 572*, p. 56; and those for 1932 from monthly issues of *Wholesale Prices*, U. S. Bureau of Labor Statistics. The aggregative formula,

$$\frac{\sum P_1 Q_1}{\sum P_0 Q_0}$$

was employed in constructing the index. The weights used were obtained from *U. S. Bureau of Labor Statistics Bulletin No. 493*, p. 99.

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IX. INDEX NUMBERS OF THE PURCHASING POWER OF GOLD, SILVER, AND NON-FERROUS METALS IN THE UNITED STATES, 1900-32^a
(1926=100)

Year	Gold	Silver	Non-ferrous Metals	Year	Gold	Silver	Non-ferrous Metals
1900	178.3	177.4	116.4	1917	85.1	114.6	139.5
1901	180.8	173.1	113.9	1918	76.2	120.1	110.7
1902	169.8	143.6	98.6	1919	72.2	129.6	82.8
1903	167.8	145.8	106.4	1920	64.8	105.8	74.0
1904	167.5	155.1	102.8	1921	102.5	103.6	77.9
1905	166.4	162.7	115.5	1922	103.4	112.5	85.7
1906	161.8	174.8	133.5	1923	99.4	103.9	94.2
1907	153.4	162.3	172.2	1924	101.9	109.6	93.9
1908	159.0	136.2	120.2	1925	96.6	107.4	97.9
1909	147.9	123.8	112.6	1926	100.0	100.0	100.0
1910	142.0	123.4	109.2	1927	104.8	95.3	95.8
1911	154.1	133.3	118.9	1928	102.4	95.9	95.2
1912	144.7	143.9	136.8	1929	103.6	88.5	111.2
1913	143.3	140.5	128.4	1930	115.9	71.5	91.7
1914	146.8	132.4	113.4	1931	140.6	65.0	78.1
1915	143.9	117.8	156.7	1932	153.8	70.0	65.6
1916	117.0	126.0	181.2				

^a The index of the purchasing power of gold is the reciprocal of the Bureau of Labor Statistics all commodities wholesale price index. The indexes of the purchasing power of silver and of non-ferrous metals were derived by dividing the silver price relatives and the index of wholesale prices of non-ferrous metals by the all commodities wholesale price index of the Bureau of Labor Statistics. The silver price relatives represent the average price of silver in New York per fine ounce, as compiled by the Director of the Mint. The index of non-ferrous metal prices is described in footnote *a* of Table VIII, p. 150.

X. IMPORTS AND EXPORTS OF MERCHANDISE

Calendar Year	Merchandise (In millions of dollars) ^b			Gold (In millions of dollars) ^b		
	Imports	Exports	Net Imports	Imports	Exports	Net Imports ^d
1900.....	158.3	119.3	39.0	4.7	3.8	0.9
1901.....	193.0	122.4	70.6	0.6	5.4	-4.8
1902.....	198.5	134.8	63.7	0.1	6.0	-5.9
1903.....	209.3	137.0	72.3	2.6	2.5	0.1
1904.....	227.0	157.7	69.3	6.5	1.0	5.5
1905.....	326.3	166.4	159.9	8.1	3.0	5.1
1906.....	328.0	188.8	139.2	5.6	2.6	3.0
1907.....	328.6	208.6	120.0	6.6	4.6	2.0
1908.....	256.8	180.1	76.7	1.0	8.5	-7.5
1909.....	263.3	213.6	49.7	0.6	4.9	-4.3
1910.....	305.6	251.5	54.1	2.4	3.0	-0.6
1911.....	306.8	245.1	61.7	2.6	1.6	1.0
1912.....	350.0	274.5	75.5	6.9	1.3	5.6
1913.....	416.1	294.2	121.9	2.3	3.3	-1.0
1914.....	373.2	238.5	134.7	0.6	9.3	-8.7
1915.....	281.5	259.8	21.7	0.5	11.3	-10.8
1916.....	407.6	380.8	26.8	15.7	6.4	9.3
1917.....	566.5	476.9	89.6	14.3	5.2	9.1
1918.....	699.3	612.4	86.9	1.5	2.9	-1.4
1919.....	899.3	877.1	22.2	71.0	13.8	57.2
1920.....	944.9	672.1	272.8	63.2	84.9	-21.7
1921.....	688.6	456.8	231.8	22.4	35.0	-12.6
1922.....	784.4	543.7	240.7	8.1	4.7	3.4
1923.....	738.4	602.4	136.0	8.1	12.6	-4.5
1924.....	824.6	625.3	199.3	1.6	9.6	-8.0
1925.....	796.3	651.8	144.5	1.5	1.8	-0.3
1926.....	854.2	656.6	197.6	1.2	7.0	-5.8
1927.....	699.0	634.1	64.9	1.4	2.3	-0.9
1928.....	849.2	703.6	145.6	4.5	0.1	4.4
1929.....	810.2	650.2	160.0	0.6	1.9	-1.3
1930.....	602.6	411.7	190.9	1.2	8.8	-7.6
1931.....	487.2	309.1	178.1	—	10.9	-10.9
1932 ^e	356.7	167.5	189.2	...	23.8	-23.8

^a The original data were compiled from the following sources: 1900-20, *Foreign Trade of China*, Chinese Maritime Customs; 1932, *Monthly Returns*

^b Converted from Haikwan taels into dollars at the average rate of exchange.

^c Converted from Haikwan taels into fine ounces at 1.20665 per tael.

^d Minus sign indicates net exports.

^e Data for 1932 are incomplete. The exports from and imports into the Chinese Maritime Customs reports.

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AND TREASURE OF CHINA, 1900-32^a

Silver (In millions of dollars) ^b			Silver (In millions of fine ounces) ^c			Calendar Year
Imports	Exports	Net Imports ^d	Imports	Exports	Net Imports ^d	
29.4	17.8	11.6	47.3	28.6	18.7	.....1900
10.4	14.8	-4.4	17.4	24.7	-7.3	.....1901
11.6	20.3	-8.7	22.2	39.0	-16.8	.....1902
14.7	18.6	-3.9	27.8	35.0	-7.2	.....1903
15.5	24.5	-9.0	28.4	44.8	-16.4	.....1904
22.9	28.2	-5.3	37.9	46.6	-8.7	.....1905
15.4	30.4	-15.0	23.3	45.9	-22.6	.....1906
5.6	30.3	-24.7	8.6	46.2	-37.6	.....1907
13.1	21.1	-8.0	24.3	39.1	-14.8	.....1908
19.5	15.1	4.4	37.3	29.0	8.3	.....1909
29.4	15.0	14.4	53.8	27.5	26.3	.....1910
39.7	14.8	24.9	73.7	27.5	46.2	.....1911
33.4	19.1	14.3	54.4	31.1	23.3	.....1912
40.7	14.4	26.3	67.2	23.8	43.4	.....1913
11.1	20.2	-9.1	19.9	36.3	-16.4	.....1914
12.8	24.2	-11.4	25.0	47.2	-22.2	.....1915
29.3	52.0	-22.7	44.8	79.4	-34.6	.....1916
28.3	50.0	-21.7	33.2	58.5	-25.3	.....1917
45.5	15.9	29.6	43.6	15.2	28.4	.....1918
86.3	12.5	73.8	74.9	10.9	64.0	.....1919
156.7	41.8	114.9	152.5	40.7	111.8	.....1920
68.0	43.4	24.6	108.0	68.9	39.1	.....1921
62.8	30.0	32.8	91.3	43.6	47.7	.....1922
75.1	21.4	53.7	113.3	32.2	81.1	.....1923
40.1	19.0	21.1	59.7	28.4	31.3	.....1924
62.1	9.6	52.5	89.2	13.8	75.4	.....1925
59.9	19.5	40.4	95.1	30.9	64.2	.....1926
56.5	11.6	44.9	98.8	20.3	78.5	.....1927
79.3	3.8	75.5	134.8	6.4	128.4	.....1928
77.7	10.0	67.7	146.5	18.8	127.7	.....1929
47.2	16.3	30.9	123.8	42.8	81.0	.....1930
25.8	10.3	15.5	91.6	36.7	54.9	.....1931
21.2	12.9	8.3	75.2	45.9	29.3	.....1932

Returns of Trade and Trade Reports, Chinese Maritime Customs; 1921-31, of the Foreign Trade of China, Chinese Maritime Customs. change for each year.

Manchurian ports during the last half of 1932 were not recorded in the

XI. INDEX NUMBERS OF THE PHYSICAL VOLUME OF IMPORTS AND EXPORTS
FOR BRITISH INDIA, 1904-31*
(Average for 1923-25=100)

Year.	Imports	Exports	Year	Imports	Exports
1904	95.1	94.7	1918	66.7	73.8
1905	97.1	90.6	1919	63.7	74.7
1906	100.4	89.5	1920	93.2	74.5
1907	102.4	96.2	1921	80.6	76.0
1908	105.0	78.7	1922	90.7	84.6
1909	98.8	92.1	1923	90.8	95.8
1910	109.1	102.3	1924	104.2	97.5
1911	117.9	96.9	1925	105.0	106.7
1912	131.5	99.6	1926	117.3	95.6
1913	145.2	100.5	1927	132.3	99.2
1914	122.7	90.8	1928	129.6	103.5
1915	92.4	86.6	1929	137.3	107.4
1916	86.3	93.3	1930	107.1	101.2
1917	73.4	85.5	1931	86.9	85.5

* The basic data for both indexes were compiled from *Accounts Relating to the Sea-borne Trade and Navigation of British India* for the calendar years 1904-31. Fifty-nine quantity series were included in the index of imports and 56 in the index of exports. These series covered only the important articles which entered into the foreign trade of India and for which significant quantity data were obtainable. The aggregative method was used in combining these into indexes. As there were marked shifts in the demand for certain import or export commodities and hence in their relative importance during the period covered, it was necessary to employ three sets of weight factors in constructing the import and export indexes. The first set was derived by dividing the total value of each commodity imported or exported during 1904-07 by the aggregate quantity of the corresponding commodity for the four years. Similarly the second and third sets were obtained by dividing the aggregate value of each series for 1910-14 and for 1922-29 by the total of the corresponding quantities for the five and eight years respectively. Three sets of index numbers for imports and exports were computed by applying these weights. The 1904-07 weights were used for the construction of one set for 1904-14; the 1910-14 weights for another, covering the years 1904-25; and the 1922-29 weights for a third, covering the entire period 1904-31. In each case the base is the average for 1923-25. In the case of the 1904-14 set of index numbers a base outside of the range of the index numbers was computed, with the average for 1923-25 as 100. The final index numbers of either imports or exports, as presented in the table, may be described as follows: for the years 1904-14 they are the geometric average of the three sets of index numbers computed with the 1904-07, 1910-14, and 1922-29 weights; for 1915-25 they are the geometric average of two sets of index numbers constructed with the 1910-14 and 1922-29 weights; and for 1926-31 they are the original index numbers as computed with the 1922-29 weights. For a discussion of the method employed in constructing these index numbers, the reader is referred to the writer's article, "Indexes of the Physical Volume Production of Producers' and Consumers' Goods," *Journal of the American Statistical Association*, March 1932, pp. 25-30.

**XII. PRIVATE IMPORTS AND EXPORTS OF MERCHANDISE AND OF TREASURE
BY BRITISH INDIA, 1900-32^a**
(In millions of dollars)

Cal-endar Year	Merchandise			Gold			Silver		
	Im-ports	Ex-ports	Net Ex-ports ^b	Im-ports	Ex-ports	Net Im-ports ^c	Im-ports	Ex-ports	Net Im-ports ^c
1900	247	343	96	39	12	27	18	13	5
1901	290	388	98	30	11	19	29	13	16
1902	279	408	129	31	12	19	41	16	25
1903	292	480	188	63	12	51	30	9	21
1904	333	523	190	75	12	63	42	19	23
1905	354	512	158	59	12	47	22	3	19
1906	380	554	174	57	18	39	28	7	21
1907	420	611	191	65	11	54	35	6	29
1908	444	483	39	35	12	23	48	7	41
1909	392	559	167	49	11	38	42	9	33
1910	418	682	264	88	13	75	36	11	25
1911	462	725	263	114	12	102	41	19	22
1912	514	794	280	156	12	144	33	14	19
1913	610	798	188	109	16	93	25	7	18
1914	537	694	157	54	10	44	35	3	32
1915	418	585	167	20	11	9	26	4	22
1916	492	741	249	31	1	30	9	13	-4
1917	513	769	256	—	—	—	8	7	1
1918	564	815	251	1	11	-10	7	2	5
1919	599	914	315	13	39	-26	—	2	-2
1920	1,302	1,182	-120	65	27	38	23	16	7
1921	765	608	-157	28	80	-52	45	8	37
1922	734	848	114	87	—	87	54	7	47
1923	735	1,067	332	122	—	122	72	11	61
1924	794	1,223	429	144	1	143	73	13	60
1925	854	1,481	627	222	2	220	79	6	73
1926	888	1,202	314	85	1	84	77	9	68
1927	936	1,191	255	60	—	60	66	11	55
1928	943	1,237	294	77	—	77	63	11	52
1929	933	1,195	262	65	—	65	42	5	37
1930	697	930	233	57	—	57	47	3	44
1931	476	574	98	11	126	-115	32 ^d	5	27
1932	352	364	12	4	200	-196	4 ^d	3	1

^a These statistics were compiled from the following sources: 1900-03 and 1932, monthly issues of *Accounts Relating to the Sea-borne Trade and Navigation of British India*; 1904-31, yearly issues of the same. The original data for 1900-03 and 1921-32 were in rupees and for 1904-20 in pounds sterling. The rupee and pound sterling figures have been converted into dollars at the average rate of exchange for each year.

^b Minus sign indicates net imports.

^c Minus sign indicates net exports.

^d Statistics of the imports of silver for 1931 and 1932, particularly for the latter year, are incomplete. Because of the levying of a high import duty on silver by the Indian government during this time, a considerable quantity of silver was smuggled into the country or brought across the border of Burma, where no customs existed. Such silver was not recorded in the customs report.

XIII. PRIVATE AND GOVERNMENT IMPORTS AND EXPORTS OF SILVER OF
BRITISH INDIA, 1900-32^a
(In millions of fine ounces)

Calendar Year	Private			Government		
	Imports	Exports	Net Imports ^b	Imports	Exports	Net Imports ^b
1900.....	26.4	19.7	6.7	—	—	—
1901.....	45.1	19.7	25.4	14.4	—	14.4
1902.....	69.7	28.9	40.8	0.1	—	0.1
1903.....	51.2	14.3	36.9	9.7	8.4	1.3
1904.....	66.9	28.9	38.0	46.3	0.6	45.7
1905.....	32.9	3.8	29.1	27.8	—	27.8
1906.....	37.7	7.4	30.3	94.4	—	94.4
1907.....	47.8	—	47.8	59.4	—	59.4
1908.....	79.0	—	79.0	0.4	—	0.4
1909.....	73.9	—	73.9	0.4	—	0.4
1910.....	60.1	14.0	46.1	0.4	—	0.4
1911.....	69.2	30.7	38.5	0.2	—	0.2
1912.....	49.4	20.9	28.5	41.0	—	41.0
1913.....	36.9	8.6	28.3	42.8	0.1	42.7
1914.....	55.3	3.1	52.2	0.1	2.3	-2.2
1915.....	47.1	4.1	43.0	0.2	3.7	-3.5
1916.....	13.2	15.4	-2.2	74.5	5.4	69.1
1917.....	8.7	8.8	-0.1	83.4	6.3	77.1
1918.....	5.3	1.9	3.4	166.2	2.8	163.4
1919.....	0.4	2.9	-2.5	162.6	2.0	160.6
1920.....	17.4	14.2	3.2	1.3	1.0	0.3
1921.....	64.0	12.6	51.4	0.3	—	0.3
1922.....	76.1	0.9	75.2	1.2	0.2	1.0
1923.....	105.7	13.9	91.8	1.0	—	1.0
1924.....	104.7	18.3	86.4	0.2	—	0.2
1925.....	107.0	7.1	99.9	0.2	0.3	-0.1
1926.....	117.6	11.7	105.9	0.2	—	0.2
1927.....	110.1	17.0	93.1	0.4	0.3	0.1
1928.....	103.7	16.0	87.7	—	19.0	-19.0
1929.....	73.8	7.7	66.1	—	19.5	-19.5
1930.....	94.6	16.2	78.4	—	15.1	-15.1
1931.....	70.9 ^c	10.0	60.9 ^c	—	23.8	-23.8
1932.....	8.0 ^c	7.9	0.1 ^c	—	24.1	-24.1

^a Data were compiled from the following sources: 1900-03 and 1932, monthly issues of *Accounts Relating to the Sea-borne Trade and Navigation of British India*; 1904-31, yearly issues of the same.

^b Minus sign indicates net exports.

^c Statistics of private imports of silver for 1931 and 1932 are incomplete. See footnote *d* to table XII, p. 155, for explanation.

XIV. AVERAGE MONTHLY PRICES OF SILVER IN NEW YORK, 1910-33*
(In cents per fine ounce)

Month	1910	1911	1912	1913	1914	1915	1916	1917
January.....	52.4	53.8	56.3	62.9	57.6	48.9	56.8	75.6
February.....	51.5	52.2	59.0	61.6	57.5	48.5	56.8	77.6
March.....	51.5	52.7	58.4	57.9	58.1	50.2	57.9	73.9
April.....	53.2	53.3	59.2	59.5	58.5	50.3	64.4	73.9
May.....	53.9	53.3	60.9	60.4	58.2	49.9	74.3	74.7
June.....	53.5	53.0	61.3	59.0	56.5	49.0	65.0	77.0
July.....	54.2	52.6	60.7	58.7	54.7	47.5	62.9	79.0
August.....	52.9	52.2	61.6	59.3	54.3	47.2	66.1	85.4
September.....	53.3	52.4	63.1	60.6	53.3	48.7	68.5	100.7
October.....	55.5	53.3	63.5	60.8	50.7	49.4	67.9	87.3
November.....	55.6	55.7	62.8	59.0	49.1	51.7	71.6	85.9
December.....	54.4	54.9	63.4	57.8	49.4	55.0	75.8	86.0
Average.....	53.5	53.3	60.8	59.8	54.8	49.7	65.7	81.4
	1918	1919	1920	1921	1922	1923	1924	1925
January.....	88.7	101.1	132.8	66.0	65.5	65.7	63.4	68.4
February.....	85.7	101.1	131.3	59.2	65.3	64.3	64.4	68.5
March.....	88.1	101.1	125.6	56.0	64.4	67.6	64.0	67.8
April.....	95.3	101.1	119.8	59.3	66.6	66.9	64.1	66.9
May.....	99.5	107.1	102.6	59.8	71.2	67.0	65.5	67.6
June.....	99.5	110.4	91.0	58.5	71.1	64.9	66.7	69.1
July.....	99.6	106.4	92.0	60.3	70.2	63.0	67.2	69.4
August.....	100.3	111.4	96.2	61.6	69.4	62.8	68.5	70.2
September.....	101.1	114.5	93.7	66.2	69.5	64.2	69.4	71.6
October.....	101.1	119.2	83.5	71.0	68.0	63.6	70.8	71.1
November.....	101.1	127.9	77.7	68.2	65.2	63.8	69.3	69.2
December.....	101.1	132.0	64.8	65.8	63.9	64.7	68.1	68.9
Average.....	96.8	111.1	100.9	62.7	67.5	64.9	66.8	69.1
	1926	1927	1928	1929	1930	1931	1932	1933
January.....	67.8	55.8	57.1	57.0	45.0	29.4	29.8	25.4
February.....	66.8	57.9	57.0	56.2	43.2	26.8	30.1	26.1
March.....	65.9	55.4	57.2	56.3	41.7	29.2	29.8	27.9
April.....	64.4	56.4	57.4	55.7	42.4	28.3	28.3	30.7
May.....	65.1	56.3	60.3	54.1	40.7	27.7	27.8	34.1
June.....	65.5	56.8	60.0	52.4	34.6	27.2	27.5	35.7
July.....	64.8	56.4	59.2	52.5	34.3	28.3	26.7	37.6
August.....	62.4	54.7	58.9	52.6	35.2	27.5	28.0	36.1
September.....	60.6	55.4	57.5	51.0	36.3	28.2	27.9	38.4
October.....	54.5	56.0	58.1	49.9	35.8	29.5	27.2	38.2
November.....	54.1	57.5	58.0	49.6	35.9	32.2	26.7	43.0
December.....	53.5	58.0	57.3	48.5	32.6	30.1	25.0	43.6
Average.....	62.1	56.4	58.2	53.0	38.1	28.7	27.9	34.7

* Sources: 1910-21, *Engineering and Mining Journal*; 1922-33, Handy and Harman.

XV. MINE PRODUCTION OF SILVER OF THE WORLD AND THE PRINCIPAL
PRODUCING COUNTRIES, 1900-33^a
(In millions of fine ounces)

Year	World	United States	Mexico	Canada	Peru
1900.....	173.7	57.6	57.4	4.4	7.3
1901.....	173.1	55.2	57.7	5.2	3.6
1902.....	162.9	55.5	60.2	4.2	4.3
1903.....	167.8	54.3	70.5	3.1	1.7
1904.....	164.3	57.7	60.8	3.6	3.0
1905.....	172.4	56.1	65.0	6.0	6.2
1906.....	166.0	56.5	55.2	8.6	7.4
1907.....	184.8	56.5	61.1	12.8	9.6
1908.....	204.1	52.4	73.7	22.1	9.6
1909.....	213.4	54.7	73.9	27.5	9.6
1910.....	221.4	57.1	71.4	32.9	6.6
1911.....	227.1	60.4	79.0	32.7	8.4
1912.....	225.9	63.8	74.6	31.6	8.4
1913.....	227.5	66.8	70.7	31.5	10.0
1914.....	177.2	72.4	27.5	28.4	9.2
1915.....	189.5	74.9	39.5	26.6	9.4
1916.....	174.6	74.4	22.8	25.5	10.8
1917.....	179.9	71.7	35.0	22.2	10.9
1918.....	203.4	67.8	62.5	21.4	9.8
1919.....	179.9	56.7	65.9	16.0	9.8
1920.....	173.3	55.3	66.7	12.8	9.2
1921.....	171.6	53.0	64.5	13.1	10.0
1922.....	209.8	56.2	81.1	18.6	13.2
1923.....	246.3	73.3	90.9	17.8	18.7
1924.....	239.7	65.4	91.5	19.7	18.7
1925.....	245.2	66.1	92.9	20.2	19.9
1926.....	253.8	62.7	98.3	22.4	21.5
1927.....	254.0	60.4	104.6	22.7	18.3
1928.....	257.9	58.4	108.5	21.9	21.6
1929.....	261.0	61.2	108.9	23.1	21.5
1930.....	248.7	50.6	105.4	26.4	15.5
1931.....	195.9	30.8	86.1	20.6	10.9
1932 ^b	164.8	23.8	69.3	18.4	6.7
1933.....	163.0	21.4	69.1	15.4	....

^a Sources: 1900-24, Merrill, *U. S. Bureau of Mines Economic Paper 8*; 1925-32, *Annual Reports of the Director of the Mint*; 1933, Handy and Harman estimates, *Annual Review of the Silver Market, 1933*.

^b Preliminary figures.

SELECTED BIBLIOGRAPHY

- American Bureau of Metal Statistics, *Year Book*, New York.
- Barbour, Sir David, *Theory of Bimetallism*, Cassell and Co., Ltd., London, 1885.
- Bratter, Herbert M., "Silver—Some Fundamentals," *Journal of Political Economy*, June, 1931.
- , "Should We Turn to Silver?" *Public Policy Pamphlets No. 6*, edited by Harry D. Gideonse, University of Chicago, 1933.
- , *Silver Market Dictionary*, Commodity Exchange, Inc., New York, 1933.
- Carothers, Neil, *Fractional Money*, Wiley and Sons, New York, 1930.
- Chinese Maritime Customs, Statistical Department of the Inspectorate General of Customs, *Returns of Trade and Trade Reports*, Shanghai.
- , *Foreign Trade of China*, Shanghai.
- , *Monthly Returns of the Foreign Trade of China*, Shanghai.
- Chinese Ministry of Industry, Commerce, and Labor, Bureau of Industrial and Commercial Information, *Project of Law for the Gradual Introduction of a Gold Standard Currency System in China, together with a Report in support thereof* (a report submitted to the Minister of Finance by the Commission of Financial Experts, November 11, 1929) Shanghai, 1929.
- Darwin, Leonard, "The Stability of Gold and Silver Prices in Recent Years," *Journal of the Royal Statistical Society*, June, 1899, pp. 348-72, London.
- Economist*, The, "The Silver Situation," March 28, 1931, pp. 661-64, London.
- Elliston, Herbert B., "The Silver Problem," *Foreign Affairs*, April, 1931, pp. 441-56, New York.
- Gibbs, Henry H., "The Fall in Silver and the Closing of the French Mint," *Economic Journal*, March, 1891, p. 145, London.

- Giffen, Sir Robert, *The Case Against Bimetallism*, Bell and Sons, London, 1892.
- Graham, Frank D., "The Fall in the Value of Silver and Its Consequences," *Journal of Political Economy*, August, 1931, pp. 425-70, Chicago.
- Great Britain, *Annual Report of the Deputy Master and Comptroller of the Royal Mint*, H. M. S. O., London.
- , Royal Commission on Indian Currency and Finance, *Report of the Royal Commission on Indian Currency and Finance, Appendices to the Report, Minutes of Evidence Taken in India*, Cmd. 2687, H. M. S. O., London, 1926.
- Gregory, T. E., *The Silver Situation, Problems and Possibilities*, Manchester University Press, Manchester, 1932.
- Handy and Harman, *Review of the Silver Market* (annual), New York.
- Ho, Franklin L., "Revised Index Numbers of the Quantities and Prices of Imports and Exports and of the Barter Terms of Trade in China, 1867-1930" (in Chinese), *Quarterly Journal of Economics and Statistics*, March, 1932, Tientsin.
- India, *Annual Reports of the Controller of the Currency*, Calcutta.
- , Department of Commercial Intelligence and Statistics, *Accounts Relating to the Sea-borne Trade and Navigation of British India* (annual and monthly), Calcutta.
- International Chamber of Commerce, *Report on Silver Problem*, Washington, 1931.
- International Financial Conference, *Memoranda of Experts* ("Memorandum of the Fluctuations in the Price of Silver and Their Causes: the Effect upon the Exchanges of Silver-Using Countries and the Reaction upon Trade and Prices in the World as a Whole," by G. Findlay Shirras), Brussels, 1920.
- Jamieson, G., "Effect of the Fall in the Value of Silver on Prices of Commodities in China," *Journal of the Royal Statistical Society*, December, 1893, pp. 646-69, London.
- Jevons, H. S., *The Future of Exchange and the Indian Currency*, Oxford University Press, London, 1922.

- Kann, E., "How Much Silver is There in China? An Investigation of the Present Status," *Chinese Economic Journal*, April, 1931, Shanghai.
- , *The Currencies of China*, Kelly and Walsh, Ltd., Shanghai, 1926.
- Kemmerer, Edwin Walter, *Modern Currency Reforms*, Macmillan, New York, 1916.
- Kirk, John H., "Silver: A Study on Monetary Stability," *Economic Journal*, September, 1931, pp. 385-94, London.
- Laughlin, J. Laurence, *History of Bimetallism in the United States*, Appleton, New York, 1897.
- Lawrie, H. N., "Gold and Silver," *The Mineral Industry* (annual).
- League of Nations, *Interim Report of the Gold Delegation of the Financial Committee* (Document No. C. 375. M. 161. 1930. II.), Geneva.
- Leavens, Dickson H., "Graphic Facts about Gold and Silver," *Finance and Commerce*, August 12, 1931, Shanghai.
- , "Silver and the Business Depression," *Harvard Business Review*, April, 1931, pp. 330-38, Cambridge.
- Leong, Y. S., "An Estimate of the Amount of Money Held by the Banks and of the Amount of Money in General Circulation in the United States," *Journal of Political Economy*, April, 1930, pp. 164-93.
- , "Indexes of the Physical Volume Production of Producers' and Consumers' Goods," *Journal of the American Statistical Association*, March, 1932, pp. 21-36.
- Montagu and Company, Samuel, *Weekly Bullion Letters*, London.
- Nicholson, J. S., "The Effects of the Depreciation of Silver with Special Reference to the Indian Currency Experiment," *Economic Journal*, March, 1894, pp. 59-69, London.
- Pinnick, A. W., *Silver and China; An Investigation of the Monetary Principles Governing China's Trade and Prosperity*, Kelly and Walsh, Ltd., Shanghai, 1930.
- Rawles, William P., *The Nationality of Commercial Control of World Minerals*, American Institute of Mining and Metallurgical Engineers, New York, 1933.

- Remer, C. F., "International Trade between Gold and Silver Countries: China, 1885-1913," *Quarterly Journal of Economics*, August, 1926, pp. 597-643, Cambridge.
- , *Foreign Investments in China*, Macmillan, New York, 1933.
- Roosevelt, F. D., "Coinage of Silver," *Presidential Proclamation No. 2067*, Government Printing Office, Washington, 1933.
- Salter, Sir Arthur, "The Silver Problem," *Political Science Quarterly*, September, 1931, pp. 321-34, New York.
- Shirras, G. Findlay, "Gold and British Capital in India," *Economic Journal*, December, 1929, pp. 629-36, London.
- , *Indian Finance and Banking*, Macmillan, London, 1920.
- , "Some Effects of the War on Gold and Silver," *Journal of the Royal Statistical Society*, July, 1920, pp. 572-606, London.
- Spalding, William F., *Dictionary of World Currencies and Foreign Exchanges*, Pitman, London, 1928.
- Taussig, Frank W., *International Trade*, Macmillan, New York, 1927.
- , *The Silver Situation in the United States*, American Economic Association, Baltimore, 1892.
- United States Congress, 71 Cong. 2 sess., *Commercial Relations with China*, Hearings before Senate Committee on Foreign Relations, Pts. 1-4, Government Printing Office, Washington.
- , 72 Cong. 1 sess., *The Effect of Low Silver*, Hearings before House Committee on Coinage, Weights, and Measures, Pts. 1-4, Government Printing Office, Washington.
- , 71 Cong., Senate Report 1716, 1931, Government Printing Office, Washington.
- United States Department of Commerce, Bureau of the Census, *Census of Manufactures* (biennial), Government Printing Office, Washington.
- , Bureau of Foreign and Domestic Commerce, *Trade Information Bulletin No. 140* ("Changes in the Monetary

- Uses of Silver Since 1914," by Leland Rex Robinson), Government Printing Office, Washington, 1923.
- , Bureau of Foreign and Domestic Commerce, *Trade Information Bulletin No. 457* ("The Bombay Bullion Market," by Don C. Bliss), 1927.
- , Bureau of Foreign and Domestic Commerce, *Trade Information Bulletin No. 682* ("The Price of Silver," by Herbert M. Bratter), 1930.
- , Bureau of Foreign and Domestic Commerce, *Trade Information Bulletin No. 742* ("The Silver Market in 1930," by Herbert M. Bratter), 1931.
- , Bureau of Foreign and Domestic Commerce, *Trade Promotion Series No. 27* ("Currency, Banking, and Finance in China," by Frederic C. Lee), 1926.
- , Bureau of Foreign and Domestic Commerce, *Trade Promotion Series No. 139* ("The Silver Market," by Herbert M. Bratter), 1932.
- , Bureau of Foreign and Domestic Commerce, *Trade Promotion Series No. 149* ("The Monetary Use of Silver in 1933," by Herbert M. Bratter), 1933.
- , Bureau of Mines, *Mineral Resources of the United States* (annual), Government Printing Office, Washington.
- , Bureau of Mines, *Economic Paper 8* ("Summarized Data of Silver Production," by Charles White Merrill), 1930.
- , Bureau of Mines, *Economic Paper 10* ("Economic Relations of Silver to Other Metals in Argentiferous Ores," by Charles White Merrill), 1930.
- , Bureau of Mines, *Economic Paper 14 and Information Circular 6647* ("Silver Consumption in the Arts and Industries in the United States," by Charles White Merrill), 1932.
- , Bureau of Standards, *Technologic Paper No. 348* ("Tarnish Resisting Silver Alloys," by L. Jordan, L. H. Grenell, and H. K. Herschman), Government Printing Office, Washington, 1927.
- United States Department of State, *Treaty Information Bul-*

- letin No. 47*, Government Printing Office, Washington, 1933.
- United States Treasury Department, Bureau of the Mint, *Annual Reports of the Director of the Mint*, Government Printing Office, Washington.
- , Bureau of the Mint, *Monetary Systems of the Principal Countries of the World*, 1912 and 1916.
- , Bureau of the Mint, *Monetary Units and Coinage Systems of the Principal Countries of the World*, 1929.
- Walker, F. A., *International Bimetallism*, Holt, New York, 1896.
- Warren, George F. and Pearson, Frank A., *Prices*, Wiley and Sons, New York, 1933.
- Willis, H. Parker, *A History of the Latin Monetary Union*, University of Chicago Press, 1901.
- , "Silver," *New Republic*, March 11, 1931, pp. 92-94, New York.
- White, Benjamin, *Silver, Its History and Romance*, 2d ed., Waterlou and Sons, London, 1920.
- Wochenbericht des Instituts für Konjunkturforschung*, "The Silver Problem," February 18, March 4, and March 11, 1931, Berlin.
- Wu, Tayeh, "A Statistical Analysis of the Fluctuations in Silver Prices, 1883-1931" (in Chinese), *Quarterly Journal of Economics and Statistics*, March, 1932, Tientsin.

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