SILVER
The Restless Metal

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I owe it to my father

Preface

In the preparation of my book *The Golden Constant,* I found the history of silver throughout the centuries was entwined with that of gold. Every avenue of investigation on the subject of gold led me to silver, too. The two metals were found together in nature, were combined in the artifacts of early man, were used together in sacred rituals, and were held to be precious everywhere. When used as coinage, both became the means by which wealth was measured and commerce carried on.

But whereas gold maintained its value over long periods of time, even centuries, silver's movements in monetary history were volatile and erratic. It seemed to me that this less valuable but no less influential relative of gold must have an explanation for its errant behavior. Was there enough statistical evidence available to generate a unified price series over long periods of time? How did silver fare in episodes of inflation and deflation? How was its purchasing power affected by events? How did it compare with gold in these respects?

I was curious. The answers I found to these questions and many others are in this book.

Because the book on gold was written for England and the United States, this comparative volume on silver is for the same two countries. The basic reason for selecting England was the availability of consistent data over centuries; the reason for studying the United States is that it has been

a prime mover in silver markets since the last quarter of the nineteenth century.

I approach this excursion into history as an economist and a statistician. I do not presume to take on the role of an economic historian or a specialist in monetary economics. But it is evident that major historical events did occur concurrently with significant shifts in the position of silver. These events must be noted in any approach to an understanding of the history of the metal. These episodes are described and their relevance to silver is noted in this book. But it remains for the economic historian and the monetary theorist to explore their causal significance fully.

I wish to acknowledge here the assistance and encouragement of many people, foremost that of my wife, Virginia Jastram. She was of constant help to me in the research and writing and in all the ways a good partner can be. "The Long Look Back," which opens the book, is primarily hers.

Timothy Green, an author in his own right (*The World of Gold, How to Buy Gold, The World of Diamonds*) and a consultant to Consolidated Gold Fields on precious metal flows, has been helpful. Some of the very early historical data are due to him.

On domestic silver data, W. C. Butterman of the Bureau of Mines, U.S. Department of the Interior, has been of great aid. My gratitude also is offered to Professor John J. TePaske of Duke University, who kindly allowed me to use some of his prepublication research papers on the Spanish treasures taken from the Americas.

Of the libraries I must mention first the Research Library of the Bank of England and acknowledge here the personal assistance given by its Librarian, Mr. Terence Bell. Other libraries especially useful were the British Museums; the Bodleian, Oxford University; and the Archivos General de Indias, Seville.

I am pleased to record continued kindness from Professor A. H. John of the London School of Economics and from Professors Carlo Cipolla and John Letiche on the faculty at Berkeley.

Financial support for the research activity came from the Institute of Business and Economic Research of the University of California, Berkeley. As with *The Golden Constant*, I was aided greatly in data collection and technical analysis by two excellent research assistants, Dr. Aharon Hibshoosh and Dr. Christopher Miller. Ms. Patricia Murphy had overall responsibility for processing the manuscript. Jeane Scotten helped in many crises.

I have been fortunate over the years to have been acquainted

with people in the world of precious metals who have helped me sense movements in the real world and who have on occasion been generous with advice. Among these I would name Mr. Robert Guy, Director, N. M. Rothschild & Sons; Mr. Keith Smith, Managing Director, Mocatta & Goldsmid Limited; Dr. Henry Jarecki, Chairman, Mocatta Metals Corporation; Mr. Peter Fells and Mr. David Potts, Consolidated Gold Fields Limited; and Mr. Robert Beale, Director, Samuel Montagu & Company Limited.

Professor Edward S. Shaw of Stanford University, one of the finest critical minds I know, read the entire manuscript and offered valuable suggestions.

All these people have helped make the book better. None should be blamed because it is not perfect.

ROY W. JASTRAM

Carmel Valley, California
February 1981

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THE LONG LOOK BACK

> At any given time, nothing is successive; everything is contemporaneous, even that which is past. And in the present we are all irremediably products of our background. . . .
>
> Immanuel Wallerstein
> *The Modern World-System*

Because silver and the coins made from it have had a pervasive influence on the course of history from earliest recorded time, it seems desirable to examine that influence in some detail. This is the rationale for "The Long Look Back." The material included is chosen solely to give perspective to the quantitive analyses that are the main content of the book and to provide the reader with some knowledge of the various roles silver has played throughout earlier centuries. The emphasis on the single metal silver is not meant to underestimate the contributions the baser metals have made.

The first use of silver in Asia Minor was for ornamentation and display. We know that gold, silver, and electrum (part silver, part gold) articles were placed in graves as early as 2300 B.C. In the inventory of a Hittite king is "a great bull of silver, standing." Gold and silver drinking vessels were common gifts from one ruler to another. Trade was carried on by the ancient system of barter with all its obvious disadvantages. Money was unknown.

Then ingenious men experimented, over centuries, with items such as seeds, shells, leather, and beads as agreed-on talismans for a measure of value. However, without intrinsic value such token money had restricted use only. What was needed was an article easily portable, divisible, and, as nearly as possible, indestructible. The answer they found was metal. Gold, silver, copper, bronze, and brass were tried and used successfully. Of them all, silver became the currency of choice of the greatest number of the world's peoples.

Why was this so? The reasons are not obscure. First there was more of it scattered over the world's surface, and, when smelting became possible, it could be separated from the complex of base ores with which it was usually found. Gold, the most precious of the metals, when found at all was available only in small quantity in large areas of the world.

Silver was known by ancient craftsmen to have many useful and desirable qualities. Next to gold, it was the most ductile and malleable. It was the whitest metal and had the highest reflectivity. It could be melted down easily and turned to other uses. When made into coins of the purity that was the pride of kings, bullion value was equal to their trading price.

The weight of silver was in its favor. It could be carried handily in the sailing ships of early traders like the Greeks. Maritime peoples spread the knowledge of and desire for silver coins along all the shores of the Mediterranean. Those merchants who traveled by land on the great caravan routes of Asia and Africa preferred gold because, though many times heavier, a small amount purchased far more.

Another reason for general popularity was that silver's value lay midway between gold, which was too precious to use in ordinary commerce, and copper or bronze, which became the hand-to-hand coins of the marketplace. As villages became towns, purchases of medium value were conveniently paid for in silver coins by an expanding middle class.

It would be a mistake to equate silver with coinage but its use as coinage was one of the great facilitating inventions of mankind. Let us examine how this became so.

In the context of ancient times, of the agricultural subsistence economies then in place in Europe and Asia, produce could be bartered only with near neighbors. Cattle, in which much of early wealth existed, could not be driven over long distances, nor could grain, for which the cattle might be exchanged, be easily brought home. People were scattered about in tribes and cultivated what fertile land was available. It is easy to see how the coming of a money economy would facilitate trade over distance, encourage the mingling of peoples, and stimulate cross-cultural transference.

It can be argued that the rise of cities would not have taken place without a coinage system. People could no longer feed themselves when settled into groups of considerable size. Food had to be imported and paid for. Wages had to be paid. Cities lived by trading internally and externally; their coinage had to be acceptable in both markets.

In consequence, the use of coinage had requirements. A stable government, one that would guarantee its money and accept it in payment, became indispensable. There had to be trustworthy merchants at home and abroad, laws to govern them, and courts where disputes could be settled. In all these civilizing developments the precious metals played their enforcing and enabling roles.

Not the least of these was to accelerate social change. When man was tied to the land he was little better than a slave. He was at the mercy of his landlord. But when he could sell at least a portion of his produce or his labor, hoard his coins, and plan for a better life, his emancipation had begun. A leather bag of silver coins hidden under the dirt floor of a peasant hut meant for many hopes of independence and of some measure of human dignity.

It must be recognized that not all the results of men's use of precious metals were benign; quite the contrary. Greed has always been with us. The great storehouses of treasure collected in palaces, temples, and sanctuaries tempted men to looting and to wars. When Alexander the Great led the Greeks into Asia Minor, he called it a war of revenge against the Persians. Revenge was important to the proud Greeks, but the added attraction was the opportunity to plunder the vast gold and silver treasures of the Persian Empire.

That war, brutal as it was, became the means by which an obsolete oriental theocracy, covering much of the civilized world, was destroyed. Peoples of diverse races and cultures were brought together and the immense idle reserves of the Archimedean Empire were turned to productive use. The flow of new money minted by Alexander from captured

treasure was to spread prosperity (and incidentally inflation) throughout the conquered lands.

Centuries later, Rome sent her legions into the known world to plunder wherever hoards of precious metals had accumulated. When plunder became scarce, she was forced to organize production. The mines of her Asian, African, and European provinces financed her expansion on a grand scale. Ultimately the mines ceased to provide the precious metals she needed in sufficient quantity. The slide into debased coinage began.

Perhaps the greatest positive contribution that precious metals have made to social change was the impetus to discovery and exploration given by the continuing search for more and ever more. From earliest times and in all succeeding centuries, that search pushed men out into the unknown. In that search they founded colonies, took what civilization they possessed to peoples living in barbarism, and opened up the frontiers of knowledge.

By the fourteenth century the peoples living along the Atlantic coast began to use their new found knowledge of navigation to move out south and west by sea: the Portuguese to the Gold Coast and then around the horn of Africa; the Spanish to cross the Atlantic by the end of the fifteenth century.

There were two pressures driving them to risk their lives and fortunes. The first was an ever expanding population needing land and food. The resources of the European continent had been largely exploited. Population pressures existed in spite of the decimation of wars and plagues.

The second pressure was the pressing need to find additional sources of precious metals. New mines had been developed in Central Europe, especially in Bosnia and Serbia; still the need for more specie to support expanding trade was critical. The remaining frontiers were the oceans.

This push out into the Atlantic and later the Pacific changed man's conception of the world, presenting two new continents, thousands of islands, new flora and fauna, new races with strange customs and religions. After more than 20 centuries of being the cultural and economic center of civilization the Mediterranean lost its dominance; the maritime nations of the Atlantic took charge.

The Spanish discovery and early development of the Americas had profound effects transcending Spain and reaching to all of Europe, hence to the world at large. As John TePaske points out, American silver became so ubiquitous that merchants from Boston to Havana, Seville to

Antwerp, Murmansk to Alexandria, Constantinople to Coromandel, Macao to Canton, and Nagasaki to Manila, all used the Spanish peso—the romantic "piece of eight"—as a standard medium of exchange.

The mines of the Cerro de Potosí alone, thousands of feet in the Andes, produced over 22 tons annually from 1580 until 1610, under the most primitive and difficult conditions imaginable.

The European entrepôts for this treasure were, by edict of Charles V, Seville and Cadiz. Through meticulous researches of records maintained there, we have good estimates of the silver volume entering Europe. But where did it go? The quick answer is: "To the ends of the earth." Though we don't know the quantities, we do know the directions. Silver flowed out of Spain to England, France, and the Low Countries for purchase of manufactured goods unavailable in Castile. From English, French, Flemish, or Dutch outlets, Spanish silver, coined or otherwise, was transshipped to the Baltic or into Scandinavia and Russia to be traded for furs. With an offtake as it passed through Russia, Spanish silver went southeast along the Volga into the Caspian Sea to Persia, from which it traveled into Asia by land or by sea. Along another route, silver flowed out of Spain through the Mediterranean eastward to the Levant. India received the silver by way of the Red Sea and into the Indian Ocean or overland from the eastern shores of the Mediterranean through Turkey and Persia to the Black Sea. Or silver got there directly from Europe on ships rounding the Cape of Good Hope.

Portuguese, Dutch, and English ships carried Spanish-American treasure directly to Asian ports to exchange for Asian goods. In addition, American silver went from Acapulco, Mexico directly to Manila on some of the most harrowing sea passages suffered by man.

In addition to the wide dispersal of American silver by commercial means, vast quantities were expended throughout Europe on the futile Hapsburg Wars.

The general reader who undertakes a close examination of the research on the American treasure might be surprised to learn that:

- It was nearly all silver (98 percent) and very little gold (2 percent) after 1560; before that, the physical quantity of gold was minor.
- Most of it was to the account of private interests (74 percent) and not the crown (26 percent) between 1500 and 1660.
- The proportionate augmentation to the royal revenues in Spain was

really rather small (falling from a peak of 22 percent in 1598 to roughly 10 percent during the first half of the next century).

Data due to E. J. Hamilton (1934) and J. J. TePaske (1979) are assembled in Appendix A.

In this chapter a few observations have been made on the event-filled path of the metal silver as it wound through ancient and medieval history. Silver, by itself, was a neutral force; whether it worked for good or evil was determined by the men who used—or misused it.

One uncontestable statement can be made; it was a superb learning instrument for mankind.

PART ONE

THE ENGLISH EXPERIENCE

1800
1850
1900
1950
1980

1 Silver in England Since the Thirteenth Century

The statistical story of silver in England begins in 1273. At this time the Mint was within the walls of the Tower of London, placed there by William the Conqueror. The Mint weighed its silver by the Tower pound, so named by the Conqueror and undoubtedly used by him as a unit of weight in his Normandy domains before his conquest of England in 1066.

Chart I spreads out the grand sweep of silver prices from 1273 through 1979—seven centuries of price data assembled in one place on a consistent basis. The full set of figures is given in Appendix B with a complete explanation of their derivation. In this chapter we will confine our attention to a graphic description of the lines on the chart and the historical events that give them meaning.

The second line on the chart marks out the price behavior of gold based on data contained in the author's book *The Golden Constant*.

The third line depicts year by year the ratio of the price of gold to the contemporaneous price of silver, both stated in ounces (the gold/silver price ratio).

One further word of technical explanation, before the narrative, on how silver and gold have fluctuated and yet remained related to each other. Both the price of silver per ounce and the price of gold have been

put in index number form, with the base year 1930 = 100.0 taken for each. In this way the price curves are directly comparable and can be plotted to the same percentage scale.

A word of caution: this procedure causes the price index number for silver everywhere between 1270 and 1930 to be above the index number for the price of gold. This, of course, does not mean that the price in shillings per ounce was higher for silver than gold. Quite the opposite was the case.

In 1930 the price of gold was 939.21 pence and the price of silver was only 17.69 pence, or in the ratio of 53 to 1. Hence if the money prices of the two metals were plotted against each other, the gold curve would be 50 times as high at that point. The whole graph would be very awkward, indeed. One of the purposes of using index numbers is to bring the two curves closer together (with a common base in 1930) so that their fluctuations can be more easily compared.

The meaning is that for all those centuries the price of silver stood higher on a percentage scale relative to its money price in 1930 than did gold relative to its 1930 price. In fact, reassurance that the money price of gold was always substantially higher than the comparable silver price is given by the third line on the chart. This line tells us, for example, that from 1560 to 1600 the price of gold per ounce was about 12 times higher than the price of silver per ounce. The advantage of putting both gold and silver on an index number basis is that their *proportionate fluctuations* are immediately comparable, and the reader does not have to make continuous mental allowances for the fact that one reads in pounds per ounce and the other in mere shillings. Also, it should be noted that, with the lines plotted on ratio scale, comparative percentage changes can be deduced by a comparison of slopes of the lines wherever plotted on the chart.

The reader will notice that the horizontal scale is broken occasionally (for example, from 1620 to 1660). This is merely to save space in what already is a very long chart. In each instance of discontinuity of the time scale the index value for silver is constant over the gap.

With these technical details out of the way, we are ready to develop the narrative of the chart.

This record of silver prices in England begins not long after the Magna Carta, so we are dealing with ancient data. These do, however, come from the London Mint and are absolutely trustworthy according to the definition given in Appendix B. In an attempt to make the history of

silver prices more coherent we will differentiate among selected periods by silver's rather different behavior within each. We can then consult the economic and political history of each period to see what insight we can gain into the causal elements impinging on silver both as money and as a metal. In each period we will take note of the concomitant behavior of gold. The two metals are seldom separated in the thinking of men and the machinations of governments. We will find it helpful (almost unavoidable) to speculate on each as viewed from such distant times.

1273–1465

These 192 years saw ever increasing prices for silver. The price per ounce increased by 86 percent during this span, and the simple annual average rate was 0.45 percent. The first gold price we have is for 1343–70 years into the beginning of the period. From then until 1465 gold increased in price by 55 percent. The upshot was that silver and gold both increased at an annual rate of 0.45 percent based on known data between 1273 and 1465. This concordance in the rate of rise in the two precious metals is shown by the third line plotted on the chart: the gold/silver price ratio, much referred to by students of the precious metals, stayed almost level at approximately 12 : 1. Monetary history is sketchy for this period, but some things we know.

By the mid-fourteenth century, silver mining in the Western world had run into diminishing returns. No innovations took place in techniques of mining extraction; hence it became increasingly expensive, per ounce yielded, to work the old deposits to greater and greater depths. The price of silver was rising because the production cost of new silver was increasing.

What then, for gold? Newly mined gold in Europe was without importance until the middle of the thirteenth century. It was not until then that mines of any significance were opened in middle Europe: Hungary, Bohemia, Silesia. And these were no El Dorados.

On the whole a severe shortage of the stock of precious metals and of coin was a legacy from the Dark Ages and newly mined supplies were slow and costly in repairing this deficiency.

The aggregate stock of precious metals in any one region depends not only on new production, but on trade. There is evidence that after the

start of the Crusades in 1095 Europe was able to draw some silver and gold from the East, such as Byzantine gold coins and other forms of gold of Islamic origin, at a time when European mines were solely silver. It is known, further, that by the thirteenth century Italian merchants were importing gold from North Africa. There were, however, ongoing offsets as silver was being exported by the growing Eastern trade. In balance, the view of authorities on this period is that there was a net drain of the precious metals from Europe all during the Middle Ages.

If there is little doubt that the supply side was tight, there is no doubt that the demand side was flourishing. Population, production, and trade were growing at unprecedented rates, at least into the fourteenth century. All of this was accompanied by an accelerating phenomenon—the use of money in place of barter for labor or for goods. The evidence is compelling that from the thirteenth through the fifteenth centuries the supply of precious metals lagged well behind the demand and that the attendant increase in the price of silver and gold was the result.

1465–1560

After 1465, the price of silver remained stable for 58 years, until 1523. Then it broke upward in two major surges to become stable again in 1553. The period under review here is continued until 1560 in order to accommodate the unusual behavior of gold, which displayed a phenomenal rise from 1523 until 1560.

When the period is taken as a whole, silver increased in price by an average annual rate of 0.5 percent. Gold went up more than three times as fast with an average yearly increase of 1.67 percent. What was going on?

Throughout this entire period the money of England was in disarray. The influx of bullion from the Americas, which might have offered surcease, did not arrive in time to exercise its potential. Gold passing through Cadiz did not work its way up to England in quantities until a quarter of a century after 1492. Silver came even later, after the opening of the great mines of Potosí in 1545.

Meanwhile, two sources of trouble were indigenous to England. First, the excess of demand over supply continued. Second, Edward IV came to the throne.

In previous reigns there had been monetary abuse. Fiddling with the

currency was considered a royal privilege and had been used to benefit previous rulers. However, one of the very first actions taken by Edward IV (in 1464) was to make the biggest single change in the weight of coins in recorded English history. For both silver and gold, simultaneously, the quantity of coin created from a pound-weight of metal was increased by 25 percent. This effectively raised the mint price for both metals by a like amount. There is no record that Parliament complained. The people were told simply that the change was necessary because English gold was flowing to foreign mints where higher prices prevailed. That sounded sensible. What Edward did quietly under the coverage of this momentous change was to increase the seniorage to himself for both silver and gold to 12 percent (from the previous 8.3 percent for the former and 1.5 percent for the latter).

Through the following reigns of Edward V, Richard III, and Henry VII, the same arrangements at the Mint were kept in place to the enduring profits of the kings.

Then Henry VIII took the throne in 1509. For 16 years he was circumspect with regard to coinage. The mint regulations did not change. Monetary matters were deceptively calm. The war with France beginning in 1523 turned King Henry into the Great Debaser. Immediately huge sums had to be sent abroad to support the armies on the continent, partly through shipments of metal and partly through bills of exchange with Italian and Flemish financiers. The rates of exchange moved drastically against England as a result. The pound depreciated sharply against the ducat and the guilder. In August 1526 the King decided to accept the depreciation of the pound as beyond his remedy and altered his own currency accordingly. The net result was that the mint price of both silver and gold was raised. (It was at this time, incidentally, that the Tower pound of William the Conqueror was eliminated from the Mint and the reckoning from then on was in troy weight.)

From these times until 1542, Henry VIII and his Councils improvised various fiscal and monetary measures to temper the deficits into which war had run them. But the Exchequer was still in need.

In early 1542 England was set up by Henry for the Great Debasement. As we look back on it now, the first move in the game was a royal warrant to the offices of the Mint directing them "to coin, whenever they should be so commanded by the Privy Council, the value of one pound weight of troy of gold or silver, of every sort or print, of such like fineness, alloy, number, and print as should be devised by the said Council,

any act, statute, ordinance, or provision made to the contrary notwithstanding." This royal warrant received no public attention since the list of addresses was confined to Mint personnel. Nevertheless, it was on the books. It gave the King and his Privy Councillors complete control over the currency whenever they chose to use it.

The sting was felt on May 16, 1544. A general proclamation was then issued stating that silver and gold were so elevated in Flanders and France that the domestic price of each at the Mint must be raised to prevent a disastrous outflow of coins and bullion from England. The King therefore decreed the price of an ounce of fine gold of 24 carats at an even 48 shillings and an ounce of sterling silver at just 4. These were percentage increases of 7 and 9 percent, respectively, over the last price levels officially set in 1526.

But the debasement was just under way. The following tabulation shows the mint prices per troy ounce for silver and gold in the ensuing years:

Silver in Pence	
1544	48.0
1545	51.8
1546	51.8
1547	59.2
1549	68.5
1551	111.0

Gold in Shillings	
1544 (May)	48.0
1545 (March)	50.0
1546 (January)	51.0
1546 (March)	51.0
1546 (October)	52.0
1547 (January)	58.0
1549	60.0

The full details of the debasement of the coinage by Henry VIII are tortuous indeed, but Table 1 shows the magnitude of the debasement in some of its ramifications and, most impressive of all, the profits to the King.

By 1547 all England was aware of a debasement that made the coins of Edward IV (1526) look fine by comparison. So sad was the silver coinage with its high proportion of alloyed metal that even the best of it had

Table 1

STATISTICS OF THE DEBASED COINAGE, 1542–1547

Date	Metal	Fineness	Total Face Value of Coins £	s.	Gross Profit £	s.	d.	Expenses of Coining £	s.	d.	Net Profit to the King £	s.	d.
1 July 1542 to	Gold	23 carat	15,595	4	649	16	0	137	16	6	511	19	6
31 March 1544	Silver	8.3 ounces	52,927	4	8,821	4	0	22	10	11¼	8,798	13	0¾
1 June 1544 to	Gold	23 carat	165,931	4	7,922	1	3	886	13	0	7,035	8	3
31 March 1545	Silver	9 ounces	149,287	4	28,179	16	10	4,872	1	6½	23,307	15	3½
1 April 1545 to	Gold	22 carat	206,085	0	17,209	18	3	1,485	2	10	15,724	15	5
31 March 1546	Silver	6 ounces	176,155	4	75,538	15	6	6,952	16	0	68,585	19	6
1 April 1546 to	Gold	20 carat	107,580	0	16,527	17	0	1,987	5	7	14,540	11	5
31 March 1547	Silver	4 ounces	120,240	0	75,074	11	8	4,078	13	8	70,995	18	0
1 April 1547 to	Gold	20 carat	107,190	0	4,702	11	8	1,915	3	3	2,787	8	5
30 September 1547	Silver	4 ounces	27,872	8	15,871	15	8	781	12	9	15,090	2	11
		Total gold	602,381	8	47,012	4	2	6,412	1	2	40,600	3	0
		Total silver	526,482	0	203,486	3	8	16,707	14	10¼	186,778	8	9¼
		Grand total	1,128,863	8	250,498	7	10	23,119	16	0¼	227,378	11	9¼

Source. Sir Albert Feavearyear, *The Pound Sterling* (London: Oxford University Press, 1963).

been "blanched" at the Mint (coated with silver to improve appearance). It took very little wear to let the copper show through. A rhyme of the time about the coin called a "teston" ran:

> These testons look red, how like you the same?
> 'Tis a token of grace: they blush for shame.

1558–1603: ELIZABETH I

In the period between the reign of Henry VIII and that of his second daughter, Elizabeth, nothing was done to the currency, good or bad. The first heir to the crown was a 9 year old boy, Edward VI, who received with it his father's financial advisor, the Duke of Northumberland. A weak attempt at reform was devised but had no time to be effective. The young king expired at 16, and within a month Northumberland died suddenly from beheading. Henry's first daughter Mary became Queen in 1553 and occupied her 5 year reign largely with a futile attempt to return England to Catholicism. One economic change occurred during her years on the throne that was later to benefit tremendously the quality of the currency although it was none of her doing. During her reign the full flood of silver was flowing into Europe from the Americas. This was to allow the genius of her half sister to have full effect in the Great Recoinage of 1560.

Henry had seen that his daughter Elizabeth received a superb education for those times and for her position. Scholars from the great universities served as her tutors. When she acceded to the throne in 1558, she was already of a will to bring order, regularity, and reasoned authority to the affairs of the land. With respect to money, she made a resounding resolve "to achieve to the victory and conquest of this hideous monster of the base money" (Dyson's *Proclamations*).

The Queen knew the business of a monarch. She had a remarkable memory, kept her own records of the events of state, and was never bored with shilling and pence. She had a feel for money; many called her penurious. She chose William Cecil as her Principal Secretary with these words, "This judgment I have of you, that you will not be corrupted with any manner of gift; and you will be faithful to the state: and without respect of my private will, you will give me that counsel that you think best." Elizabeth reduced her Council to a dozen men and eliminated from it all

representatives of organized religion. She preferred laymen as her associates in the intricate affairs of government and, in general, men of moderating views.

In June of 1560 a small commission headed by Cecil, later to become Baron Burghley, was appointed to plan for the purpose enunciated by Elizabeth in her call for victory over debasement. Since secrecy was of the greatest importance, they quietly approached a few experienced and discrete persons for their suggestions. One of these was Sir Thomas Gresham. Gresham had won his spurs as an advisor under Henry VIII during the earlier years when the latter was financially hard-pressed but still circumspect. At that time Gresham had proved invaluable (and infallible) as an advisor on foreign exchange maneuvers with Flanders.

Curiously enough, Gresham's name lives today attached to a "law" of economics that he certainly did not invent, the law that "bad money chases out good." The essence of this epigram appeared hundreds of years earlier in petitions addressed to the parliaments of Edward III and Richard II. Lord Macaulay in his *History*, Vol. IV, p. 628n ascribes it to Aristophanes. It was not called "Gresham's Law" until Macleod got around to naming it 300 years later in his *Theory and Practice of Banking* (1892).

The group worked swiftly, and on September 27, 1560 Elizabeth was able to publish her famous proclamation "for the valuation of certain base monies of this Realm called testons." (For an excellent and succinct account of the details of the recoinage, see A. E. Feavearyear, *The Pound Sterling*, Chapter IV, "Restoration and Reform.")

For numerous years following the Great Recoinage the large influx of silver from the Americas kept the Mint busy.

Commodity prices rose until 1650 (see Chart II). Silver prices stabilized for the following 135 years. The price of gold was far more tractable than before. Many factors were to affect the course of monetary history, but the astute and resolute action of Elizabeth and her advisors opened a new era of accountability in English monetary affairs.

THE SILVER STANDARD

From the time of the Saxons until the close of the seventeenth century, the coinage of England was based on a silver standard. Some gold coins came into the country by trade and a few gold pennies were minted un-

der Henry III, but nothing remotely approaching a bimetallic standard existed.

A bimetallic standard implies certain definite working conditions. The unit of currency must be exchangeable for both silver and gold at some fixed ratio between the two, and both metals must freely exchange for currency in unlimited quantities at a fixed rate. There must be complete freedom of trade in both bullions, and freedom to convert currency into bullion at will. These technical conditions did not exist in the England of which we speak.

Quite apart from these definitional aspects there is one quintessential requirement for the working of a double standard. The necessary condition for true bimetallism to function is that either metal can take over the working commerce of the day if the other is lacking. This was never true in England before the seventeenth century. Gold coins were too valuable to act as surrogates for silver. The smallest gold coin that circulated in any noticeable volume in the fourteenth century had a face value of 1⅔ shillings. Records show that before the Black Death this would pay a week's wages for a farm worker, almost a week's wages for a carpenter, or the cost of a whole sheep. Not many people could spend as much at one time with a single coin. For the same reason, few would want to accept such a coin. To make change in the next transaction was just too troublesome. Gold may have circulated contemporaneously with silver, but it did not present a real alternative standard. Shakespeare contrasted, "gaudy gold, hard food for Midas" with silver, "the pale and common drudge 'tween man and man" in the *Merchant of Venice*.

Starting with the gold penny of 1257, 14 different English gold coins were issued by 1717. Gold coinage was no stranger to early England, but it never caught on with the public until the eighteenth century was well under way. However, as time went on, the nature of dealings and the size of individual transactions were gradually moving toward magnitudes that made gold coins convenient and, therefore, acceptable. Wages still could not be paid in gold, but an increasing proportion of production was passing into the control of capitalists, who could use gold in their transactions with merchants and the larger agriculturists.

One major factor that began to accelerate the proportionate substitution of gold for silver was the rising volume of trade with the East, thanks largely to the activity of the East India Company. So great did the volume become that whenever East India merchantmen were preparing to sail, the market price of silver rose sharply.

Three ways were open to the East India Company to finance the imports to England of the teas, coffees, spices, textiles, and so forth, she wanted: exporting goods, borrowing in Asia at excessive rates of interest, or transporting silver and gold from Europe. India could not be interested in exchanging its merchandise for the warm woolen cloth of England. Instead, she wanted the precious metals, especially silver, and could absorb immense amounts at high prices.

Table 2 is taken from K. N. Chandhuri's *The Trading World of Asia and the English East India Company, 1660–1760* (Cambridge University Press, 1978, p. 177).

Along with this outpouring of silver was an influx of gold into England for quite a different reason. Peace with France in 1713 increased tremendously England's trade with that nation, and the French settled their trade balances in gold. What was occurring in England was a major shift in the internal stocks of gold and silver. Gold was flowing in as silver was flowing out. Gold was no longer undervalued in terms of silver. In addition, silver coins were melted down and were disappearing and gold coinage was taking their place. During the 3 years following peace in 1713, over 4 million pounds' worth of gold was minted. England, without plan, conscious motivation, or general realization, was rapidly moving toward a de facto gold standard.

THE GOLD STANDARD COMES TO ENGLAND

Important to the understanding of this section is the history of the golden guinea coin. As so often is the case in English history, nobody named it; it came to be called that because of the tiny imprint of an African elephant. The warrant for the issue of this gold coin was dated Christmas Eve 1663. Its nominal face value was 20 shillings.

The guinea never passed for exactly 20 shillings. As early as January 1665 it went for 21 shillings 4 pence in actual circulation. It appears to have been always well above 21 shillings until the event we are about to describe.

Since the gold guinea was passing in the streets as higher than its face value in terms of the silver shilling, clearly the ratio of the face value of the two coins was out of line with the price ratio existing in the bullion markets. As so often is the case, and with the usual futility, the govern-

Table 2

THE QUANTITY OF SILVER AND GOLD EXPORTED BY THE COMPANY, 1660–1760

	Pure Silver (kg)	Pure Gold (kg)
1660–1665	40,145	1074.47
1666–1670	22,910	1675.66
1671–1675	49,828	3669.59
1676–1680	179,252	5156.62
1681–1685	240,952	6951.61
1686–1690	30,567	879.18
1691 1695	7,687	221.14
1696–1700	131,511	491.22
1701–1705	166,886	—
1706–1710	175,833	141.11
1711–1715	167,508	148.79
1716–1720	250,851	—
1721–1725	289,849	—
1726–1730	261,401	—
1731–1735	260,102	—
1736–1740	260,378	—
1741–1745	257,882	—
1746–1750	366,289	—
1751–1755	398,041	—
1756–1760	193,458	—

Sources. India Office Records, East India Company, Commerce Journals and General Ledgers, L/AG/1/6/Vols. 1–8, L/AG/1/1/Vols. 2–14.

Note. The standard ounce of silver and gold containing 11/12 part of pure metal is converted into kilograms at the rate of 28.7675 grams of pure silver or gold.

ment tried to solve this economic impasse by edict. A proclamation was issued on December 22, 1717 forbidding any person to give or receive guineas at a *higher* price than 21 shillings (and reducing any other gold coins in due proportion).

As Master of the Mint, Sir Isaac Newton wrote a brilliant report on the imbalance. But even he did not foresee fully the consequences of the disequilibrium. A passage from Sir Isaac Newton's report helps to make clear what happened:

> If things be let alone till silver money be a little scarcer the gold will fall of itself. For people are already backward to give silver for gold and will in time refuse to make payments in silver without a premium as they do in Spain and this premium will be an abatement in the value of gold. And so the question is whether gold shall be lowered by the Government or let alone till it falls of itself by the want of silver money.

In other words, Newton realized that the two metals could not continue to circulate side by side in coined form at the existing ratio between the bullions. Moreover, he was thoroughly aware that silver was coming into shorter and shorter supply. If they were both to remain in circulation, either gold must come down or silver go up. What he did not seem to realize was what the difference between the two alternatives portended.

England did not establish the gold standard by any design or deliberate act. The proclamation of December 22, 1717 brought the golden guinea down to 21 shillings. If guineas, by the ordinary working of supply and demand, had then come down to less than 21 silver shillings and shilling pieces had continued to pass for 12 pence, the currency would still have been based on a silver standard. But if guineas remained at 21 shillings and the shilling pieces went to a premium, then ipso facto England had changed over to a gold standard. The guinea stood fast. The value of 21 shillings in money was tied to the value of gold in a guinea and not to the value of silver in 21 shilling pieces.

It was a classic case of "Let the marketplace decide." England's change to a de facto gold standard in 1717 was a momentous piece of monetary history. The relationship was not solemnized until a century later in 1816. Following the Napoleonic Wars, Lord Liverpool's Act established gold as the sole de jure standard. But a full century earlier, one of the most influential currencies of all time had quietly eased onto the gold standard at a Mint price of 3 pounds, 17 shillings, 10.5 pence (£3.17s.10.5d.) per standard ounce.

THE PHILOSOPHY OF HARD MONEY

This is the time to discuss the origin among the English of a high regard for sound money.

In the 1690s the coinage was in one of its chronic states of disarray. John Locke, best known to us as a philosopher, was called in by Somers, the Lord Keeper, to give his views. Locke was in frequent association with Sir Isaac Newton, who seems to have agreed with him on this occasion, but only the views of Locke come down to us in his essay entitled *Further Considerations Concerning Raising the Value of Money*.

The heart of this is preshadowed in the Dedication of the book to Lord Keeper Somers:

> Westminster Hall is so great a witness to your Lordship's unbiased justice and steady care to preserve to everyone their right, that the world will not wonder you should not be for such a lessening our coin as will, without any reason, deprive great numbers of blameless men of a fifth part of their estates beyond the relief of Chancery.

Locke advanced the argument of the injustice to the creditors that would result if the bullion content of the unit of account were reduced. The only true pound, he maintained, was 5 ounces, 17 pennyweight, 10 grains of sterling silver, and the only justice that could be done was by recoining all the money at the previous rate.

Locke's view prevailed over the opposition of the goldsmiths, the bankers, and many commercial men. For the first time since 1299 a recoinage was made that restored completely the standard prevailing before debasement (1697–1698).

The sanctity that Locke attached to the Mint weights was something new. (It is significant that it took a philosopher to do it.) Before his essay surely very few people had regarded the weights of coins in any way as immutable. Kings had made coins; they had altered them many times, and surely if they cared to do so they would alter them again. As early as the fifteenth century the notion that Mint weights should not be changed had disappeared entirely. Coinage was regarded as a prerogative of the King, who might do with it as he pleased.

After 1696, however, the gospel according to Locke persisted. Peel, in 1819 and again in 1844, stood firmly on Locke's doctrine that the pound was a definite quantity of bullion that must not be altered.

THE DIMINUTION OF SILVER

A few summary numbers will help to convey the completeness of the switch from silver to gold. Between Elizabeth's recoinage in 1560 to the founding of the Bank of England in 1694, 135 years, the total amount of gold coined at the Mint did not amount to more than £15 million. In the next 45 years, however, the amount of gold turned out by the Mint was over £17 million. By way of contrast, in the former period the amount of silver coined was over £20 million, while during the latter 45 years of 1695 to 1740 silver coinage amounted to barely one-twentieth as much. For all practical purposes the Mint was devoid of silver during the greater part of the eighteenth century. The market price was always 1.5 pence or more above what the Mint would offer. Silver coins were in a lamentable state and were generally in short supply. It has been said that during this period the counterfeiters were performing a valuable public service, for at least from them came a supply of token coinage with some silver content.

Then toward the close of the eighteenth century the position of silver underwent a marked change. Beginning as early as 1785, the market price fell so low that quantities were attracted to the Mint by what had come to be the higher prices there. In the year of 1787 alone, after 20 years of none at all, £55,500 worth was offered. The monetary world of England was faced with a new and unsettling condition. The many measures taken to attract silver to the Mint in the first half of the century had failed. The drain-off by the East India Company and the associated level of market price had made the Mint unable to attract silver. Gold had ousted it almost completely. It was well accepted that gold was perforce the standard. Now came silver, threatening to return in large volume. An act was hastily passed preventing the Mint from receiving it for coinage until proper arrangements had been made for its accommodation in an orderly manner. As a result, from 1788 to 1816 practically no silver coinage was issued by the Mint (Sir John Craig, *The Mint,* Appendix I).

THE LIVERPOOL ACT OF 1816

As the close of the Napoleonic Wars approached, two sentiments were growing in strength: one for a reform of the silver currency and the

other for a resumption of the redemption of paper money by precious metal. (For all practical purposes England had been off the gold standard since February 26, 1797.) An Order in Council had been issued on that date prohibiting the Bank of England from redeeming its paper notes in gold until further notice. (The gold standard was a temporary casualty of Napoleon.)

Both agitations proved successful. The outcome concerning us here is the reform of silver in the monetary system of England. To treat with this problem, the Committee of the Privy Council on the State of the Coins reported in May 1816. It was of the opinion that an early coinage of both gold *and* silver would be of great public benefit. They recommended official recognition of the century-old practice of taking gold as the sole standard. Silver coins should be considered as representative coins and should be legal tender not in excess of two guineas. The Committee concluded by recommending that £2,500,000 of new silver be coined and readied for distribution before any issue took place and that to clear the way all genuine coins of any earlier issues be purchased at face value and removed from circulation.

Within a month the Liverpool Act of 1816 was passed, containing these recommendations and providing further that all silver brought to the mint should be coined at 66 shillings to the pound. Silver was to be legal tender for payments of up to 40 shillings only.

The Liverpool Act brought silver back into a thriving role in England's monetary system where it remained until 1947. From that year onward her "silver" coinage contained no precious metal but consisted of cupronickel alloy. Chart II, however, records the bullion price until 1979.

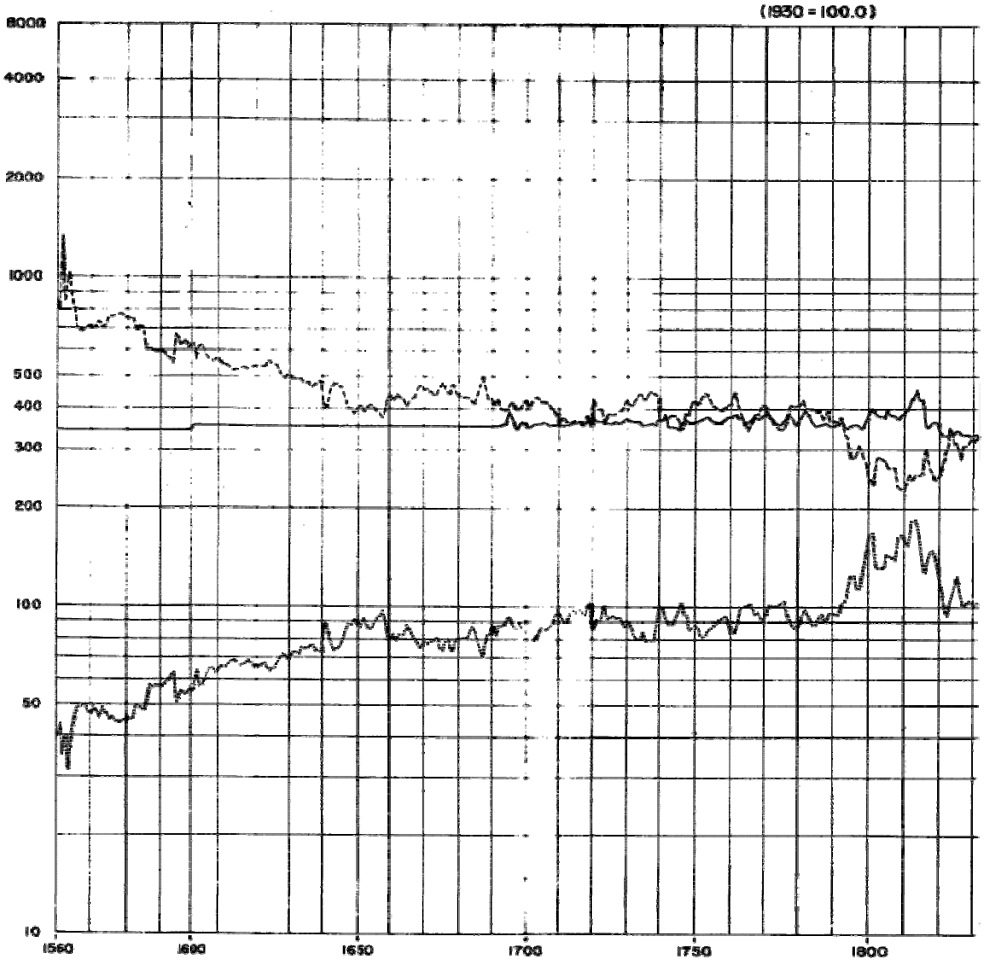
2 The Purchasing Power of Silver in England

Two aspects of price have been historically important for students of the economics of the precious metals: the price of a metal itself and the price ratio between the metals. For silver, Chapter 1 has dealt at length with the first. The second, specifically the gold/silver price ratio, is a feature of Chart I and the reader can trace it out thereon.

There is a third way of looking at the price of a precious metal and that is in terms of its exchange rate against other commodities in general. For silver our conceptual equation would be SP ÷ CP = PPS (the price of silver divided by the price of commodities equals the purchasing power of silver).

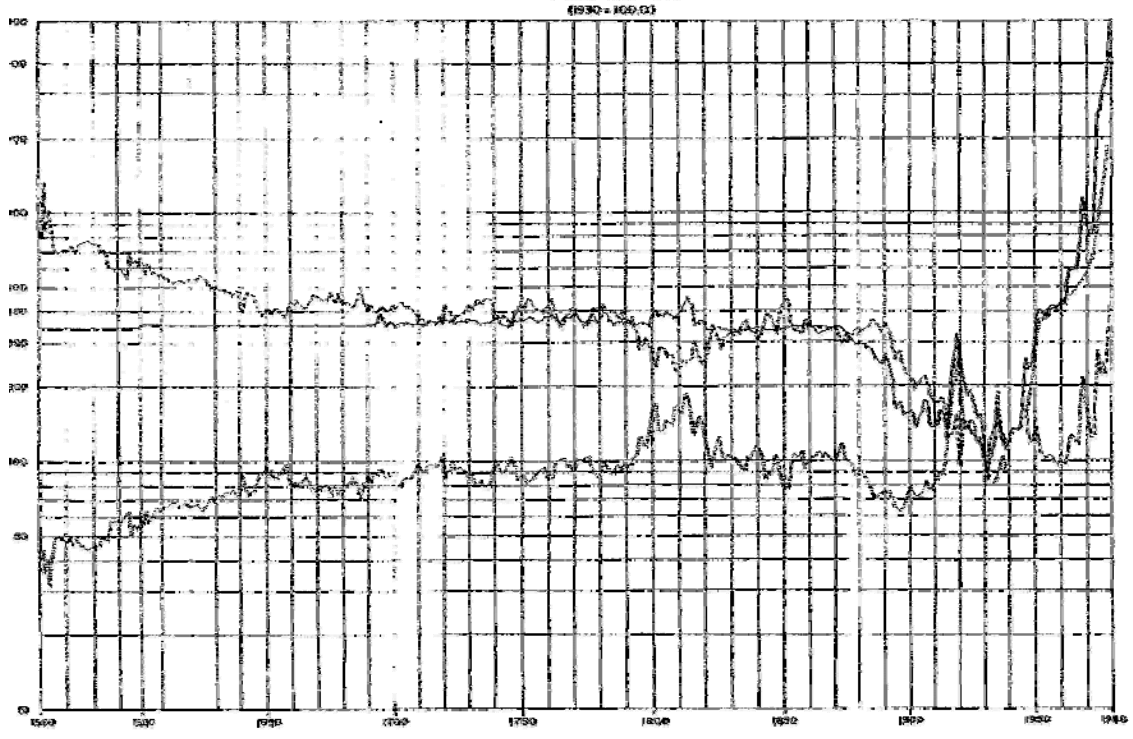
How can we construct, with confidence, a unified series of commodity prices since 1560 to match against our silver price series since that date? Appendix D answers that question and Table 17 presents the results of the calculations for commodities at the wholesale level. Table 18 then gives for England the index of purchasing power of silver since 1560. That year is selected for the start of the series because it marked Queen Elizabeth's Great Recoinage. This was not to be the last of England's troubles with base currency and light coins; but it was a major reform toward a currency that could offer valid price comparisons over time.

CHART II PRICE AND PURCHASING POWER OF SILVER, ENGLAND 1560 - 1979 (1930 = 100.0)



—— PRICE OF SILVER INDEX
····· WHOLESALE COMMODITY PRICES

CHART II PRICE AND PURCHASING POWER OF SILVER, COMMODITY PRICES
ENGLAND 1560 – 1979
(1930 = 100.0)



TEC INDEX

Related to the idea of the purchasing power of silver is the concept of *operational wealth* represented by a certain amount of silver in physical form. Operational wealth is a new term (first used in *The Golden Constant*) but not a new concept. It describes the ability of an individual to "operate" with his precious metal. This ability depends on two factors: (a) the number of dollars into which his stock of silver can be converted, and (b) the prices of things he might want to command through such conversion. Just as with purchasing power, the analytical scheme of measuring silver's operational wealth is to take the price of an ounce of silver over time and adjust it for changes in the prices of goods.

A key consideration when examining the purchasing power of a precious metal is whether the economy is undergoing inflation or deflation. The operational wealth in question may behave quite differently depending on whether commodity prices are rising or falling. Analyzing the differential behavior is the purpose of this chapter.

Now let us go back to Chapter 1 and collect the separate episodes of price inflation to find any generalities that attach to these and, similarly, to gather for special analysis all the periods of price deflation. In short, I divide price history in England into periods of inflation and deflation.

There is no common agreement on the definitions of the terms "inflation" and "deflation"; in fact, authorities construe them differently. Some present-day writers use them simply as descriptive terms for periods of rapidly rising or falling prices; others confine them to a description of monetary phenomena underlying price behavior (see, e.g., J. A. Schumpeter, *Business Cycles*, pp. 260–262).

In this book I use "inflation" and "deflation" in a sense descriptive of prices' behavior. Inflation refers to a period of rapidly rising prices; deflation connotes an interval of swiftly falling prices.

Even when this choice of nomenclature is adopted another element, both arbitrary and subjective, enters into the semantics: How fast is rapid; how precipitous is swift? Also, this open question has to be related to the length of the time period descriptively designated as inflationary or deflationary.

Since I cannot hope to argue my way through to any common agreement on such subjective matters, I simply adopt an arbitrary schema and state my considered selection of terminal dates for periods of inflation and deflation in English price history. The reader can examine the same charts and tables that I do and either agree with my choice or make a choice of his own. In the latter event he or she can also use my basic ta-

bles to rework my analyses to suit time segments of his or her own choosing.

With all the caveats just expressed I would select from a reading of Chart II the following episodes of price history:

Inflationary	Deflationary
1623–1658	
	1658–1669
1675–1695	
1702–1723	
	1723–1758
1752–1776	
1792–1813	
	1813–1851
	1873–1896
1897–1920	
	1920–1933
1934–1979	

We must be careful not to infer from these episodes of inflation and deflation movements in trade approximating what we now refer to as business cycles. Regarding the earlier years, Wesley C. Mitchell argues cogently that this modern-day phenomenon did not appear until the advent of a "money-making" economy and explains:

> To repeat: we do not say that a business economy has developed in any community until most of its economic activities have taken the form of making and spending money. That way of arranging production, distribution and consumption is the matter of importance—not the use of money as a medium of exchange. (*Business Cycles, The Problem and Its Setting*, 1927, p. 68)

Mitchell agrees with Mentor Bouniatian that no business cycle of a modern type can be found before the close of the eighteenth century (Bouniatian, *Geschichte der Handelskrisen in England, 1640–1840*).

There have always been bad times and good. These spells of adversity and prosperity have been recorded since humans developed the ability to write and to figure. However, until the turn into the nineteenth century these periods of adversity were largely accounted for by crop failures, epidemics, wars, civil disorders, political struggles, and deviant public finance (including chicanery); on the other hand, good harvests, prolonged peace, enlightened rule, and sound recoinage brought revival

and prosperity. It was not until the uses of money in economic dealings reached a fairly advanced stage that economic vicissitudes and well-being took on the undulating character of a business cycle.

My remarks refer to forms of the economic disturbance and not necessarily to their severity. Indeed, living may have been more precarious and economic fortunes more capricious in medieval towns than in more modern cities. But it was not until a large part of the populace was receiving and spending money incomes, producing goods for large markets, organizing enterprises with few employers and many employees, and using credit instruments in support of all this activity that economic fluctuations took on the character of business cycles.

It is no accident of scholarship that the first treatise on the business cycle was published in 1819—*Nouveaux Principes d'Économie Politique* by J. C. L. Simonde de Sismondi. The period was one of economic distress. As Napoleon's eventual fall became imminent, English producers and merchants accumulated large inventories for export in anticipation of reopened continental markets. Waterloo was followed by several months of brisk trade and attendant optimism. But it soon became apparent that Europeans lacked the money to support the boom. Heavy inventories of English goods overbalanced the markets, and many firms went bankrupt. Some recovery followed thereafter, and 1818 showed favorable business activity, but 1819 was again severely depressed.

Sismondi, who had been influenced by Adam Smith, was impressed by the economic disarray he saw around him. He wrote:

> I was deeply affected by the commercial crisis which Europe had experienced of late, by the cruel sufferings of the industrial workers which I had witnessed in Italy, Switzerland and France and which all reports showed to have been at least as severe in England, in Germany and in Belgium.

Sismondi was particularly puzzled by the English experience. If the country where economic liberty had freest expression—the country where the new methods of machine production had their greatest advance—could be plunged into depression by the return of peace, then something must be wrong with the system of economic laissez faire. Sismondi set himself to find out what it was, and his *Nouveaux Principes* became the first study of the business cycle as such.

This digression occurred while explaining why in the earlier periods of our study we do not necessarily associate prolonged price movements with cycles of prosperity and depression in the modern sense. Nonethe-

less, it is important to know what was happening during each of the designated periods of price movements to understand the relationships between commodity prices and silver. Therefore, the subsequent discussion is organized in terms of these periods, and a brief historical account of what was happening in each of them is given.

Fortunately, for an understanding of events in the earlier period we have a fascinating account by William R. Scott drawn from his detailed study of British business records in manuscripts, official reports, books, pamphlets, and newspapers from the middle of the sixteenth century to 1720 (*The Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720,* 1972). One shortcoming of the Scott record, however, is that he was most interested in what he called "crises," and disproportionate attention was given to bad times. For the later years I have drawn on our general knowledge of events but have relied heavily on Sir John Clapham's three-volume work, *An Economic History of Modern Britain* (1951), and his two-volume *The Bank of England* (1944). Feavearyear's *The Pound Sterling* is useful throughout.

I must emphasize that the narrative that accompanies each period in no way purports to give an explanation of causes of price behavior or the purchasing power of precious metals. The purpose is solely to orient the reader to events that were taking place. At the opening of each narrative is a statistical statement of the length of the period, the change in commodity prices, and the change in the purchasing power of silver. These percentage changes are derived (as they must be) from the original respective indexes computed on the base 1930 = 100.0, to be found in Tables 17 and 18 in Appendix B. Gold figures throughout come from *The Golden Constant.*

One very beneficial effect comes incidentally from considering these index changes period by period. Over intervals of 20 or 30 years the composition of the sample of prices remains much more nearly the same than when comparisons are made over centuries. Equally important, the *quality* of each good remains much more nearly the same. Hence we are on much firmer ground in short-term comparisons of index numbers than in the very long comparisons sometimes involved elsewhere in this volume.

One final word of introduction. We are not concerned with a transient swing of short duration upward or downward in prices, but rather with fundamental changes in price levels of substantial duration. Fortunately the curious reader can look up the particular events that might interest

him and see from the tables and charts what happened to prices and purchasing power on those occasions. (For example if you should be interested in the effects of the collapse of the South Sea Bubble, look up 1720.)

1623–1658: INFLATIONARY, 35 YEARS

Commodity prices	+51%
Purchasing power of silver	−34%
Purchasing power of gold	−34%

This was a period of stable prices for both silver and gold. Therefore, the loss in purchasing power was equal for both and due entirely to the rise in commodity prices.

From 1610 to 1630 the English Mint was nearly inactive in silver (Sir John Craig, *The Mint*, p. 415). The coins that continued in active circulation grew worse and worse, so that trading prices for commodities by tale would have been expected to increase.

Spanish treasure from Mexico came to have an effect on English commodity prices in an interesting way. By 1630 Spain was fighting a religious war against Protestantism in much of Europe while at the same time trying to maintain her administrative and political influence in the Low Countries. Her internal finances were desperate. She could pay the costs of administering the Netherlands only with the silver that came from Mexico. This silver could not be shipped directly to the Netherlands. To get it across the Atlantic was dangerous enough; to send it up the English Channel was suicidal.

In 1630 James I made peace with Spain, and in the treaty an agreement of the utmost importance to England's economy was made. This agreement provided that all the silver needed by Spain for financing her operations in the Low Countries should be brought to England in English ships. At least a third of this would be coined in England, being paid for with bills drawn on Antwerp; the remainder either disposed of in like manner in England in exchange for Flemish money or shipped directly on to Flanders. The advantage to Spain lay in the greater safety for its bullion. The Dutch, Spain's bitter enemy at this stage, would hesi-

tate to attack the well-armed English vessels. By this means Spain would ultimately receive in the Netherlands the wherewithal to pay its bills.

The plan worked well for many years. The merchants of Madrid also fell in with the scheme to transfer their funds safely to the Low Countries as needed. The influx of silver for England was momentous. Some accounts suggest that £10 million worth of Spanish silver was coined at the Mint between 1630 and 1643. In any case, the total coinage of silver in the reign of Charles I (1625–1649) was more than £8.75 million, about twice the amount coined during the whole of Elizabeth's reign (1558–1603), including her great recoinage.

The Monopolies Act of 1624 was of great importance in this period. In allowing a monopoly for inventions for a stated number of years it has been called the first patent law. It may very well have established the base for England's later technical progress.

Companies, whether chartered, joint-stock, regulated, or informal, were not usually prosperous between 1625 and 1645, and some had rough going indeed between 1645 and 1660. Because of the prospect of business failures, the concept of limited liability of shareholders had its inception during this period.

The troubles of the forties were not favorable to foreign trade or to company promotions. But there was one group that insecurity favored—the goldsmiths. William R. Scott, *Constitution and Finance,* lists for this period:

1620–1625.	Effects of crisis in cloth trade; Dutch competition in foreign trade; default of East India and Russia companies; bad harvests; plague; deaths in London, 35,403.
1640.	Seizure of bullion by Charles I. Note: this was particularly disturbing to trade because the king blocked about 120,000 pounds' worth of silver bullion in the Mint belonging to merchants of Madrid and ordered that nothing be paid out on it. English merchants were aghast at this cavalier treatment of their kind. The incident was long remembered as proving how unsafe a national bank would be under the monarch. It was to affect the particular way the Bank of England was organized half a century later.
1652 1654.	Losses of shipping in the Dutch War; possibly, too, effects of the Navigation Act.

1658–1669: DEFLATIONARY, 11 YEARS

Commodity prices	−21%
Purchasing power of silver	+27%
Purchasing power of gold	+42%

Again a period in which silver prices were stable. Its purchasing power appreciated solely from the fall in commodity prices. The price of gold elevated in 1663 by +11.5 percent over its level of the past 40 years, so that its gain in purchasing power was even greater.

Charles II (1660–1685) took several major steps toward putting England on a purely automatic monetary standard. Thomas Mun's immensely influential *England's Treasure by Foreign Trade* was published in 1664, but he had been advocating its principal thesis—the removal of all restrictions on the export of bullion—in powerful circles before. In the earlier years of his reign Charles II was freely granting licenses to export bullion. In 1663 Parliament passed a comprehensive statute entitled "An Act for Encouragement of Trade." One important provision was for free export of any kind of foreign coin or gold or silver bullion.

It was also under Charles II in 1663 that the new machine of the Frenchman Blondeau was installed in the Mint and for the first time coins with milled edges were issued. The coin clipper (a prime mover in coinage debasement) had at last been circumvented.

Heavy pressure from both merchants and goldsmiths—each with different motives—grew for the Mint charges to be abolished in these times. In 1666 an act was passed providing that any person bringing bullion to the mint could have it assayed, melted, and coined. Further, for every pound weight of standard metal he should receive a pound weight of coins without charge, and for metals of less than standard he should receive coins in due proportion. In addition, for those who still remembered the consternation caused by the blocking action of Charles I in 1640 the Act declared that no "stop" should be put on the issues of the Mint for any reason—that metal brought in should be coined and paid out in order of receipt and with all convenient speed. These provisions were to remain in force until 1925 when they were repealed by the Gold Standard Act of that year.

Thus four large steps were taken toward a completely decontrolled and automatic metallic standard: milled edges of coins, free export of foreign coins and bullion, abolition of mint charges, free coinage. There was, in effect, a fixed price of gold with unlimited purchase and sale by the government.

As a numismatic note, one of the most famous coins in commerce came into being in this period. A royal warrant in 1663 required the Mint to stamp all coins issued using bullion brought to it by the African Company with a tiny elephant, the trademark of the company. This was a favor given as an advertisement, but it caught the public fancy and the famous "guinea piece" was born.

Returning to the work of William R. Scott we find listed for this period:

1659–1660. Losses in Spanish War, especially cloth trade, strain of continued high taxation.

1664–1667. Dutch War, plague (deaths 68,596), Great Fire, Dutch fleet in the Thames, 1667. Run on bankers.

1675–1695: INFLATIONARY, 20 YEARS

Commodity prices	+27%
Purchasing power of silver	−13%
Purchasing power of gold	−21%

Dominating this period was the burgeoning of credit inflation, which is central to the question of reserve metals. To understand this new phenomenon we must go back to earlier years and the founding of the practice of banking in England.

As mentioned earlier, the treaty with Spain in 1630 brought about a vast influx of silver bullion to be coined. This enormous mass of full-weight new coins was thrown in with the existing debased coinage, some of it left over even from Elizabethan times. With the good new coins mixed indiscriminately with the light coins already in circulation, there was money to be made. The astute goldsmiths stepped in to make it.

They solicited from merchants and brokers cash for safekeeping for

short periods, even for overnight. For this they would sometimes pay the owners 2 and 3 percent. What the owners did not know was that the goldsmiths had staffs who would select the good coins left in their care, replace them with light coins, and return the light coins only.

In a description by a traveler from Amsterdam:

> It is the goldsmiths, especially those on Lombard Street, who are the greatest merchants and London cashiers, and who will receive any man's money for nothing, and pay it for them the same or the next day, and meantime keep people in their upper rooms to cull and weigh all they receive, and melt down the weighty and transport it to foreign parts.

This was the beginning of banking in England. (There was nothing uniquely nefarious about it; the Dutch had started the practice half a century earlier.)

During the Civil War and the disturbances of Cromwell, landowners and merchants often transferred their liquid funds to the goldsmiths for safekeeping. The goldsmiths were ready to pay interest for the reasons just disclosed. They were soon to find fresh uses for these deposits once the heavy coins had been removed for melting. Small sums were privately borrowed at interest from goldsmiths as early as 1650. This new business really began to boom when the government started to borrow on a large scale.

From this time on, the system of credit and credit currency was developing. The first bank note probably evolved in the following fashion. A man made a deposit of cash with a goldsmith, an account was opened in his name, and he was given a receipt stating the interest to be received and the length of notice to be given before withdrawal. At first these receipts were simply treated as deposit receipts of the modern kind. As early as 1668 we know, however, from Pepys' *Diary* that they had become negotiable. Soon after that date we find references to them as "cash notes" or "bills."

The seventeenth century before 1675 saw the several advances toward a free metallic standard under Charles II that we noted earlier. But now there was a new kind of currency made of paper and promises. The problem of freeing the coinage was to be overshadowed by the problem of controlling the paper. Trouble was to come very soon.

The infamous "stoppage" of the Exchequer occurred on January 2, 1672. This meant that the government stopped paying its old bills and used all new tax receipts to pay for new orders. The new war with Hol-

land was the reason. The stoppage reaffirmed to the commercial world that a national bank would be unsafe in the clutches of a monarchy and assured that when a central bank came (in 1694) it would be put in private hands.

In the prosperous years following the stoppage, a new breed of goldsmith-bankers grew up. They stayed out of state affairs and did not get burned again by letting a king be one of their debtors. The bulk of their funds was applied to supporting the rapidly growing commerce based on London.

Although Charles II had earlier shocked the financial world with indebtedness and stoppages, the last 6 years of his reign, until 1685, became a period of rectitude, economy, and debt reduction. By this time credit had improved sufficiently that in London all payments of size were made with paper money. Every merchant had his account with a banker. The position of credit currency in the nation's economy was established completely.

Now a surprising but possibly predictable operation got under way. The milled edge on a coin defeated the clipper, but it assured a melter that a good coin had fallen into his hands. As soon as the Mint issued the heavy milled coins, they were taken out of circulation and melted down for their bullion.

The position of the Mint was ludicrous. Sir Dudley North regarded it as "a perpetual motion found out, whereby to coin and melt without ceasing, and so feed goldsmiths and coiners at the public charge" (*Discourses on Trade*, 1691). John Locke, our philosopher-cum-financier agreed with him and said so in *Some Considerations of the Consequences of the Lowering of Interest and Raising the Value of Money* (1692, p. 147). It was even reported by William Lowndes at the time that workmen in the Mint were making copies of old clipped and hammered coins and issuing them to get out some coinage that would stay in circulation (and probably make a profit for themselves). By 1695 it was estimated by Lowndes, then Secretary of the Treasury, that milled silver formed only 0.5 percent of the coinage in circulation.

War with France broke out in 1689. There would have been grave financial difficulties even with a sound coinage.

When the Exchequer stopped payments in 1672 its debts amounted to £2.25 million, and annual revenue was about 1.6. King William III by 1694 was spending £2.5 million a year on the Army alone and by 1697 had piled up debts amounting to over £20 million.

William, who acceded to the throne in 1689, used almost every device then known for raising money and invented a few. He and his government increased taxes as far as they dared. They borrowed on personal loans from everyone who would lend. They issued a lottery loan of a million pounds, with large prizes for lucky numbers in addition to 10 percent on the principal invested in the lottery. Finally, and almost as an afterthought, the Bank of England was founded.

(There is much special literature on the early history of the Bank of England and it is not our present purpose to go into the subject deeply since we are concerned with its effects on price phenomena only. Those wishing more information should read, in addition to J. H. Clapman, *The Bank of England,* Michael Godfrey, *A Short Account of the Bank of England,* and Thorold Rogers, *The First Nine Years of the Bank of England,* among others.)

The Ways and Means Act of May 1694 gave the Bank its charter. It was to lend the government £1.2 million at 8 percent, a moderate rate considering the state of the government's credit at that time. The Bank was to receive in return the very considerable privilege of incorporating a joint-stock company.

It was perfectly clear from the onset that the new institution would do a regular banking business—that it should be in the position of receiving deposits and creating a credit currency; it was not created solely for the purpose of bailing out the government. It is more than a distinction of form to remember that the Bank as an institution, not the subscribers of the Bank collectively, loaned the money to the King. Most of the subscribers, as individuals, would never have loaned to the King for a mere 8 percent. What attracted subscribers was the opportunity to get into the first joint-stock bank in England—a venture with extraordinary promise of profitability for a long time to come.

The Bank from the beginning was a bank of issue and not merely deposit. One of its first acts was inflation of credit of the simplest, most direct kind. The entire issue of capital of the Bank of £1.2 million was quickly subscribed, but only £720,000 were actually put up. As soon as it was clear that the subscription would be successful, preparation was made for printing notes. All £1.2 million were soon paid out to the government in bank bills with the seal of the Bank ("sealed bills"). These were quickly disbursed by the government throughout the country and were accepted at par. As Michael Godfrey, first Deputy Governor of the Bank of England so innocently said, "The Bank have called in but £720,000. . . . They have paid into the Exchequer the whole of the

£1,200,000. . . . The rest is left to circulate in trade" (*A Short Account*, p. 3). Godfrey foresaw no ill effects, but commodity prices were to feel them very soon. England was still a small domestic economy.

The original Act establishing the Bank contained the wording "they shall not owe at any one time more than the said sum of (£1,200,000)," so, of course, when its issue of "sealed" bills had reached this sum it raised the question whether it could issue any more. The Court decided that once this limit had been reached, new sealed bills could be issued only to replace those that came in. Curiously, it held that the ruling applied only to sealed bills and not at all to the less formal "running cash notes" which did not bear the seal of the bank and an engraving of Britannia sitting on a pile of money. Instead, the "running cash notes" were signed by the Cashier.

These notes were soon issued freely and accepted unquestioningly. Somewhat prophetically they were nicknamed "Speed's Notes," but that was because Speed was the surname of the Cashier of the Bank of England. As early as August 1694 a million pounds' worth had been issued for the Army alone. That was only the beginning.

The financial strain of the government had been greatly relieved; some by lottery money, some by taxation, much of it made possible by the first credit inflation in the history of Britain.

The decade closing this period were boom years. It was a time of great artistical, financial, and technical ferment in Britain. St. Paul's was built; the Royal Society founded; the Hudson Bay Company came into its greatest prosperity. Domestic industrial activity was marked by the formation of companies for numerous and varied ventures: leather, saltpeter, pumping machines, wallpaper, printing paper, plate and bottle glass, sawmilling, water supply, various kinds of munitions—a very long list. All this activity had been much encouraged by official acts supporting infant industries in 1681. In total, the number of companies in Britain rose from 22 in 1688 to nearly 150 by 1695.

Perhaps the most important aspect of commercial progress in the second half of the seventeenth century was the burgeoning of trade with the East. The East India Company, though founded at the turn of the century, was now paying off most handsomely. The company, whose capital was £370,000 at the outset, paid a bonus of 100 percent in 1676. The value of all imports from India increased by thirty times in the reign of the last two Stuarts, 1660–1688.

Scott's chronology gives the following for this period, starting with an entry for 1672 and closing with an entry for 1696–1697.

1672. Stop of the Exchequer.

1678. Prohibition of trade with France, expectation of war with Holland, run on bankers.

1688. Revolution—run on bankers.

1696–1697. The financial strain of the war, exaggerated ideas of the nature of credit, bad harvests, suspension of cash payments by Bank of England, failure of Land bank schemes.

1702–1723: INFLATIONARY, 21 YEARS

Commodity prices	+25%
Purchasing power of silver	−18%
Purchasing power of gold	−22%

In this period silver was mildly responsive to the general inflation and rose by +3 percent. Gold shaded downward by a similar amount. The purchasing power of both metals declined in consequence, with gold the greater sufferer. This decline in the price of gold, though small in itself, was momentous in monetary history. It established the basis for the gold standard to which England turned in 1717 under the direction of Sir Isaac Newton.

This was a period during which the role of the new Bank of England (founded in 1694) began to have its lasting effects on commerce and finance. Earlier its function had been largely to finance the war and its fiscal aftermath.

The progress of credit currency was substantial during these years. Although this credit currency took many forms, and some of it was quite informal, the following principal instruments can be identified:

1. Engraved and watermarked private bank notes were developed. Because they were harder to forge, hence safer, they began to supersede both the written note and the customer's draft on his banker. Safety and acceptability breed usage, so credit circulation in this form increased.
2. Still the most common form of paper money in this period was the banker's promissory note to his client, made out as a printed form and payable either on demand, or following a specified date, to

whomever was the bearer at the time. So-called "bearer's notes," having the advantage of anonymity of payee, were convenient—and convenience breeds usage.

3. One of the more curious credit currencies was the malt ticket. A tax on malt was voted, and the government immediately issued to the public tickets that would later be paid out of tax collections, bearing interest in the meantime. The tickets passed from person to person as currency and, while current, added to the money supply without a corresponding contraction elsewhere. In fact government lottery tickets passed as currency in the same way between time of ticket sale and time of lottery.
4. Exchequer bills became a regular method of raising short-term loans. They were made out payable by the Bank of England on demand and passed as freely as Bank of England notes, the mainstay of credit currency of the time.

These several forms of paper money came into play during this inflationary period (1702–1725) but were confined to large transactions. Coins remained the principal media for common transactions on the streets.

The composition of the coinage was, however, undergoing a great shift from earlier times. A calculation from the mint figures shows that between 1700 and 1725 the coinage was

Gold	£11,452,000
Silver	£ 557,000

In the preceding 25 years gold and silver coinage had been almost equal at £7.5 million each.

Another feature that marked this period of prosperity was the rapid increase in joint-stock companies and the pooling of financial resources they made possible. According to Scott, in 1695 there were 140 such companies with a capital of £4.5 million, whereas total capitalization rose to nearly £21 million by 1717. By all evidence the expansion of this form of business organization continued to rise rapidly.

The importance of such organizations to industrial development can hardly be overestimated because it allowed for both the pooling of resources and the sharing of risk by small operators who could not undertake the entrepreneurial role alone.

There were dangers of excess in the form of highly speculative ventures, some of which went broke. The mania of 1719–1720 is an example

of this. Also, the promotion of companies provided a possible channel through which funds could flow away from, rather than toward, productive purposes.

For perspective, it is well to remember that England was still a thin economy during this period. At the time of Queen Anne (1702–1714) a contemporary estimated that the metropolitan area of London, the more or less continuous town, and going well beyond the City, had about half a million population. London was at least 14 times the size of the next biggest town and accounted for approximately one-twelfth the entire population of England and Wales. (Sir John Clapman, *A Concise Economic History of Britain*, p. 189) If this is correct, the total population was of the order of 6 million only—a population economically, socially, and politically dominated by one huge town in the south.

W. R. Scott had gleaned these doleful events from the archives:

1704–1708.	Losses in the war, financial strain, tensions between England and Scotland, fears of a French invasion, run on Bank of England.
1710–1711.	Financial strain of the war, change of ministry.
1714.	Fears of the consequences of the succession, reported death of Anne, run on the Bank of England.
1715.	Rebellion.
1718.	Fears of an invasion.
1720.	Panic follows the collapse of speculation (South Sea Bubble). Note: the last stands out clearly in Chart II and registers a fall of 17 percent in the commodity price index in 1 year.

1752–1776: INFLATIONARY, 24 YEARS

Commodity prices	+27%
Purchasing power of silver	−22%
Purchasing power of gold	−21%

Silver prices were in a modest decline, while commodity prices in general rose. The market price of gold was essentially stable, holding near the new official price of 3 pounds, 17 shillings, 10.5 pence on which the gold

standard now rested. Both metals lost operational wealth to the new inflation at very nearly the same rate.

The Industrial Revolution probably has been dissected and discussed by economic historians more than any other episode in British history. Various dates have been suggested for its beginning, but with a phenomenon so amorphous it is impossible to achieve unanimity on when it began. There is, however, something of a consensus that it had its immediate antecedents in the latter half of the eighteenth century. We may take it that this inflationary period (1752–1776) was associated with the early rise of the Industrial Revolution.

The Industrial Revolution did not cause the inflation; the development and proliferation of fiduciary forms of money probably did that. It was a demand-pull inflation rather than a cost-push type. A case can be made that the Industrial Revolution was an ameliorating factor because industrial growth at this time was aimed at creating a supply of goods at medium and low prices and in large quantity. It was not intended to serve the wealthy few, but rather the large markets of the increasing population. In 1750 England was already distinguished among European nations for the variety and prosperity of its industry.

Also helpful to the moderation of inflation was the healthy state of England's farming technology. Farming played an important part in ongoing industrialization by providing an adequate supply of food without recourse to expensive imports and by freeing labor for employment in towns.

Evidence is that the population was increasing rapidly at this time. Admittedly, the evidence is inferential because the first national census was not taken until 1801. One had been proposed in 1753 but, curiously enough, was rejected by Parliament on the grounds that it would be an invasion of privacy and dangerous because it might reveal weakness to an enemy.

Another circumstance that might have relevance to the form of this inflation is that much of the new industrial development went on in districts that had been undistinguished as industrial producers in the past and were poor and backward. All the preceding explain why the inflation was smooth and gradual up until the Napoleonic Wars. The wage payments were widely dispersed into hands that were not prosperous before. Also, there was not a heavy press on productive facilities and a labor supply already working at near capacity.

Although the whole period is dominated by the upsweep of the Indus-

trial Revolution, some singular events should be noted. There was a boom followed by a collapse associated with the Seven Years' War ending in 1763. A short depression and a rapid revival continued to 1772 when the failure of an important banking house caused a severe panic, the worst since the bursting of the South Sea Bubble. The war with the American colonies, which closed this period, actually caused a depression in trade. An excited boom followed the end of the war but collapsed in 1783 with a financial panic.

1792–1813: INFLATIONARY, 21 YEARS

Commodity prices	+92%
Purchasing power of silver	−33%
Purchasing power of gold	−27%

This was the dramatic inflation of the Napoleonic Wars. Nothing as severe had occurred in the recorded history of England. It was superimposed on the continuation of the Industrial Revolution, with the development of heavy industry an especially prominent feature.

It was during this period that England effectively went off the gold standard. On Sunday, February 26, 1797 an Order of Council was issued suspending, it was hoped temporarily, the exchange of gold for currency by the Bank of England. Gold was free to go to a premium in the marketplace. Silver, of course, had been exchanged in an unfettered market all along.

Between 1792 and 1813, the peak of the commodity price inflation, the price of silver soared by +28 percent. Gold broke loose from 3 pounds, 17 shillings, 10.5 pence and climbed by +39 percent, unprecedented bursts for both. Yet they were far outstripped generally by rising commodity prices and both precious metals suffered a severe loss in purchasing power.

It is now convenient to remind the reader that we engaged in these commentaries not to explain periods of inflation and deflation but rather to appreciate the events occurring during such periods. The task can now be eased by having recourse to an unusual volume by Willard Long Thorp published by the National Bureau of Economic Research in 1926,

entitled *Business Annals*. In this book, he gleaned year-by-year the publications bearing on business and financial activities in the major countries of the world and, almost in note form, summarized what was happening in each of them.

Thorp's book is, in spirit, similar to that of W. R. Scott, which we used up through 1720. But Thorp's book is far superior in that Thorp had many more publications to consult (since the business press was enlarging over time) and—more important—Thorp noted bad *and* good times, whereas Scott tended to concentrate on crises. The format we use for England in the period 1792–1813 is to give Willard Thorp's commentaries in modified, sometimes amplified, form.

The use of Thorp's annual synopses is particularly appropriate for this period. It covers the most chaotic time in England's economic history for a century before and after and is examined often for historical lessons on what can happen when most of the Western world is in turmoil. The reader specially interested in gold prices, commodity prices, and purchasing power may wish to follow in the tables and chart a year-by-year account of events.

Before getting into a detailed account, it is important to remember that this was in general a period of major wartime activity in terms of both preparation and combat. Also, it was a period of mismanagement—or complete lack of management—of paper currency because England for the first time did not back her paper with specie.

Thorp's *Annals*[1] give the following synopses:

1792. Prosperity; financial strain.

Continued prosperity and expansion in trade; speculation; imports decline but exports increase strongly.

Easy money tightens in autumn; security prices high.

Crop failure with higher price.

Mobilization of forces in preparation for war, December.

1793. Recession; panic; depression.

Slackening of activity to stagnation, spring; many failures, especially second quarter; commodity prices advance sharply and peak, spring, and then decline; reduction in foreign trade, chiefly exports.

[1] Willard Long Thorp; *Business Annals* (New York: National Bureau of Economic Research, 1926). Reprinted by permission.

Very tight money eases, summer; panic, February to July, with runs on banks and failures; government relieves situation by issuing exchequer bills.

Moderate crop.

War with France declared, February; France seizes all British goods, October, and England issues severe navigation restrictions; English army lands in Flanders, but is driven from Toulon; civil unrest causes suspension of Habeas Corpus Act.

1794. Depression.

Industry at a standstill; cotton trade most severely hit; revival in foreign trade.

Money easy.

Deficient crop and rising prices.

English victories at sea and defeats on land.

1795. Revival.

Some improvement in industry; rapid rise in commodity prices; foreign trade dull.

Easy money tightens, last half-year; foreign exchange unfavorable.

Deficient crop and very high prices.

Military impressment results in civil unrest, summer.

1796. Uneven prosperity.

Industrial activity; slow rise in commodity prices; foreign trade advances to new high record.

Continued tightening in money market; gold scarcity; security values decline.

Abundant harvest.

Severe distress, first half-year; extension of scope of poor relief; French invasion of Ireland fails, December.

1797. Recession; panic; depression.

Activity yields to stagnation, spring; unemployment; slight decline in commodity prices, summer; many failures; foreign trade reduced.

Monetary stringency; panic, February, with runs on banks; Bank of England suspends specie payments, February.

Poor crop, fair price.

Army and Navy mutinies; British allies make separate peace with France.

1798. Depression.

Dullness in industry; revival in export trade.

Money eases; unfavorable foreign exchange and large imports of bullion.

Good crop, low price.

French invasion of England threatened, February; Irish rebellion, May; naval successes; Pitt presents income tax, December.

1799. Depression.

Inactivity continues; after feverish speculation, prices of imported goods collapse; decline in imports, active exports.

Money tightens; improvement in security prices.

Harvest very deficient, especially wheat; prices very high.

Great distress and riots; trade unionism checked by passing of Combination Act.

1800. Depression.

Continued stagnation of industry; further rise in commodity prices, especially foodstuffs; active foreign trade.

Money eases.

Harvest failure; very high prices; duties on grain suspended and active importation.

Distress and riots; further extension of Combination Act.

1801. Depression; revival.

Improvement in industry late in year; commodity prices rise rapidly to peak, second quarter, and then decline; commerce prosperous.

Money easy; rapid depreciation of currency.

Moderate harvest.

Peace of Amiens with France, October.

1802. Prosperity.

Rapid improvement and expansion in industry; building brisk;

speculation; commodity price decline checked, last half-year; larger exports.

Money easy; large gold premium.

Treaty of Amiens, March: income tax repealed.

1803. Prosperity; recession; depression.

With breaking of peace, industry slackens and commerce becomes stagnant; commodity prices rise to peak, third quarter; many failures.

Money tightens; gold premium greatly reduced.

Moderate harvest.

Peace broken, May, and troops mustered, June; embargo declared on all French and Dutch ships, May; Emmet's rebellion in Ireland, July; income tax reestablished; war in India.

1804. Mild depression.

Industry quiet, activity being concentrated on amassing of war forces; foreign trade dull.

Money eases.

Very deficient wheat and barley crops; sudden and great rise of prices following passage of new corn law with higher duties.

Spain declares war, December; French ports blockaded.

1805. Revival.

Improvement in industry and trade; slight rise in commodity prices.

Money easy.

Average crop.

Alliance with Russia formed, April; Austria, Sweden, and Naples join coalition against France, September; French and Spanish fleets defeated at Trafalgar, October; severe defeats of Austrians and Russians, December.

1806. Prosperity.

General activity in industry; commodity prices decline; decreased imports and increased exports.

Money fairly easy.

Moderate harvests, lower prices.

Prussian ports closed to British shipping, March; Napoleon's Berlin Decree establishes "Continental System," November.

1807. Recession.

Activity continues, though slackening; commodity prices decline further; increased failures; many new companies and active speculation; marked reduction in foreign trade.

Money eases.

Poor harvest, lower prices.

Slave trade abolished, February; active war in Spain begun; expedition to Constantinople and Egypt fails; Treaty of Tilsit creates coalition of all European nations against England, July; American embargo declared, December; Napoleon extends blockade by Milan Decree, December.

1808. Mild depression.

Stagnation in manufacturing and further reduction in foreign trade; commodity prices rise rapidly; speculation; joint-stock companies boom; enormous exports to South America.

Easy money tightens; security market very active.

Military successes in Portugal.

1809. Revival; prosperity.

Improvement in industry; prices high and speculation frenzied; extraordinary increase in foreign trade.

Money market tightens; increased gold premium.

Poor crop, very high prices.

America passes Non-Intercourse Act.

1810. Prosperity; recession.

Activity and speculation continue to crisis, July; wild price fluctuations give way to general decline; many failures; manufacturing paralysis and unemployment, autumn; record imports with little increase in exports.

Money very tight; bank failures, summer; gold advances and large premiums.

Good wheat and oats crops, fair barley; high prices.

Military successes in Portugal.

1811. Deep depression.

Complete stagnation of industry; many failures; unemployment; wage cuts; commodity prices decline; marked reduction in foreign trade.

Money eases; exchequer bills issued; currency improves.

Deficient crops; very high prices.

Universal distress; Luddite riots; war successes after April; Regent appointed to displace George III, November.

1812. Revival.

Gradual improvement in industry despite unrest in manufacturing districts; distress and unemployment in cotton industry; revival of speculation, autumn; sharp rise in commodity prices; many failures; recovery of export trade.

Money easy; increased gold premium.

Fair crops; very high prices.

Severe distress, riots; war with United States declared, June; victories in Spain; Napoleon's disastrous invasion of Russia.

1813. Prosperity.

Industry flourishes, except for severe cotton strike, Scotland; rapidly rising commodity prices; active speculation; increased foreign trade.

Money easy; large gold premium.

Abundant harvest, sharp fall in farm prices.

Military successes in Spain; coalition of Russia, Prussia, England and Austria against Napoleon; corn law eased.

Thus climaxed the most rampant price inflation in England until very recent times.

The only earlier rival might be the so-called Tudor inflation of the sixteenth century, imprecisely measured because of the dearth of dependable price statistics.

1813–1851: DEFLATIONARY, 38 YEARS

Commodity prices	−58%
Purchasing power of silver	+69%
Purchasing power of gold	+70%

From the historical peak of 1813 prices fell abruptly and swiftly for 3 years and then continued a generally downward trend for the next 35 years. Agricultural prices already were depressed in 1813, and in the second quarter of 1814 prices in the manufacturing sector followed precipitously, bringing commercial distress and numerous failures. Money tightened and gold went to a record premium.

1815 opened with promise until Napoleon returned from Elba in March. The uncertainty of the Hundred Days had a dampening effect on the economy. Then came the final defeat at Waterloo in June, touching off a speculative boom that ended in credit collapse and failures by autumn. Commodity prices continued to decline, money tightened, and many country banks failed.

By 1816 England was in a deep depression. There was stagnation of industry and trade generally; the iron and coal industries were paralyzed. In addition, there was a failure of the wheat crops and below average harvests in barley and oats. Riots occurred spasmodically from May through December.

These dismal times, following soon after Waterloo, simply portended a long period of depression and distress, only occasionally punctuated by brighter times of short duration. For 22 of the next 35 years Thorp recorded depression, recession, and even panic. Only 9 were designated as prosperity. (The reader who wishes a detailed study of this period can find one of the best in *The Growth and Fluctuation of the British Economy, 1790–1850*, by A. D. Gayer, W. W. Rostow, and A. J. Schwartz, Oxford, 1953.)

This price deflation was by far the most severe England had ever experienced, both in depth and duration, granted it also started at the culmination of an unprecedented price peak. More than 35 years of declining trend brought prices down to the level of the last quarter of the seventeenth century!

During this time the price of silver fell by −26 percent and gold dropped by −28 percent. In both cases most of the decline was in the first few years following 1813. During the full reach of the commodity deflation the purchasing power of both metals therefore increased handsomely. Holders of either saw their operational wealth improve by more than two-thirds. Once again the precious metals were a marvelous protection against deflation.

1873–1896: DEFLATIONARY, 23 YEARS

Commodity prices	−45%
Purchasing power of silver	− 6%
Purchasing power of gold	+82%

This was the period of the precious metals revolution. Country after country was shifting from silver to gold as the basis for its currency. The associated oversupply of silver cut its price in half between 1872 and 1896. This was unprecedented in the history of the Western world and exceeds anything even hinted at in all other records. In England gold held steady. This was her golden age of monetary standard.

As for commodities *generally*, after 1851 prices rose sharply to an index level of 100.0 and remained on a plateau for two decades. Then England plunged into another major deflation.

Recession hit in the last of 1873 with a stringent money market and very poor wheat harvests. Commodity prices were down before the close of the year, yet exports declined drastically. A long depression was setting in. During the next 23 years Thorp found only 4 years that he would label as prosperity; nearly all the rest were years of full depression or recession. Prices reached their low point in the summer of 1896.

With its price per ounce stable, the operational wealth represented by gold increased enormously. A hoard of gold would exchange for about 80 percent more commodities in 1896 than 20 years earlier.

With silver prices collapsing, its story was quite different. Only the horrendous commodity deflation that paralleled the declining value of silver saved silver holders in their operational wealth. In the net, the purchasing power of silver fell only −6 percent. However, this was obviously because other prices fell so much, not because silver fell so little. Silver's reputation as a store of wealth was going to take 50 years to recover.

1897–1920: INFLATIONARY, 23 YEARS

Commodity prices	+305%
Purchasing power of silver	− 61%
Purchasing power of gold	− 67%

The year 1897 marked an abrupt change in British price history. Two decades of almost unbroken decline were turned into a gradual rise that culminated 23 years later in a threefold increase. It is true that a major war intervened. But the rise approximated 40 percent by 1914 and again was more than 30 percent after the Armistice in 1918. From 1914 to 1918 prices went up by 126 percent, and wartime increases are very real for those who suffer them. The point, in any case, is that the situation involved more than wartime inflation.

The war years aside, Thorp counted 13 years of prosperity and one characterized as "revival" out of the 19 remaining years. The year 1909 saw the low point for English silver prices in this period. All that silver had gained in price since the year 1345 was lost. One great plateau of five and one-half centuries stood in between.

From 1897 to 1920 the price of silver went up by +58 percent, very steep by historical standards. But the surge in commodity prices was so great that silver's purchasing power fell by more than 60 percent in the same period. By 1920 silver was at its lowest rate of exchange for commodities in English history.

1920–1933: DEFLATIONARY, 13 YEARS

Commodity prices	− 69%
Purchasing power of silver	+ 32%
Purchasing power of gold	+251%

When American readers hear of the Great Depression they think of The Crash of 1929. They may not be aware—or they may have forgotten—that England suffered its own economic crash in 1920.

The slump began in summer; employment had peaked in April. As

early as May a general strike was attempted, and by September employment was in rapid decline. The financial sector was in a severe depression before the year was out.

Between 1920 and 1933 commodity prices deflated at the most severe annual rate in British history.

What was happening to silver? The year 1919 had seen a quite uncharacteristic spike in the annual series of silver prices. A short-lived surge had carried quotations back even to 1870 levels. The residual requirements of wartime demand carried abnormally high prices into 1920, then they broke. From 1920 to 1933 the price of silver plunged by −58 percent. This was, however, less than the drastic decline in commodity prices in general, so silver's purchasing power went up.

Gold responded sharply with the peaking of commodity prices in early 1920. *The index of gold prices had remained constant within one decimal point for 90 years.* Then between 1918 and 1920 gold increased 33 percent.

Gold was responsive to a commodity price *increase* for the first time in a century. It matched in exact proportion the rise of commodity prices in 1920, then gold fell away as commodity prices declined, but far more slowly than the latter. Once again the purchasing power of gold began to rise as a depression phenomenon.

1933–1979: INFLATIONARY, 46 YEARS

Commodity prices	+2149%
Purchasing power of silver	+ 241%
Purchasing power of gold	+ 27%

We have it on the authority of *The Economist* (July 13, 1974) that "Apart from a brief period during the Second World War, when the government rigged the official cost-of-living index with subsidies and controls, prices in Britain have not fallen since 1933." The wholesale commodity price index used here shows the same record, a record that speaks for itself. Amazing.

The record of silver is also startling. First let us take the very long view. In 1931 the silver price was the lowest known since the second half of the thirteenth century. Not only was the 1931 price in England less than any

time for six and one-half centuries, it was less by one-third than where it had stood about the time of the Magna Carta.

Then in the latter part of 1933 the United States began its silver buying program. For reasons quite beyond the initial impulse, silver prices exploded for the next 45 years at a rate exceeding that for any precious metal in recorded history. Between 1933 and 1979 the net change was by *+7568 percent*. This far outstripped commodities in general, and a new record was set for appreciation of operational wealth, whether in inflation or deflation.

Gold also soared in price, but not as much. Gold gained nearly +30 percent of its purchasing power in England between 1933 and 1979. For a student of gold this period is fascinating. With gold prices free and volatile after the breakup of the London Gold Pool in 1968, the metal fought to hold its own versus wholesale commodity prices. In the end, it did.

A SUMMARY OF ENGLISH INFLATIONS AND DEFLATIONS

We have now examined the statistical history of price inflation in England from the seventeenth through the twentieth century. Let us be certain we are aware of the wide variety of circumstances in which these inflations have taken place.

- Some have occurred in an almost completely agrarian economy, with only the most rudimentary of tools and equipment to aid a productive process largely carried out by human effort alone; others have occurred in predominantly urbanized societies with the highest technological developments so far achieved. The full scale has been run between labor-intensive and capital-intensive economies, with every degree in between represented.
- Some have occurred when barter was still a principal means of exchange; some have taken place before the invention of credit currency; when only coins were a common denominator for exchange; some have taken place in fully developed money markets, domestic and international, in which the sophistication of finance has reached apogee.

- Some have been associated with wars; some have occurred in moderating peaceful circumstances.
- Some have taken place amid political turmoil; some have had the benign influence of social stability and governmental benevolence.

Out of all these varied circumstances are there some uniform findings about inflation?

First, we must consider how to measure inflation. Several techniques have been used for this statistical measurement. These differ in degrees of sophistication and also in the particular view of inflation that the analyst wishes to represent. The following points need to be made:

1. Simplest of all, but perfectly acceptable in some contexts, is the net change in price (or defined price level measurement) from the beginning of the inflationary period to the end. Thus one might say "Inflation has been particularly serious in San Francisco since 1970. The Consumer Price Index has gone up by _____% to 1980." This is a completely meaningful statement, but it represents inflation in its grossest form. That is to say, it reflects both a rate of ascent of prices and the duration of ascent. Within its proper context it is quite acceptable for characterizing the severity of inflation in *that* locality for the time period chosen by the speaker, and it allows for a comparison between two or more localities as long as the time period is the same in the comparisons made.

   The preceding format breaks down as soon as one wishes to speak of two different periods of inflation of differing duration. It is misleading, if not nonsensical, to make a statement of the following type: "Recent inflation is much more severe in San Francisco than what we had before the war. Since 1970 the Consumer Price Index went up by _____% until the start of 1980, but the total increase from 1938 to 1938 was only _____%." The comparison is fallacious because the *duration* of the period is different in the two cases. Obviously, a way to get around this difficulty is to express inflation as a *rate* per unit of time.

2. The simplest way to express inflation as a rate is to compute the "simple annual average" rate of inflation (or monthly rate, if you choose). This means taking the net change in prices from beginning to end and divides by the number of years intervening. Stated as a

rate of change per unit time, it has the clear advantage of adjusting for the differing lengths of various periods of inflation, thus allowing for direct comparisons between their degrees of severity.

3. There is nothing really wrong, or even ambiguous, about the form of statistical statement in (2). *It looks back at history*. What we often find unsatisfactory about it is that it does not reflect the economic sense of inflation as experienced by the *participant*. By its nature, inflation is a compounding process.

   As consumers we feel its surge to a higher level and then, as it continues, a surge from that level to a yet higher one. Each segment of inflation starts from the higher level already created by its predecessors. It is this compounding process that the participant experiences. This corresponds mathematically to the phenomenon of compounding interests, and we can speak of the "average annual compounded rate of inflation" and compute our statistical measure accordingly.

For most inflation periods it makes a distinct difference which statistical measures we use. For the episodes of English inflationary history which we have just examined, let us present all three measures so that we may see how they differ.

Years	Duration	Net Change (%)	Simple Average Annual Rate (%)	Average Annual Compounded Inflation Rate (%)
1623–1658	35	+51	+1.5	+1.2
1675–1695	20	+27	+1.4	+1.2
1702–1723	21	+25	+1.2	+1.0
1752–1776	24	+27	+1.1	+1.0
1792–1813	21	+92	+4.4	+3.2
1897–1929	29	+305	+13.3	+6.3
1933–1979	46	+2149	+46.7	+7.0

The following observations can be made about the record:

1. The duration of periods of pronounced inflation has been about the same between the last half of the seventeenth century and the one that we are now experiencing. Two decades plus has been the norm.
2. Although the net changes look impressive, the annual rates of inflation were not at all severe until the twentieth century. This is espe-

cially true if we concentrate on the compound rates that commend themselves as more realistic to the statistician. Annual rates of the order of 1 percent must have been absorbed easily by the participants, even if inflation rates built up to substantial price increases when continued for more than 20 years.

The inflation associated with the Napoleonic wars was the first to reach a magnitude noticeable by modern standards. There is no gainsaying its severity, but one must remember that it was marked by two highly unusual circumstances: (1) the wars themselves, which were especially embracing and extraordinarily expensive for the economies of the times; and (2) the naive financial governance of the Bank of England, which was quite unprepared (understandably) to manage for the first time in history a paper-issue currency not redeemable in specie.

The other periods of the seventeenth and eighteenth centuries may look imposing on a chart. However, we must remember that they occupied an entire adulthood of that day; their yearly accumulation of inflationary burden was really quite small.

3. This leaves us with the conclusion that *inflation is not a necessary part of the human condition*: it has not always been with us in anything like the severity of current times. Economic historians speak of the "English Price Revolution" of the sixteenth century, but R. A. Doughty has shown recently that, over the entire major inflationary period commonly so designated (1519–1629), the average compounded rate was 1.1 percent for industrial products and only about 1.5 percent for agriculture (*Explorations in Economic History*, Vol. 12 (1975)). What is more, the so-called Great Debasement (1540–1560) largely accounted for the increased price quotations of those times.

Let us now look in the same way at the periods designated as deflationary in our price history of England.

Years	Duration	Net Change (%)	Simple Average Annual Rate (%)	Average Annual Compound Rate (%)
1658–1669	11	–21	–1.9	–2.1
1813–1851	38	–58	–1.5	–2.2
1873–1896	23	–45	–2.0	–2.6
1920–1933	13	–69	–5.3	–8.5

- Since 1800 England has had about as many years of deflation as inflation—74 years as compared with 82 (but we must be very much aware of definitions).
- The most recent deflation was by far the most severe. It was sharp and deep as compared with the rest.
- There have been an equal number of periods of deflation and inflation since 1792, that is, since the Industrial Revolution.
- The current inflation is quite the greatest in English history as measured by the average annual rate, whether simple or compounded.

Having summarized inflations and deflations separately, we are now in a position to draw together the experience with the precious metals in each. From earlier results we have the following net changes in the index of commodity prices and the purchasing power of silver and gold.

	Inflation			Deflation		
		Purchasing Power of			Purchasing Power of	
Years	Prices (%)	Silver (%)	Gold (%)	Prices (%)	Silver (%)	Gold (%)
1623–1658	+51	−34	−34			
1658–1669				−21	+27	+42
1675–1695	+27	−13	−21			
1702–1723	+25	−18	−22			
1752–1776	+27	−22	−21			
1792–1813	+92	−38	−27			
1813–1851				−58	+69	+70
1873–1896				−45	− 6	+82
1897–1920	+305	−61	−67			
1920–1933				−69	+32	+251
1933–1979	+2149	+241	+27			

Let us look first at the history of silver in inflations. In every period recorded in the three centuries following the sixteenth, the purchasing power of silver declined, often by severe amounts. Only in the current inflation, now unbroken for 46 years, has silver outdistanced commodities in general and displayed a gain in operational wealth. When it reversed its historical role it did so handsomely, improving its rate of exchange against other commodities by nearly two and a half times.

The new era in silver, which I would date from 1946, deserves a closer

look, both for its own sake and in terms of its relationship to commodity inflation. When British price statistics began to be published after the wartime hiatus, the wholesale commodity price index stood at 162.0 for 1946. This is almost exactly the index level of silver prices 1 year earlier. Both series then took off at a phenomenal rate. The extent to which this new era for silver broke with history can be seen from the broad sweep of Chart II on logarithmic scale.

But these were historic times for prices in general. Between 1945–1946 and 1950 there was tremendous and parallel acceleration in all commodity prices in England, including silver. As shown in Chart II, this swift parallelism remained the case until about 1960. Then silver shot ahead and its purchasing power accumulated to the extent of a gain of +211 percent between 1933 and 1979.

As far as our history goes back for England, silver did very well as an instrument of accrual in periods of deflation. The pattern of increased purchasing power failed only in the depression of 1873–1896. Even then it behaved well, down only 6 percent, in the face of a 50 percent collapse in the price of silver per ounce.

In the history of England, gold has been a consistent loser in purchasing power in inflationary times, until the present ongoing episode when it has gained in purchasing power.

PART TWO

THE AMERICAN EXPERIENCE

3 The Price of Silver in the United States

The broad sweep of silver prices in the United States can be simply described: approximate constancy from 1800 to 1872, a downward trend from 1873 to 1932, and a rising trend thereafter. This is the last simple statement that can be made about the history of silver in this country. The rather voluminous material in this chapter has been divided into four sections: Precarious Stability, 1800–1872; Politicized Chaos, 1873–1932; A New Deal for Silver; The End of Silver as Money.

PRECARIOUS STABILITY, 1800–1872

The Bill of Rights for silver was Alexander Hamilton's *Report on the Establishment of a Mint*, dated May 5, 1791. Perceptive though it was in many respects, it was thoroughly pragmatic in its arguments for bimetallism. Theoretical justifications, some of them quite woolly, were to be later inventions of monetary economists.

In discussing the alternative of gold versus silver, Hamilton came down on the side of gold, if a single standard were to be adopted.

> Gold may, perhaps, in certain senses, be said to have a greater stability than silver; as, being of superior value, less liberties have been taken with it in the regulation of different countries. Its standard has remained more uniform, and it has, in other respects, undergone fewer changes; as, being not so much an article of merchandise, . . . it is less liable to be influenced by circumstances of commercial demand. And if . . . it could be affirmed that there is a physical probability of greater proportional increase in the quantity of silver than in that of gold, it would afford an additional reason for calculating on greater steadiness in the value of the latter.

How prophetic he was we shall see.

But when it came down to a final recommendation Hamilton chose a double standard. This was pragmatism. There was a scarcity of specie of any kind in the new country. Silver was the metal of more common use, and its continued acceptance was not in question. The principle object of Hamilton was to devise a metallic backing in abundance for currency, so that commerce would not be stifled. With bimetallism Hamilton could retain the silver already current and hope to add gold to the currency base as it became available. He was aware, too, that there was then a large influx of silver into the West Indies directly from South America. In the normal course of a thriving trade with the former, the United States was likely to be kept in good supply.

With bimetallism his choice, the Secretary had now to recommend a ratio between the two metals. He reasoned that the best legal ratio would be that equal to the market ratio, "if this can be supposed to have been produced by the free and steady course of commercial principles." But this still forced him to a choice between the market ratio in his own country or, since it might be different, the price ratio between gold and silver in the larger commercial world of which the United States was then so small a part. He threw up his hands at the prospect of determining the latter with proper precision "without an inconvenient delay" and opted for the market ratio in domestic markets.

Hamilton probably did the best he could, given the inefficiencies of international market information of the times, but it was not good enough. No functioning system of bimetallism has been able to last for any time in a country trading with foreign states if the domestic mint ratio was not in agreement with the market ratio of its principal trading partners.

Hamilton chose 15 : 1 as the legal counterpart to his estimate of the market ratio in the United States of that time.

In April 1972, Congress passed "An Act establishing a Mint, and regulating the Coins of the United States." This contained the clause "that

the proportional value of gold to silver in all coins which shall by law be current as money within the United States shall be as fifteen to one, according to quantity in weight, of pure gold or pure silver."

While we are examining this Act, we should also note that it provided for "Free Coinage," meaning the right of all private persons to have bullion coined at the legal ratios, and in this Act was also specified that "bullion so brought shall be assayed and coined as speedily as may be after the receipt thereof, and that free of expense to the person or persons by whom the same shall have been brought."

The Act of 1792 thus stipulated that all holders of bullion should have free access to mintage and that no charge should be made for the privilege. It further provided that both gold and silver coins should have unlimited legal tender.

A bimetallic system probably has never been established *de novo* under more favorable circumstances. It was simple and unfettered. There was no prejudice among the people for or against either gold or silver. The relative values of the two metals had been almost constant for a long time past.

The one hitch that might have occurred was that Hamilton, in choosing the United States market ratio, failed to recommend the going commercial world ratio. But even here circumstances were propitious. We know now what Hamilton did not know then, that the European prices, as reflected by the ratios at Hamburg, gave a market relation of almost exactly 15 : 1 during the 4 years 1790–1793 when our system was being put into place.

What then, went wrong? What went wrong was that the perpetual potential flaw in all bimetallic systems surfaced. The commercial world ratios moved away from 15 : 1.

The following are the Soetbeer ratios for Hamburg, then as important as London in reflecting commercial world metals.

Year	Ratio
1793	15.00 : 1
1794	15.37 : 1
1795	15.55 : 1
1796	15.65 : 1
1797	15.41 : 1
1798	15.59 : 1
1799	15.74 : 1
1800	15.68 : 1

What then were the consequences of the divergence of the world market ratio away from the U.S. Mint ratio? Perfectly predictable under Gresham's Law.

But to lay the foundation for the answer let us look further at the Hamburg ratios following 1800.

Year	Ratio	Year	Ratio
1801	15.46 : 1	1811	15.53 : 1
1802	15.26 : 1	1812	16.11 : 1
1803	15.41 : 1	1813	16.25 : 1
1804	15.41 : 1	1814	15.04 : 1
1805	15.79 : 1	1815	15.26 : 1
1806	15.52 : 1	1816	15.28 : 1
1807	15.34 : 1	1817	15.11 : 1
1808	16.08 : 1	1818	15.35 : 1
1809	15.96 : 1	1819	15.33 : 1
1810	15.77 : 1	1820	15.62 : 1

What had begun in 1794 persisted, and often enlarged, after that year. The commercial world ratio stayed above 15.00 : 1 and, not infrequently, was of the order of 16 : 1.

Now the operation of Gresham's Law is really very simple. (We will call it by that code name even though the phenomenon was described as early as Aristophanes, and alluded to in English Parliaments as early as the fourteenth century.) Under a bimetallic system the possessor of gold or silver bullion has two places where he can dispose of it: the public mint or the private bullion market. In the first he can have it coined and receive the number of coins that are his legal due. In the second he can sell it as private bullion for the existing price per ounce and receive the number of coins which are his market due. He will take his bullion where he can get the greatest number of coins.

To see how gold and silver interact let us personify the process in terms of a single money broker happily confronted with a mint ratio of 15 : 1 and a market ratio of 16 : 1. The money broker can take his 15 ounces of silver coin to the mint and receive an ounce of gold in coin. He can quickly sell the gold as market bullion (melting it or selling it to an exporter) for 16 ounces of silver bullion. He keeps the 1 ounce of silver as profit and, with the 15 ounces left over, goes back to the mint

for more silver coins. He exchanges these for more gold coins, sells the gold as bullion against more silver coins, and again makes a profit of 1 ounce of silver. With the incentive of 1 ounce per round, he will continue this process until all gold coins have disappeared. Or to shortcut the drawn out round-by-round process, when it becomes general knowledge that a gold coin will buy more silver bullion than it will of silver dollars, the gold coins will be converted into bullion and disappear as money.

The surface manifestation that Gresham's Law is at work in the monetary system is when the coinage of gold at the mint falls drastically in proportion to new silver coinage. The following table shows this proportionality for selected years. Specifically, the figure given is the proportion of total gold coinage in dollars to total silver coinage in dollars for the interval stated.

Years	$Gold/$Silver
1800–1804	3.1 to 1
1805–1809	0.5 to 1

Clearly in the first decade of the nineteenth century in the United States there was a tremendous change in the proportionality of the two precious metals brought to the mint. In the decade ending with 1830 gold coinage of the mint was only about 11 percent of the total silver coinage. Considerable contemporary comment said that gold had disappeared from circulation by about 1818 (see, e.g., Conday Raguet, *Currency and Banking*, 1822). The process was undoubtedly hurried along as England amassed gold from abroad in order to resume specie redemption for paper in accordance with her Act of 1819.

The United States was effectively on the silver standard however read the law.

The condition of the currency in the United States was deplorable from 1820 to 1830. This was well documented by a report to Congress in 1832 by Campbell P. White (H.R. Report No. 278). Gold had disappeared, paper issues by local banks were extensive and uncontrolled (down to denominations of one-sixteenth part of a dollar), bank reserves were slim and almost entirely in silver, and Spanish dollars and parts of dollars were estimated to make up about 25 percent of the metallic circulation. Things were so bad that in 1834 a group of 18 New York bank-

ers memorialized Congress that the silver dollars of Mexico, Colombia, Chili, and Peru likewise be made legal tender.

Something had to be done.

Some of the best minds of the period entered public arguments that a bimetallic standard was inherently instable, due to the near certainty that the market ratio would drift away over time from whatever new Mint ratio was set. Stability, according to them, was to be found in monometallism. It is interesting that most of these people favored a silver standard.

But the Congress of the United States was not ready to discard the facade of bimetallism. The Coinage Act of 1834 adopted the ratio of 16 : 1. Members on the floor pointed out that from all that was known of market ratios around the world this legal ratio would drive out silver. The press frequently referred to it as the "Gold Bill" during debates. It is certainly not impossible that recent discoveries of gold in North Carolina and other southern states stirred the minds of some congressional proponents. If so, it was far from the last time that regional political motives would impinge on the monetary policy of the sovereign United States.

In any case, Congress went into this situation with its eyes open. Unlike Hamilton (who, with expediency but undoubted sincerity, tried to match the legal ratio with the market ratio), Congress was well informed that it was overvaluing gold. The market ratio of London was published by Pixley and Abell as 15.7 : 1.

The act was passed in June 1834, and by autumn gold was moving to the United States in such volume that alarm was felt in London about the reserves in the Bank of England. The very process by which gold came into the United States took silver out of use. The sudden contraction of silver currency caused a great public inconvenience, since the small coinage of man-in-the-street commerce was largely silver in composition.

To complete the record of the shift from silver to a de facto gold standard, we should note that by a supplementary law in 1837 the proportion of alloy for both gold and silver coins was made equal. In this manner the de jure ratio became 15.98 : 1.

As epochs go, the discoveries of gold in California, Russia, and Australia came about the same time. Combined world production on an index base of 1930 = 100.0 rose as follows.

Year	Index Gold Production[1]	Gold/Silver Ratio
1849	8.5	15.78 : 1
1850	8.5	15.70
1851	19.4	15.46
1852	30.0	15.59
1853	35.1	15.33
1854	28.8	15.33
1855	30.5	15.38
1856	33.4	15.38
1857	30.1	15.27

In the adjoining column are the average annual ratios of gold to silver from the authoritative Pixley and Abell tables reflecting world market ratios based on London. One seldom sees historical monetary statistics match so closely theoretical expectations.

No one could have foreseen it during the debates of 1834, but almost any ratio that might have seemed reasonable then would have been seriously out of equilibrium by 1851. The outpouring of gold in the 1850s was unlike anything in the world before. On the same index base as above, New World production from the Americas in the sixteenth century was a trivial 1.3 annually.[2]

When the Mint ratio went to 16 : 1 in 1834, a slow substitution of gold for silver was put in motion. This was hugely accelerated in 1850 and thereafter. Not only did existing silver coins slither out of circulation as Gresham's Law worked vigorously toward their melting or exportation, but in 1851 and 1852 less than $1 million in new silver coinage was carried out by the Mint. Because subsidiary coinage had been tied to silver since 1792, Gresham's Law took jurisdiction over even the smallest silver coins, and their disappearance seriously embarrassed even trivial retail transactions.

(We might note here that although the United States had been on a dual standard of gold and silver since 1792, the first gold dollars were not coined until 1849.)

In 1853 Congress took an action that did not address the viability of bimetallism at all. With visible relief Congress seemed to accept the de facto gold standard based on 16 : 1. Whether to change the legal ratio to

[1] R. W. Jastram, *The Golden Constant* (New York: Wiley, 1977), Appendix C, p. 224.
[2] Ibid.

match the new market relation was not even called into question. Bimetallism was allowed to stay on the books either as a harmless anachronism, or because no one wanted to risk the fuss of removing the form when the substance had already been achieved.

As Mr. Dunway, who was steering the measure through the House, unequivocally said on the floor, "We have had a single standard for the last three or four years. That has been, and now is, gold. We propose to let it remain so, and to adapt silver to it, to regulate it by it."

One further quotation from the floor is irresistible: "I defy successful refutation . . . that the quantity of gold may be increased upon that of silver without changing the relative commercial value of the metals." The speaker of this silly statement was to be the seventeenth president of the United States.

The task of the act of 1853 was to tidy up the unfortunate situation concerning the subsidiary coinage mentioned previously. The net effect was to legislate that 100 cents of the small silver coins would be worth less than the value of the gold dollar. In this way the small currency was made immune to any reasonable fluctuations that might be foreseen in the value-ratio between gold and silver as bullion. One significant feature of the act of 1853 was what it didn't say: it omitted any mention of the silver dollar piece, which had dropped out of circulation years before. The portent of this omission will become clear later.

The metallic currency in the United States got along very well with the system put in place by the act of 1853. As a practical matter, the gold standard had been adopted. Gold was a suitable medium of exchange for large payments. Overvalued silver coinage stayed out in the open to handle small transactions. The precious metals as money probably would have gone along very well had it not been for the Civil War.

The Legal-Tender Act of February 25, 1862 resulted in the first installment of United States legal-tender notes to the tune of $150 million. A second act resulted in an equal paper issue on July 11, 1862. Local bank notes had circulated for decades, but these were the first paper issues of the Federal Treasury made without metallic backing. Almost immediately gold went to a premium. If one ever wants to see Gresham's Law act at its swiftest, he should watch paper money substituted for gold. Gold disappeared and it did not reappear until January 1, 1879. Gresham's Law acted even more efficiently than that. Paper drove out the small change of subsidiary silver as well.

[The period beginning with the suspension of specie payments on De-

cember 31, 1861 and ending with January 1879 is a fascinating one for a student of money. But it did not have much to do with metallic currency, and detailed treatment will be omitted here. The literature on the period is voluminous. One of the most profound studies is Wesley C. Mitchell, *Gold, Prices, and Wages Under the Greenback Standard* (1908). The present volume will deal with one aspect of the period later in the chapter on the purchasing power of silver.]

POLITICIZED CHAOS, 1873–1932

The next legislation centrally germane to the history of monetary silver in the United States is the act of February 12, 1873, while the country was still on the paper standard. This act was basically a revision and codification of the Mint and coinage laws and was of a very detailed character.

At the time, few silver coins of any denomination were to be seen. Consequently, the public was not familiar with the American silver dollar. Anyone alive had seen few—Congress included. Thus when Congress in its codification of 1873 *omitted* the silver dollar in its listing of future coins, no public attention was aroused by the omission. The legal effect, however, was that *the right of free coinage of silver at the Mint had been discontinued,* and, therefore, legal bimetallism no longer existed. When the United States returned to a specie basis on January 1, 1879, it was on a monometallic gold standard, because gold was the only metal accorded the all-important privilege of free coinage.

Later this omission was to be denounced in the most bitter terms by partisans of silver. The rhetoric itself has come to be codified under the rubric of "The Crime of 1873." The later accusations were not deserved by the Congress. Whatever they did, or failed to do, was not done with the deviousness that critics charged. J. L. Laughlin (*History of Bimetallism in the United States*, 1896) specifically addressed "the charge that silver was demonetized surreptitiously." He found that experts to whom the draft bill was sent for technical comment had pointed out the omission of the silver dollar and its consequences. This was remarked in the House by the member from Massachusetts who was in charge of the bill. At the very most it can be charged that it was "gold-standard-by-oversight,"

as if the majority of the members did not read, listen, or comprehend the bill.

Undoubtedly the reason that the act of 1873 was passed complacently (the Senate was primarily concerned with questions of abrasion, and the House with salaries of officials) was that it seemed simply to recognize again what had been de facto since 1853: that is, the United States was on the gold standard as a working matter. Great hue and much cry was raised only later when the precipitous decline in the price of silver in 1873 would have brought back a steadily increasing flow of silver dollars under the old free-coinage ratio of 16 : 1.

Another quirk occurred in the legislation of 1873, which will also lead into a larger discussion later in the book. This was the trade-dollar of 1873.

The nations of the Orient have always had a penchant for silver. World traders with those countries always had a need for silver currency to smooth their transactions. The Spanish silver dollar was the coin originally used, but this later gave way largely to the Mexican dollar. The latter contained 377¼ grains troy of pure silver. The idea behind the new trade-dollar was to put in it 378 grains so that an American coin would replace the Mexican, thus affording a new outlet overseas for silver mined in the United States.

The new trade-dollar was really an ingot shaped like a dollar and had a different stamp. The cost of coinage was charged to the owner of the bullion brought to the Mint. There was no intention that it circulate domestically. Through an oversight, however, Congress voted it legal tender power, along with all other silver coins, in the Act of 1873. This had to be corrected by an act on July 22, 1876.

Too much was made of this inadvertence when later the silver advocates assembled all the ammunition they could to fire charges that nefarious things had been done to them. It was but another slip to which the Congresses of the nineteenth century were particularly prone in monetary matters.

The period from 1873 to 1915 is one of long decline. From an index level of 346.0 in 1872 the price of silver fell to 133.8 in 1915—a decline of more than 60 percent, with very little break. Gold held its own. It was a revolution of the precious metals world-wide, and what we see here was the convolution in the United States. Let us examine its causes.[3]

[3] I shall follow the model of J. Lawrence Laughlin, of Harvard University, first published in 1886 and extended in 1896. This is one of the earliest and best ever done.

The recurring theme of the explanation is that commerce in the Western world prefers gold to silver. The rationale to account for this preference goes like this. The inconveniences of barter gave rise to the desire for money. The metals that best satisfied the desire were gold and silver. The commercial world desired that metal which was as stable in value as possible; which had considerable value in small bulk, especially when transactions were large; and which possessed other handy qualities, such as homogeneity, divisibility, and cognizability.

Steadiness of value was popularly supposed to belong to gold and was cited in Hamilton's report, for example, even when he had no supporting statistics. Moreover, in the great centers of commerce and trade, gold was preferred to silver because of its smaller bulk per unit of value. One was not eschewed for the other. But given anything like an even break, the preference was for gold. This is not meant as a finding of deep-seated research. It is an assumption on which the historical analysis to follow is based.

Both silver and gold have been monetized metals. They are also valued as bullion. As we have seen throughout history, a change in the value of one metal produces, ipso facto, a change in the other. The intimate connection of the two metals causes reflex changes. But the action of silver on gold is not the same as the action of gold on silver.

The magnitude of gold production following 1850 was the most marked characteristic of the nineteenth century. The annual yield of gold in all of history was insignificant compared with the yearly production following the discoveries in California and Australia. From a production of about $15 million a year in 1840, new supply rose to more than $150 million soon after 1850. Even more impressive are the following figures.[4]

His *History of Bimetallism in the United States* (New York: D. Appleton & Co., 1896) has long been out of print. Another very useful account, with the advantages of a latter-day look, is in D. H. Leavens, *Silver Money* (Bloomington, Ind.: Principia Press, 1939).

[4] Adolph Soetbeer, "Materialism zur Erlaukrung und Beurtheilung der wirtschaftlichen Edelmallverkaltnisse und der Wahrungsfrage," 1886. See J. L. Laughlin, *op. cit.*, Appendix I.

For consistency, and because they are generally considered to be the most authoritative, production figures will be from Adolph Soetbeer. Soetbeer, in his turn, appears to draw from the Reports of the United States Director of the Mint for the United States and for certain other countries.

Some compilers of production data have disagreed. For example, Sir Hector Hay had the following to say in testimony before the Royal Commission on Recent Changes in

Years	Gold	Silver
1493–1850	$3,315,000,000	$7,358,000,000
1851–1875	3,318,000,000	1,395,000,000

As much gold was produced in the third quarter of the nineteenth century as in all 350 years following the discovery of the Americas.

Now, because of the preference posited in the preceding, it was quite unlikely that there would be any falling off in demand for gold for money uses. The only question all along was whether the supply would be sufficient. Law can create a demand for the metal that would not normally be chosen only by overvaluing it in its legal ratio, thus making it profitable to drive the preferred metal from monetary use. The gain of the money changer can be depended on to bring this switch about.

But if both metals are put on market parity at the mint—if such a circumstance is possible for any time—it would be found that gold is preferred for large payments and silver for small payments. This is the rule of convenience of an extensive trading population.

What now needs to be explained is why, when gold came pouring in, it was silver that dropped in price.

The first thing that happened was that the ratio between gold and silver, which had risen to 16 : 1, dropped to 15.31 : 1 for a time (Pixley and Abell, 1853 and following). A second effect soon became visible. The cheapened gold began to drive out silver from the currencies of the United States and Europe. (At the former ratios, fixed before the gold discoveries, gold was overvalued at the mints.) Gresham lived again.

The matter most worthy of attention was that this exchange of gold for silver was looked on with satisfaction. Here, again, is the preference

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the Relative Value of Precious Metals given in 1886: "My figures differ somewhat from those of the Director of the Mint of the United States, for this reason, that I got my figures from the annual statement of Wells, Fargo, & Co.'s manager, Mr. Valentine, who gives the value of the production in the United States in different figures from the Mint; and I think he is more likely to be correct than the Mint figures, for this reason, that when the Mint authorities send round to the different mines to ascertain how much they have produced, it is to the interest of those mining companies to exaggerate their production a little, whereas when they send their bullion by Messrs. Wells, Fargo, and Co., all the different mines would declare a less sum because they are insured in the same way, and therefore I think that Wells, Fargo, & Co.'s estimate is more likely to be correct than that of the United States Mint Director."

This is an ingenious argument. But a person more familiar with California than Sir Hector would know that not all gold mined from the earth or streams went by Wells, Fargo. Further, some gold was produced in territories that company did not serve.

for gold that constantly persisted. One effect of this movement into gold was to prevent its price from falling as much as it might otherwise have done with the large new supplies. Another effect was to reduce the demand for silver for use as a medium of exchange in the Western commercial nations. The very cheapness and abundance of gold increased the demand for it for use as a medium of exchange and ipso facto diminished the demand for silver. This interchange of gold and silver began in the United States by 1853.

The first pronounced effect of the new gold on the currencies of Europe was seen in France.

Since 1803 France had maintained a legal ratio of 15.5 : 1. Inasmuch as the market ratio was nearly 16 : 1 between 1820 and 1850, gold disappeared from circulation and silver took its place. By 1850, the main part of the circulation in France was silver.

The great discoveries of gold exactly reversed this situation. Gold fell in value. Its relation to silver changed so that the ratio remained below 15.5 : 1 until 1867. Under these conditions a veritable revolution took place in the French currency between 1853 and 1867. With free coinage available there was a stream of gold flowing to the French mint for coinage, while silver rapidly disappeared from circulation and even left the country. During the period 1852–1864, France absorbed through direct imports about $680 million of gold and ejected about $345 million of silver.[5]

As Cairnes, the Englishman, wrote in his *Essays in Political Economy:*

> But in proportion as gold has thus found a market, silver has been deprived of one; and the 45,000,000 £ of silver liberated from currency of France is as much an addition to the disposable supply in the world, and tends as effectually to lower its value, as if it had been raised immediately from the mines.

The discarded silver of France in large measure found a home in the East.

France and the United States saved gold from depreciation to a certain extent by absorbing vast quantities from the mines. This process displaced a great amount of silver. India, for her part, now saved silver from depreciation to a certain extent by her absorption of the metal no longer in extensive use in Europe.

The willingness of India and the East to absorb apparently unlimited

[5] Report to House of Commons on "Depreciation of Silver," 1876.

quantities of silver in the eighteenth and nineteenth centuries has been remarked elsewhere.[6] The reasons are deep-seated and longstanding. The demand for silver for purposes of ornamentation was very extensive. Precious metals were highly prized for this, and the cheaper silver much desired. The other demand was for a medium of exchange. Throughout large sections of India, transactions were still carried out by barter in the nineteenth century. To escape the inconvenience of barter, silver was the best medium of exchange. The mass of the people were poor, and the transactions were on a scale so small that they could be settled only by the use of the cheaper metal.

We have seen that France expelled about $345 million of silver between 1852 and 1864. All Europe exported to the East $764 million in the same period; from 1852 to 1875 at least $1 billion of silver had been shipped from England and Mediterranean ports to India and the East. The total production of silver from the mines in the same years had not been much more than that.[7]

We have just seen how the movements of silver from the West to the East had about equaled the production of the silver mines of the West. We shall now see how gold usurped the place of silver in Germany and left the silver there to find a sale in a world market already in equilibrium.

France and India had absorbed about one-half of the new gold in the joint operation described previously. Probably $1.5 billion of the gold produced from 1850 to 1875 was yet to find a place in either the currencies or the arts of other nations. It was from this residual source that Germany proposed to help herself and thereby join the ranks of commercial states which chose gold.

At the end of the Franco-Prussian War the new German Empire planned a uniform coinage throughout its numerous small states. It was aided in this plan by the enormous war indemnity from France, of which $54.6 million was paid in French gold coin. In addition, Germany received from France bills of exchange that gave Germany the title to gold in London. Gold in these ways left both Paris and London for Berlin.

With large stocks of gold now available, Germany began a series of measures to change her circulation from silver to gold. Her circulation in 1870, apart from about 25 percent that was in paper money, was:

[6] Jastram, *op. cit.*, pp. 10–12, for the eighteenth century; House of Commons, *op. cit.*, for the nineteenth century.

[7] Soetbeer, *op. cit.*, Report to House of Commons, 1876, and French Report of Conference of 1881.

Domestic gold coins	4%
Silver coins	66%
Subsidiary coins	4%

By 1885 the amounts of gold and silver coins in Germany were almost exactly reversed.[8]

The German demand on the new gold that resulted from the discoveries of California and Australia amounted to $414 million by 1880. With the $1.16 billion coined by France, and the $440 million imported by India, this makes a total of about $2 billion taken out of the newly mined supplies of gold by what was practically a new demand arising only in these three countries.

Denmark, Norway, and Sweden, following the lead of Germany, changed their silver circulation to gold. This combined effect was to throw on the market another $9 million of silver. Small, perhaps, but a significant increment to the large supply of silver being pushed out on to world markets.

In a similar way, the suspension of free coinage of silver by the Latin-Union[9] in 1874 took another prop from under silver prices.

The reasons for the general decline of silver prices for some 20 years beginning in the 1870s have been a recurring controversy. The difficulty of cutting through a complex situation is impeded because contemporary discussions that reached print are often flawed by the partisanship and emotions of the parties concerned.

If we collect the most important factors at work, we find:

1. Before 1850 silver and gold had both been important monetary metals. The huge gold production of the next two decades supplied enough gold to displace silver in its monetary role. The substantial advantage of gold as a standard for large transactions gave it preference, and Europe went to the gold standard in the 1870s. Because of this, the monetary demand for silver in the Western world largely disappeared, leaving Asian demand only. Because there were no longer mints to support a fixed price of silver by free coinage, the price of the metal understandably dropped. Any time you knock out

[8] Adolph Soetbeer, "Gegenwärtiger Stand der Währungsfrage und die Zukunft des Silbers," April 1885.

[9] France, Belgium, Italy, and Switzerland in 1865; later joined by Greece, Romania, and the States of the Church.

the price supports for a commodity in excess supply, you can expect its price to fall.

2. The establishment of the gold standard almost simultaneously by so many nations in effect created a shortage of gold. World production of gold was constant or declining in the 1870s and 1880s, while commerce and trade were expanding. The international illiquidity that resulted was accompanied by persistent deflation for three decades following 1865. No longer pegged by free coinage, the price of silver fell along with other commodities.
3. During all of this, the world production of silver was vastly increasing. It went from roughly 40 million ounces per year in the 1860s to *four times* as much in the 1890s. An effect on price was inevitable.

In brief, then, huge supplies of new gold replaced silver in the monetary structures of the West. Of the displaced silver, India and the East diverted some, but the remainder hit the bullion markets as if newly mined. Fundamentally, it was the dramatic outpouring of gold from the new mines between 1850 and 1875 that broke the price of silver in 1876.

The reader will notice that the price of silver did not rise during the Civil War in the United States. I have not seen this remarked before, yet it is quite a departure from the norm for the behavior of precious metal in wartime. The price of both silver and gold went up sharply in England during the Napoleonic War, World War I, and World War II. In the United States, the price of silver soared in World War I and during World War II. In the Civil War, gold went to a steep premium almost immediately, but silver stayed flat. This was in the midst of the period when gold was replacing silver in the currencies of the world, with the attendant result that silver as bullion was in excess supply. We can suppose that this placated the abnormal demand that ordinarily accrues to a precious metal in wartime and that in this one instance a demonetized precious metal was not the profiteer's charm.

As mentioned earlier, world silver prices began to decline in 1873 to an extent unprecedented in history. The main cause of the decline, along with the increased mining of silver, was the shifting of the major European countries to the gold standard. Silver producers commenced to offer their bullion to the Mint to have it converted into trade dollars—an attractive deal now that the world market price for bullion had fallen so low. Under this pressure the trade dollar was divested of its misplaced legal tender and its free coinage was canceled by an act of Congress in

1876. This was tough on the silver producers in America because now there was no place to go. They turned to politics.

A truly powerful political force was assembled around the slogan "free silver." Whatever some of the fringe might have thought, this meant free *coinage* of silver. Spearheaded by the silver interests, there was a joining-up of all the inflation-minded groups, with or without label. One with a ready-made label from earlier jousts was the Greenbackers. This movement achieved congressional success with the passage in February 1878 of the Bland-Allison Act over the veto of President Hayes. This reinstated the long-gone silver dollar of 371⅜ grains fine, with legal tender status. It did not grant free coinage, however. That remained with gold, alone. Equally important, Congress attempted to support the falling price of silver by authorizing the Treasury to purchase $2 to $4 million of silver each month at the market price.

In addition, backed up by deposits of silver dollars, a new type of paper money was to be issued—"silver certificates." These came to have a large circulation, but the reference to silver was somewhat hollow since the value of the "certificate" was never dependent on the value of silver bullion. It read in terms of $1, $2, $5, and $10. The silver certificate was not made legal tender, but was made receivable in payment of all public duties and customs, which had the same supportive effect.

The support of silver proferred by the Bland-Allison Act was entirely ineffective. In 1878 the value of the bullion content of the dollar was 89 cents, in 1885 it was 82 cents, and by 1900 it had fallen to 48 cents. (In 1890 Bland-Allison had been replaced by an even stronger pro-silver law, which will be discussed later.)

Commodity prices had begun to fall in 1865. At wholesale, they were off 40 percent when the Bland-Allison Act was passed 13 years later. Following some recovery until 1882, they went into a particularly severe decline until 1894. Deflation hit the farmers most severely of all, since a series of crop surpluses marked these years. Many business firms were wiped out also, and labor disturbances became endemic. The Middle West and the South were hit the hardest. The antideflationary movement broadened its base and intensified its efforts. Expansion of greenbacks was no longer enough. Bimetallism with the unlimited coinage of silver dollars was the thrust. The emphasis was on higher prices, especially for farm products, and a better balance of economic forces—agriculture versus industry; debtor versus creditor; West and South against the East.

The movement now was backed largely by farmers and labor. It ac-

commodated itself within the Democratic party, but was leftward of party doctrine. It wanted government ownership of the railroads, for example, and financial reforms to curb the omnivorous East. It is likely that the choice of bimetallism as an antideflationary weapon was a judgment of political strategy rather than a purely rational economic choice. A majority of the official Democratic Party already favored bimetallism, and the new coalition could find a political home with a built-in strength at the polls.

On July 14, 1890, the Sherman Silver Purchase Act was passed, bearing the name of the senior Senator from Ohio who had been prominent in federal financial affairs for many years. This legislation mandated the Treasury to buy each month 4.5 million ounces of silver. This was almost double the amount actually purchased under the Bland-Allison Act, and it constituted practically the entire output of the mines in the United States. The world community of finance was shocked and uncertain. Fear spread that the country would abandon its de facto gold standard. The result was an upsurge in demand for the redemption of greenbacks and treasury notes. The Treasury's gold reserve fell below its statutory floor of $100 million by April 1893, an event of psychological importance vastly greater than the dollar amount itself. Silver fell to 65 cents an ounce and gold exports rose. The Panic of 1893 entered the lexicon of finance.

Grover Cleveland was the hero. If placation of the panic can be personified at all, it is to the second-time-around Chief Executive that credit can be given. Despite the majority attitude of his Democratic Party, he believed in strict adherence to the gold standard. When the gold reserve fell below the statutory level of $100 million, he ordered the Treasury to continue redemption of paper in gold. An event that could have been calamitous was somewhat neutralized. Further, Cleveland called Congress into special session to repeal the Sherman Silver Purchase Act. The Senate put up strong resistance, but the repeal was signed on November 1, 1893.

A sense of uncertainty about America's gold standard continued in financial circles at home and abroad. Even more pervasive was an uneasiness among the public about its day-to-day money. The banks still held gold in their vaults; this was not what the public was after. A shortage of all circulating currency developed, and the populace was made acutely conscious of the sensitive role of money in their lives as they had to scramble to find paper and fractional currency simply to go about the daily transactions of living.

By 1896 things took a turn for the better, yet the fall in the price of silver continued. In 1894 the value of bullion in the dollar was around 50 cents. Bimetallistic sentiment persisted, and free-silver advocates took control of the Democratic Party. The silver dollar—like the greenback earlier—became an emotionally charged symbol.

In 1896 William Jennings Bryan of Nebraska—an extreme silverite, reflecting his soft money constituency of the prairies—became the Democratic candidate for President. Monetary emotionalism reached its apogee in his famous "Cross of Gold" speech to the national convention:

> We will answer their demand for a gold standard by saying to them: You shall not press down upon the brow of labor this crown of thorns, you shall not crucify mankind upon a cross of gold.

As it turned out, William McKinley was elected. The "free-silver" political movement never recovered.

In the hindsight of history, it is tempting to say that both the Bland-Allison Act and the Sherman Act failed, since the price of silver continued to fall after each of them. But we should remember that they both had a larger constituency than the immediate silver interests. That larger constituency was made up of the antideflationary forces—a variegated lot. Splinter political groups were the Greenback Party, Greenback/Labor, and the Populists. Many Democratic affiliations were included, even such spearheads of the Republican party as Senator Henry Cabot favored free coinage of silver.

The antideflationary forces had a common focus and a rational point of view, given their circumstances. The prolonged period of falling price levels had caused much hardship among farmers and debtors generally. To them the free coinage of silver promised cheaper money and a reversal of the punishing price decline since 1865. The appeal was especially strong to the agrarians of the West, who found their products selling at low prices and their liabilities for interest and mortgage payments remaining fixed in gold dollars.

To all the antideflationary forces in this coalition, the Bland-Allison Act must have seemed successful. We know now that the wholesale price index number was turned around from its decline since 1864 and remained higher for 5 years until 1885. Thus the first silver bill must have appeared as good medicine for failing prices. This would serve further to explain why the antideflationary people backed the second stronger silver bill. If a little is good, more is better. This time it did not turn de-

flation around, and the price of silver itself took a downward trend until 1915.

Following the election of 1896, the silver question began to drop out of the limelight. First the Spanish-American War in 1898 brought a temporary boom that softened the memory of the hard times of the earlier 1890s. Then the expanded gold production of the world, the increasingly efficient use of bank credit, and the concomitant rise in commodity prices, sapped the arguments of the antideflationary silverites. On March 14, 1900, Congress passed the Gold Standard Act. This legislative recognition of a de facto situation that had prevailed for a quarter of a century ended the struggles of a monetary standard.

Any book on silver seems obligated to recount the dreary procession of international conferences during the latter part of the nineteenth century. These are identified as:

Paris Conference	1867
Paris Conference	1878
Paris Conference	1881
Brussels Conference	1892

The first was called by Napoleon III, basically to attempt the establishment of a universal monetary system based on the French franc. It failed. The next three were initiated by the United States (in 1881 France was co-sponsor) essentially to push silver. They failed.

Some writers see in these conferences recognition by Europe that the United States was to become a leader in monetary affairs. As I read the record, she was accepted as a parvenu in international finance: too big after the Civil War to be ignored, but not sufficiently sophisticated to be at all convincing. Germany did not come in 1878. By 1892 most countries did not even send monetary experts, but slid by with the attendance of their resident ministers to Belgium. There was thinly disguised resentment that the United States would once again pester everyone about silver.

I do want to take some space to reproduce a small portion of the official *Journal* for the Conference of 1878 in order to show how ineffectual was the representation of the United States. I quote verbatim, with some indicated omissions. Mr. Groesbeck, representative of the United States is first reported by the *Journal:*

From 1792 to the day when, by a sort of inadvertence, in 1873, the Silver Standard was suppressed, not a merchant, not a banker, not a manufacturer, not an establishment, nor an interest of any kind, could be cited as having raised any objection to the simultaneous use of the two metals. . . . In 1873, in a law which did not very accurately carry out its purpose, Silver was made to disappear through inadvertence rather than intentionally, by omission to say anything about it.

Mr. Goschen (Great Britain) expressed the desire to know precisely what significance was to be attached to the word "inadvertence," which Mr. Groesbeck made use of in saying that the demonetization of Silver in the United States in 1873 had been a surprise to the public.

Mr. Groesbeck replied that by "inadvertence" he meant that the American public had never been asked whether they wished Silver to remain Legal Tender . . . a considerable number of members of Congress had confessed to him that, at the time the decision was made in 1873, they had not known what they were doing.

Mr. Feer-Herzog (Switzerland) remarked that long before the Law of 1873 Silver had disappeared from circulation in the United States; the actual circulation consisted of Gold and Paper Money. . . . As to what Mr. Groesbeck had said of "inadvertence" in consequence of the Law of 1873 had been passed, and of the surprise which the effects of the Law were supposed to have provoked in consequence, Mr. Feer-Herzog laid upon the table documents relating to the preliminary preparation of that Law—documents published by the Government of the United States. It appeared, he said, from these documents, that it was not by a mere accidental oversight, but voluntarily and with reflection that the suppression of the Silver Standard was determined upon.

It is, therefore, said Mr. Feer-Herzog, difficult to admit that there was any inadvertence; and as for subsequent surprise, that seems hardly more admissible. Mr. Groesbeck has spoken of the re-establishment of Silver by the will of the people of the United States. But the practice of *plebiscites* is not known in the United States. The people, as a body, are never called upon to pass laws themselves, and there is no special argument against the Law of 1873 to be drawn from the fact that the people were not consulted at its adoption. This is the fate of all laws.

Thus at one and the same time the representative of the United States made himself and his country's Congress look silly. He also received a lecture on the elementary civics of his own country by the delegate from Switzerland. Since all this took place before the delegates assembled—and at the first working session of the Paris Conference—it is no wonder that the United States case for silver was not adopted and the whole conclave a failure.

The exchange reported is illustrative of a broader point I wish to make: in the nineteenth century America was exceedingly naive in the public practice of money. We exported this naivete to every foreign conference we attended. Nor was this confined to the nineteenth century.

Even before the United States became a nation, its social conflicts often had their origins and fuel in financial disputes. Whereas European countries have had their politics flavored by warfare for centuries, our social and economic history can largely be written in the language of finance. The political passions surrounding the post-Civil War monetary debates alone can justify this characterization.[10]

It is not an easy period to understand. There was never the clear-cut dichotomy between "capitalist" and "worker," "industrialist," and "farmer," that an oversimplification of history might like to ascribe. However, this time period will be easier to understand (or, at any rate, describe) if we adopt two definitions at the outset:

Soft money describes those who resisted resumption of specie redemption of "greenbacks" and the deflation of commodity price levels that it implied.

Hard money denotes those partisans intent on redeeming paper with gold, if not abruptly, at least eventually.

The legal genesis for turmoil was the Legal Tender Act of early 1862 (specie payments for paper money were suspended December 31, 1861). There was an outpouring of inconvertible paper money with only the promise that the government—a government that might not even survive a civil war—would somehow redeem it some day.

In 3 years (1862, 1863, and 1864) wholesale commodity prices leaped by 117 percent—an *annual* rate of +39 percent never matched before or since.

The price of gold responded with alacrity. By 1864 it had more than doubled by undergoing an annual rate of +84 percent.[11]

At the end of the Civil War the atmosphere seemed favorable for restoring the redemption of paper by gold. To this end the Treasury began to reduce the volume of greenbacks in circulation. However, when

[10] Irwin Unger, *The Greenback Era* (Princeton, N.J.: Princeton University Press, 1964) is very good on this subject.
[11] Jastram, *op. cit.*, p. 160.

the war boom began to fade in 1867, the latent economic divisiveness of the public began to show. The Democrats (joined by many Republicans) whose stronghold was the agricultural states of the West quickly adopted an antideflationist posture. Early in 1868 Congress put a halt to the reduction in greenback circulation, which had been reduced from a peak of $450 million to $356 million. Incessant speculation in gold received a new incentive.

All we need in this politico-financial drama is evil personified. It came as a pair: Jay Gould and James Fisk. Gold speculation had been a regular thing ever since the cessation of redemption in December 1861, but it was this pair who audaciously tried to corner the entire market on gold. These men, already with a reputation for financial ruthlessness, might have gotten away with it. But the federal government finally caught up with what was going on and on September 24, 1869 ordered the sale of its own gold on the public market. Within 15 minutes the price fell from $162 to $138. Color entered the lexicon of finance: "Black Friday."[12]

The long-run effects of a political character were far more significant than the immediate monetary consequences. The populist political battle over the currency of the United States was beginning to shape up, and what was needed to bring it to an emotional pitch was identifiable villainy. Gould and Fisk epitomized the rapacious financiers of the East.

After Black Friday the gold rate of the paper dollar consistently improved because U.S. commodity prices fell. There was severe monetary restraint, and the growth in money did not keep pace with the growth in output. There was also a large inflow of foreign investment. Then abruptly in early 1873 this was replaced by an international depression.

In a roundabout way the depression of 1873, lasting about 4 years, led to the redemption of the greenback. Blame for the depression was placed on the Republicans—long in power—and the Congressional elections of 1874 went to the Democrats. The Republicans, in the main, were hard money people. As a dying act of this "lame duck" session on January 14, 1875 they passed the Resumption Act. The Treasury on January 1, 1879 had to stand ready to pay out gold coin for greenbacks.

When the Democrats came in they had the voting power to repeal the

[12] It is curious how these designations stick and gain currency. In my own generation one can say "Black Thursday," "Blue Monday," and "Black Tuesday" and all moneymen know each financial crisis involved.

act, but not the determination. Their only objection to soft money at the time was to prohibit a further withdrawal of greenbacks. The circulation was fixed at $346,681,000 in May 1878.

John Sherman, Secretary of the Treasury under Hayes, engineered the return to the gold coin standard. He was aided by a strong balance of trade in favor of the United States occurring toward the end of 1876 and by large foreign investments. The dollar strengthened sufficiently so that by the end of 1878 the gold premium had disappeared. Literally the next day the Treasury was ready to pay out gold for paper with no perturbation at all. Ironically, on that first day of legal redemption, more greenbacks were asked for than gold.

This matter of monetary economics illustrates the central role of such problems in American politics. The redemption of greenbacks was the chief issue in the vigorous debates of the elections of 1874. Even so, in the view of many, the then existing political parties were not sufficiently single-minded in their quest for monetary solutions to national problems. So between 1874 and 1876 the Greenback party was formed. It stood, of course, for new issues of legal tender notes—for soft money. Striking an alliance with certain labor groups, the Greenback/Labor party cast more than one million votes in the Congressional elections of 1878.[13]

The party anthem went like this:

> Thou, Greenback, 'tis of thee,
> Fair money of the free,
> Of thee we sing.
> And through all coming time
> Great bards in every clime
> Will sing with joyful rhyme,
> Gold is not king.

Surely it would be difficult to find another country where torchlit parades chanted praises of a particular monetary standard above all others. But the hard money advocacy of the Republicans, and the soft money of the Democrats, were both tunefully accompanied. The electorate as a whole may not have been very sophisticated in federal finance, but they were surely vociferous.

It was now that the trade dollar of 1873 was to cause tremendous controversy. It had been created as a minor part of the Coinage Act of Feb-

[13] See Arthur Nussbaum, *A History of the Dollar* (New York: Columbia University Press, 1957) for an interesting account of the whole period.

ruary 12, 1873, and, with innocent inadvertence, had been given legal tender rights and free coinage along with a whole list of subsidiary silver coins expressly intended for domestic use.

As we discussed earlier, in 1873 silver market prices began to decline. They were soon to fall with a speed, and to a depth, unprecedented in history. Silver producers began to offer their metal to the Mint, rather than the market, at what were by now comparatively handsome prices in the form of minted trade dollars. Because of this flow, for a purpose which was never within Congressional intent, an act of 1876 removed trade dollars from legal tender and canceled their free coinage.

This evoked a tremendous reaction, joining the silver interests with the various inflation-minded groups. It will be recalled that the act of 1873 (by omitting to name it in future coinage) also eliminated the domestic silver dollar—unseen for many years. This passed quietly at the time, but it was a ticking bomb waiting to explode when the world price of silver took its unprecedented fall. Now all of those whose interests aligned with silver for one reason or another joined in double indignation; silver had been struck from historical bimetallism *and* the silver trade dollar had been removed from legal tender. Prestigious papers carried the message that the demonetization of silver was a plot to defraud the good people of America for the benefit of creditor interests. Now the cry "The Crime of 1873" was coined; the "Dollar of Our Fathers" had been surreptitiously removed. Americans always have been fond of the conspiracy theory of history.

After the closing years of the nineteenth century, silver fitted into its new place in the monetary system without any resemblance to its tumultuous times in the two score years before.

The demonetization of silver was not the end of silver as currency since it circulated as subsidiary coinage. The reduction in the weight or fineness of subsidiary coins had placed their metallic value safely below their monetary value, so that there was no danger of their withdrawal from circulation. In fact, after its demonetization it was used in aggregate quantities larger than before, so much was the expanding need for small change.

Regardless of its more extensive use, the annual average price of silver declined. From $0.621 per fine ounce in New York in 1900, it fell to $0.563 in 1914. A principal reason for this decline has to do with a pe-

culiarity of mining the metal. The low levels of silver bullion prices since the great decline into the 1890s made the mining of *pure* silver in the United States unprofitable, with very few exceptions. It came to pass that nearly all silver produced came as a by-product of the base metals, such as zinc, lead, and copper. The supply of silver was contingent, therefore, on the demands for these other metals and was affected very little by the price of the precious metal itself. Under these circumstances, the price of silver could be falling, and yet more and more silver supplied so long as the demand for the base metals was increasing. By the same token, a falling price of silver would not necessarily shut off supply. In the early 1900s the base metals were booming. Predictably, the supply of silver increased, so much so that its price fell even though the demand for its use as coinage was increasing.

The spike in the chart for silver prices from 1915 through 1920—so swift, so sharp, so short—had no match in the recorded history of precious metals to that date. The phenomenon was world-wide and war related.

By 1914 only China and a handful of small states remained on the silver standard. Silver was still important as money, but mainly as a subsidiary coinage throughout the world.

The price of silver held low into September 1915. Then by May 1916 it went to 77.25 cents an ounce, higher than it had been since the closing of the mints of India to silver in 1893. In the spring of 1917 a sharp rise resumed culminating in a new peak in September of $1.085. After the Pittman Act was passed in April 1918 (an event to be discussed later), joint action of the British and American governments pegged the price at close to $1 until May 1919. When this joint action was terminated, silver exploded to $1.375 in November of 1919.

There was nothing mysterious—no esoteric monetary event—accounting for this rise. The index of wholesale commodity prices went up by +127 percent from 1914 to 1920. Demonetized silver reacted like most other commodities and soared as well. At the same time, however, something special was happening to silver on the supply side—civil war in Mexico. In the years 1914–1917, annual Mexican production *fell* by about 45 million fine ounces from its earlier yearly rate of 75 million. Since prewar world production had been of the order of 225 million annually, this alone represented a −20 percent decline in supply of new silver at the time the world was demanding more.

Much of this enhanced demand arose from silver as a subsidiary coin-

age in all countries, belligerent or neutral. All over the world more people were working than ever before. Their wages were rising as well. Money was pouring into the hands of people who had no idea of bank accounts and little trust in paper notes, whatever was printed on them. The demand for coins, especially the comforting silver, burgeoned. Correlative with this was the effect of rising prices for consumer goods. A larger amount of pocket money *per person* was needed just for the ordinary street commerce that hordes of people were newly engaged in. To pin the situation down with numbers, the coinage of subsidiary silver in the United States was $5 million worth in 1913 versus 29 million in 1917. As late as 1920, new subsidiary silver coinage added up to $25 million in the United States alone.

Affecting world prices also were the demands of India and China. Operations by Indian troops in what were then Mesopotamia, Persia, and East Africa were financed from India in silver rupees. Its government made large purchases in the open market and under provisions of the Pittman Act of 1918 obtained 20 million ounces from America alone.

China, a latecomer to wartime trade, was not an early factor. But by 1918 her trade was increasing, more of her traditional currency was needed, and from that year through 1920 China absorbed about 200 million ounces of silver.

In the autumn of 1917 the government of India was in bad shape. Her problem was a severe shortage of silver both to provide for adequate rupee circulation and to back her paper money in the form of reserve. The Indian Army, and the civilian base to back it up, was of utmost importance to the British war effort. If more silver could not be procured for India, there were real dangers of civil uprisings and a consequent collapse of a military effort on which Britain and her allies had come to depend. Secretly, therefore, the British Government opened conversations with the United States in order to arrange control over its silver production and some form of rationing it out at a fixed price.

Quiet conferences were held with American silver producers and consensus emerged that $1.00 per fine ounce would be a fair and effective price to bring forth the supplies required. The average price of bar silver in New York in 1917 was $0.84, so that the premium offered was a hefty margin for many producers. But the higher figure was settled on to allow a sufficient number of high-cost mines to operate in order to assure the sensitive requirements of a far-flung military operation. As so often is the

case, military exigencies lead to excess profits, and the silver producers of America were never known for their self-sacrificing attitudes toward the greater good. Granted, they were not alone.

The overriding consideration was to get swiftly to India enough silver to satisfy her needs. The amount of silver that could be allotted from fresh American production fell far short of this requirement. The idea arose that some of the 500 million silver dollars reposing as a reserve in the Treasury against the silver certificates in circulation should be released to meet the emergency in India.

To the dispassionate observer this might have seemed a good time and way to get rid of this stock of silver dollars permanently, since they were something of an anomaly in a gold standard country. But the silver senators were not dispassionate. Their support was contingent on a provision that the replacement of the silver dollars in the Treasury should be made when silver once again became available from domestic production. The price of $1.00 was settled on for present sale and subsequent repurchase. The actual bill was drawn up by the Treasury and the Federal Reserve Board. Not surprisingly, the favor of signing it was bestowed on Senator Key Pittman of Nevada.

From 1919 to 1932 the price of silver fell in New York by 75 percent. The prices of common commodities at wholesale fell by only 53 percent. Again, the reasons for the drastic change in silver prices were not subtle. This time the bottom simply fell out of demand.

At an average annual rate, the decline in silver was the greatest in recorded history to that point. It happened neither all at once nor smoothly. An examination of monthly data shows three separate breaks: 1920, 1926, and 1929–1930. In between prices were fairly stable—like a stepped function in mathematics.

By the first quarter of the twentieth century silver had become a speculative metal. The extraordinary wartime rise enhanced the speculative motive. Thus the first break in price in February 1920 anticipated the collapse of the postwar boom.

Fairly constant silver prices prevailed from 1921 to 1926, but deflationary forces were building up. With respect to supply, production had fallen off to about 160 million ounces in 1920 and 1921, increased to the order of 250 million by 1923, and continued at that volume through 1930.

On the demand side, little change took place. The Pittman Act coin-

age absorbed American silver until mid-1923. In 1924 European coinage demand offered some support. After a decrease in 1921, China and India again took a combined total of 150 million ounces annually.

Then in 1926 the report of the Royal Commission on Indian Currency and Finance appeared. This preordained a sale of at least 200 million ounces of demonetized silver from rupees over the next 10 years. The announcement alone precipitated a 10 percent drop in price.

By 1931 world-wide depression had cut the import of silver by India and China in half. In the next year it was cut by one-half again. In 1933 India had a net absorption of only 10 million ounces, while China actually exported 15 million.

The depth of the Great Depression found the world's two best customers effectively out of the market for silver. The price was low, indeed; only speculative demand kept it from going lower. The "Unaccounted For" category in the world statistics for silver is thought to be made up largely of stocks held on speculative account. In 1933 this was the largest single category in the tabulation, and it stood for more than it ever had in respectable statistical history (see Handy and Harman, *Annual Reviews of the Silver Market*).

A NEW DEAL FOR SILVER

Franklin D. Roosevelt ran for the presidency in 1932 on the promise of a "sound money" policy. So had every successful candidate since Jackson. Yet he was to promulgate and promote some of the most experimental monetary measures ever undertaken by a major nation, especially if one thinks of them as weighted by the size of the domestic economy affected and their international ramifications. In the public memory of money he is most noted for taking the United States off the gold standard and embarking on a program of the managed dollar. He experimented with silver as well.

Incidentally, following on this reference to gold, it is fair to mention that Roosevelt did not personally mislead the electorate by saying one thing in the campaign and doing another when a sitting President. The Democratic platform supported the gold standard, but Roosevelt the candidate never mentioned it in his speeches. His references always were to "sound money," a compromise rhetoric that was to allow him to judge

what soundness meant and how it was to be achieved. But back to silver.

The times of crisis and depression that marked the early 1930s politicized silver in a manner reminiscent of the latter part of the nineteenth century. There was an inflationary sentiment typically engendered by falling commodity prices. A new question caught hold in public discussions: How could a gold standard plus the vaunted Federal Reserve System have allowed this crisis to occur? How could money be so scarce, credit so sparse, and prices so low? The one element missing was silver. There was a national bombardment of proposals to repair this omission. Although the verbiage differed, and side issues proliferated, the underlying thrust was twofold: the mining interests wanted a higher price for their product, and the debtor sector hoped to ease the grip of the East on the money supply of the country. *The Economist* said on August 18, 1934 that silver was "the vehicle through which the agricultural states have expressed the age-old demand of the agrarian debtor for an increase in currency."

The world was now, however, much more an economic piece than during the silver forays of the nineteenth century, and the plethora of silver proposals had a heightened international cast. In general they had four discernible themes:

1. To guarantee a market for silver produced in the United States, preferably through programs underwritten by the government.
2. To raise the world price of silver.
3. To achieve international agreements on silver, primarily to prevent the dumping of bullion on the world market and to make silver acceptable in the payment of war debts.
4. To expand the currency of this country.

The demagoguery had ranged all the way from the gentle protestations of President Hoover in Salt Lake City that he "liked miners, especially of silver," to Senator Burton Wheeler's apocalyptic "The nation must adopt bimetallism or face bolshevism." All the actual measures advanced showed the parentage of the Sherman Purchase Act of 1890.

Roosevelt was inaugurated on March 4, 1933. In the words of Allan Seymour Everest, "The new President did not so much formulate the policies as compromise or accept the plans of others; even during the first few months, in the treatment of silver accompanied by all kinds of in-

flationary proposals, he was either unwilling or unable to control the monetary program, which at times threatened to run away with him." Roosevelt, in terms more generous to himself, perhaps recognized this same attribute. Speaking before the Commonwealth Club of San Francisco he said, "Government includes the art of formulating policy and using the political technique to attain so much of that policy as will receive general support; persuading, leading, sacrificing, teaching always, because the greatest duty of a statesman is to educate." For all of the reputation he was to build as a leader, Roosevelt had a real sense of the strategic importance of compromise. "He thoroughly understood the political necessity of retreating on occasion in order to go forward. With a perfect sense of timing, he knew the point at which compromise must begin, and he usually was able to advance one part of his program at the expense of concessions in some other direction." (A. S. Everest, *Morgenthau, The New Deal and Silver: A Study of Pressure Politics*, Columbia University Press, 1950. This valuable little book shares the insights of Roosevelt's Secretary of the Treasury, because the author had access to Morgenthau's personal papers, including his diary and press conferences.) This sense of compromise we shall see time and again in Roosevelt's treatment of the silver issue.

The first real action the new President took on silver was by proclamation. Carefully timed to follow the closing of the investment markets in San Francisco, Roosevelt proclaimed on the evening of December 21, 1933:

1. Mints would receive for coinage into silver dollars any silver thereafter mined in the United States.
2. Mints would retain 50 percent of the silver as seigniorage that would not be disposed of, except in the form of coin, before December 31, 1937—the expiration of the proclamation, unless repealed or modified by act of Congress or by subsequent proclamation.

There were at least two highly inventive aspects to the substance of the proclamation.

For one thing, the method of stating the return to the producer was interesting. The seigniorage of 50 percent meant that for every 2 ounces of fine silver he deposited at the Mint he got back 1 ounce paid in the form of silver dollars. In effect, he was paid $1.29 for 1 ounce. But since he got back nothing for the second ounce, his net return from the transaction would be 64.5 cents per fine ounce. (The "monetary" value of

$1.29 is arrived at by taking $\frac{1}{16} \times 20.67$, the latter being the mint price of gold per ounce at the time.) This was ingenious because it avoided explicitly setting a price for newly mined silver and yet promised the approximate level at which the producer would be rewarded.

For another thing, the cost to the government was nil. The Mint would simply place its dollar stamp on a piece of silver worth, at the time, about 33 cents in the market and turn it back to the producer. At the same time the government would receive another 33 cents worth of silver for its own, which it could stamp as a dollar and add to its revenue. The mines got a silver dollar for 66 cents worth of silver at market. Thus 34 cents profit for the miner and a potential $1.00 profit for the government were created on the basis of every 66 cents worth of silver to be mined in America. (Dickson H. Leavens, *Silver Money*, Principia Press, 1939, is very good on this whole period of Roosevelt.)

In making his proclamation Roosevelt drew on the authority, somewhat dubiously, of the Thomas Amendment to the Agricultural Adjustment Act of May 1933. The relevant passage authorized the President to reduce the weight of the gold dollar not more than 50 percent, to fix the weight of the silver dollar at any ratio to that of the gold dollar, and to provide for the unlimited coinage of both metals at the ratio so fixed. It also provided that such a new gold dollar should be the standard unit of value and that the Secretary of the Treasury should maintain all forms of currency at a parity with it. The potential hitch was that the Thomas language provided for the *unlimited* coinage of gold and silver, whereas the proclamation *limited* the coinage of silver to one-half the newly mined silver in the United States. Such was the popularity of the new President in and out of Congress that no one was inclined to hold him to the strict letter of the law.

After persistent pressure by Congress and responsive compromise by the Administration the Silver Purchase Act was signed on June 19, 1934. It had six principal features, a recounting of which serves to reflect the give-and-take between the hard-core silver interests who wanted to mandate and an Administration that wanted to avoid mandatory action.

1. Silver was to be augmented in the monetary stocks of the nation until one fourth of the monetary value would be in silver, along with gold. This implied 1.2 million ounces of silver at the current holdings of gold. But before 1934 was over, gold stocks had increased so

hugely that 125 million added ounces of silver would have been needed to attain the legislated goal.

2. The Secretary of the Treasury was to purchase silver until this proportionality between gold and silver was reached. However, the Administration retained discretion over the conditions of purchase and the rate of accumulation. The one exception specified was that no more than 50 cents an ounce be paid for silver already in the country on May 1, 1934. The Administration was almost paranoid about rewards to speculators who might have joined in the pro-silver agitation. A previously decreed purchase price of 64.5 cents for newly mined silver was not altered. And the Act did not put any limit on the price for foreign silver.
3. The Treasury could sell silver only when it exceeded one fourth of the country's total stocks or when the market price exceeded silver's monetary value of $1.29. Neither condition seemed very significant: the first because of the huge gold purchases, and the second because current market price was less than $0.50.
4. The Treasury was to maintain a circulation of silver certificates with a face value equal to the cost of all silver purchased under the Act. One hundred percent silver backing was required and all such certificates were to be legal tender.
5. The Treasury was granted the power to regulate silver trading. The Act did, however, impose a 50 percent tax on the profits from silver trading. This was at the behest of the Administration and was intended to limit the profits of speculators who might go long on silver in expectation that the Treasury would purchase at increasing prices.
6. The Treasury was given the discretion to nationalize the total silver stock within the country.

The structuring of the Silver Purchase Act of 1934 was an instructive exercise in the craft of political control. What the Administration wanted was put in as a mandate; what the Administration conceded was written as permissive. The key clauses in item 2 were a good example of the latter. The Administration knew that it had to give support to silver as a political matter, if nothing else. But the rate at which it would purchase and the price it would grant were left to its own discretion. Even the quantitative goal of its aggregate purchases was a moving target, tied to

the total accumulation of gold. The Administration exercised independent control of the latter through authority that was entirely independent of the Silver Purchase Act, itself.

Suspicions of a substantial portion of the silverites were aroused when the Administration tipped its hand that it was not going to use the inflationary potential of the Act to its maximum. The Secretary of the Treasury announced in a press conference that (a) it would issue the new silver certificates on the basis of actual costs of purchasing the metal, and not on the statutory monetary value of $1.29 (the Act had been ambiguous on this point), and (b) it would retire Federal Reserve notes to match every new issue of silver certificates.

On the score of the purchase program, permissive as it was, the silver interests really had no ground for fear. As part of the context of compromise to get the bill passed at all, the President had orally committed himself to execute the Act "enthusiastically and in the spirit in which it was enacted." Taking this clue the Secretary of the Treasury treated the purchase program as an obligation to Congress. But in the administration of the Act what was pressed forward in many small ways was opposition to speculative benefits from government action and the stifling of any tendency toward substantial inflation.

On June 28, 1934 the Treasury slapped an embargo on the shipment of silver from the country except under license. The extent of such prior shipments was not even known. The precipitous ban came from intelligence reports that silver was being shipped abroad where it could be sequestered from possible nationalization, hence be available to reap the foreseeable profit resulting from large-scale American buying.

Before going on summer vacation, Roosevelt gave confidential instruction for the nationalization of silver. This was to take place as soon as the price reached 49.5 cents. Nationalization was triggered early on the day of August 9, when the Treasury, with a series of dramatic purchases, forced the market price up to the necessary level. If you are going to nationalize, do it swiftly was the rationale of that Department.

All during the period of silver purchases their quantities, sources, and prices were secrets of the Treasury. Morgenthau concealed these details for two principal reasons. One was a fear of the effects abroad, where an exact knowledge might promote speculation and other distortions to the program. The other dealt with domestic politics. As it was, the Silver Bloc took every opportunity to goad the Treasury into a more zealous per-

formance. Clearly this gadfly role could be all the more irritating politically if the silverites knew the daily details.

August of 1934 became the turning point into heavy silver purchases on the open market. More than 48 million ounces were acquired through nationalization and from domestically mined supplies. During the following 6 months the average open-market purchase was 240 million ounces. Purchases were made all over the world through various private agencies, such as Chase National Bank and the firm of Handy and Harman—all details kept secret. Only in the case of Mexico did government deal with government.

The United States was in control of the buyers' market world-wide. Its purchases slowly forced up the world price. By mid-October the price passed 55 cents, then kept a plateau for several weeks. The President informed his Secretary that he wanted a price of 64.5 cents by the time Congress met. The President did not get all he wanted; there was just not enough time. But heavy purchases continued sucking up silver, causing serious dislocations of finances in China, Mexico, and Peru. China will be used later as a horrendous example of the destablizing effect of these massive purchases.

Silver purchases by the United States had gradually led an optimistic world market upward to a price of nearly 64.5 cents. By a proclamation back in 1933, this was the maximum the Treasury could pay for newly mined domestic silver. Out of a general agreement that the domestic price should be raised, Morgenthau proposed a 5 percent increase to 71.11 cents. This kept the lid below 72 cents, an evaluation on which the Mexican peso was based. A higher figure would devastate that country's monetary system. Roosevelt agreed and proclaimed the figure Morgenthau wanted.

This advance of the American domestic price spurred speculation in the London Market, where a new high price was reached. Such speculation began to worry the Treasury. Then in one of those aberrant moments of history, the Secretary of the Treasury heard the garbled contents of a United Press release on the night of April 24. In anger, he recommended a further price rise to the President. Within half an hour the sovereign United States was offering 77.57 cents for silver.

The world market—already poised—leaped at this news. On the single day of April 25 it jumped 5 cents. The next day it reached 81 cents, well above the new American price. For the first time Roosevelt seemed to

realize that the American silver program encouraged a speculative world market.

Privately Morgenthau admitted that he had lost control of the silver market. During the next few days he attempted to lower market prices by making progressively lower bids in London. Not surprisingly, only small amounts were advanced for his small sums. On April 30, no one would sell to him at all.

After the April crisis silver dropped in price due to the refusal of the United States to buy at what it considered speculative prices. Whenever silver threatened to collapse Morgenthau stabilized it with sizable purchases. Typically, he bought at prices considerably below the open market and often undercut what most speculators themselves had paid for it. When he felt obliged to purchase, he employed day-to-day maneuvers designed to keep the silver interests guessing and to acquire the requisite amounts of silver as cheaply as possible.

By early December, Morgenthau was personally convinced that the silver purchasing policy was futile. Abroad, he saw that all countries but one had abandoned a silver standard for their currencies. He considered it faintly absurd that the silver standard of Ethiopia should justify a continuation of the purchase program of the United States for benefits abroad. Indeed, he visualized the program as buying up all the free silver in the world and driving every silver-using country to paper money. The President was not prepared to see a discontinuance of purchasing, but he did agree that it was time to drop the world price.

On Monday, December 9, a drastically new policy was sprung. It was Roosevelt's idea. Essentially it amounted to reversing the method of fixing the world price of silver. Before this, London (representing the world) had awaited American bids before setting its price for the day. Now signals were reversed. London would have to commit itself first. London must submit its offerings and price to the United States Treasury first each day. Then the Treasury would decide whether to accept or completely reject the whole thing.

The silver markets of the world were thrown into panic. But the Treasury suavely went about its business. Between December 9, 1935 and January 20 of the following year the world price worked down from 65 to 45 cents.

The Silver Senators viewed the new tactic with equanimity. Since American producers were still getting 77 cents for their silver, they really did not care what happened to the price in the rest of the world.

Gradually world markets settled down to something like normality, even at progressively lower prices. With the price of silver retreating, Roosevelt wanted to push it downward aggressively. Overall, a complete reversal of the Administration's philosophy of raising commodity prices by raising the price of silver had taken place. The reversal was clinched when Morgenthau showed Roosevelt a huge chart displaying commodity price indexes actually rising while the price of silver fell.

Between January 1936 and March 1938 the Treasury kept its prices for foreign silver at 45 cents. Late in March the London market weakened and Morgenthau took the occasion to drop his price to 43 cents. By this time he was thoroughly disenchanted with the silver program. He had concluded that the original purposes of the silver laws were both undesirable and unattainable. The promotion of the world use of silver was simply beyond the legitimate power of the United States to exercise. The irony of this realization is that 1938 was to be the peak year for silver, with purchases of 400 million ounces. About seven-eighths of this huge amount came from foreign sources.

This reversal of attitude with regard to the foreign aspects of the silver program naturally evoked a rethinking of the domestic operation. An option always open to the President was a downward adjustment of the price to American silver producers. After a good deal of balancing of economics versus politics, Morgenthau recommended to Rooevelt continuation of domestic purchases through June 1939 at the same price of 64.5 cents. This date was selected to coincide with the expiration of the President's broad powers over both gold and silver as originally granted under the Thomas Amendment to the Agricultural Adjustment Act back in 1933. The President accepted the recommendation and made the appropriate proclamation on December 31.

From this date until its full immersion in World War II, the silver operations of the United States government were dominated by raw politics. Roosevelt needed the support of the Chairman of the Senate Foreign Relations Committee during the long neutrality controversy in Congress, and that Chairman was Pittman of the Silver Bloc. As Allan Seymour Everest wrote, based on his access to the Morgenthau Diaries, Roosevelt was eventually forced to "buy" the repeal of the Arms Embargo Act with his concessions to domestic silver. In that bargain, Pittman carried the lead in Congress of the court-packing plan in 1937. Whatever one might think of the larger stakes involved, this was one of the least prideful episodes in our history of national financial policy. Now silver policy, which

had always been tuned to political tones in the United States, became completely politicized.

A profoundly disturbing example of how one country, for purely domestic reasons, can devastate the economy of another country can be seen by examining the effects of the U.S. silver policy on the Chinese Republic. The history of this sorry episode is replete with governmental clashes at the highest levels, Japanese skullduggery in her expansionist schemes, the collapse of trade in international markets, the ruin of countless Chinese tradespeople and—it is not too much to add—starvation among her peoples. Five hundred million people were helpless to stop a juggernaut they could not even see.

China had become the largest silver importer in the world in 1930. Since the introduction into the country of the Spanish *real* there had been a regard for silver, both as a store of value and as a medium of exchange. Copper and paper did the small business of the day but silver was the chief money for large transactions. Free and unlimited coinage of silver existed; China was one of the few countries on a silver standard.

In the 2 years following 1929 the price of silver in the U.S. fell by 46 percent. This is when the silver lobby, and a sizable segment of American business, discovered China.

In commercial circles China was viewed as a vast, dormant market for American goods whose buying power had been sharply reduced by the drop in silver prices. There was much handwringing by the silver interests on China's behalf before the Senate Committee on Foreign Relations. Obviously, to them what was needed was to help China by raising the price of silver so she could purchase more goods from abroad. Senator Pittman from the silver state of Nevada was sent to China by the Senate to study the situation. He returned to certify, not unexpectedly, that higher silver was the solution. An Assistant Secretary of Commerce, presumably an expert and neutral observer, appeared before the Committee and blamed the low price of silver for the loss of both import and export trade with China. In fact the opposite was true.

- China was a large buyer of silver. With the new low prices she was able to acquire large quantities at a savings she could then apply to her purchase of other goods and commodities. As a nation with an un-

favorable balance of trade, mainly due to internal catastrophes, a low price of silver was important to her.

- China was not prostrated in trade by the low price of silver. Between 1930 and 1931 the silver price had declined by 25 percent. At the same time the United States increased its exports to China by 1.2 percent. All the more striking because American trade to all countries except China concurrently decreased by 38 percent (H. M. Bratter, *The Silver Market*, 1932).
- Some evidence available shows that under low silver prices China had a relative advantage over the gold standard countries in terms of debilitating deflation then ravaging world-wide. The following figures[14] represent the percentage loss in wholesale prices from the high of 1929 to September 1931:

China	20.1
Japan	40.5
Netherlands	38.1
Belgium	31.3
Italy	31.0
United States	29.5
United Kingdom	29.2
Canada	28.9
France	28.3
Germany	22.0

China had suffered least of all.

- As John Maynard Keynes pointed out in a letter to a House committee, there was good reason to suppose that higher silver prices would boost Chinese imports and diminish exports by raising costs of production in world terms. This would cause China to stop buying silver and to export it instead, to make up for her unfavorable balance of trade.

What China really needed was a *stabilized* price of silver, because rapidly fluctuating exchange rates could only do great harm. Predictability of exchange rates was what the businessman needed. The prospect of

[14] From U.S. Bureau of Foreign and Domestic Commerce, *Commerce Reports*, November 9, 1931, p. 301.

rising silver prices rising arbitrarily at the hands of the United States meant further instability—the last thing the commercial world of China needed to add to its internal turmoil from war, flood, and famine.

It is sad to be reminded of popular American comments of the times. These seldom went beyond reiterating the conviction that doubling the world price of silver would double the exchange value of China's stocks of silver and thereby allow her to buy the United States out of the depression. What it did was to drag China in.

The Chinese never joined the exhortation for higher silver. Two economists at the University of Nanking summarized the statements of many when they said, "As long as China remains on a fixed silver standard, those who advocate and work for higher silver values are unconsciously working for declining prices and depression in China."

Domestic American silver aims were, therefore, basically at variance with the economic good of China. Insofar as American business representatives argued this case, they were selfish and mistaken. Insofar as the silverites played the Chinese card, they were either naive or cynical. Both groups achieved their goal in the United States, and China went into economic confusion and depression.

China's economy peaked later than the economies of most nations. China's peak was in 1931, and silver was low. Thereafter she gave way to the severe deflation that had hit earlier elsewhere and to the doldrums of diminished export and import trade. Silver, rising under American aegis, added the final destructive touch in 1933. In fact, even before Roosevelt's program had time to take effect, Chinese business was stymied by apprehension over American agitation for higher silver prices. It could not have made the Chinese feel any happier to hear the American proposals advanced as a means of saving them.

In the latter half of 1934, depression in China deepened as silver rose with American buying. Dislocation became severe with the great drain of silver from the country. This forced a contraction of money and credit leading to business failures everywhere, including some major banks. In 1934 a record volume of silver left China in legal form. In an attempt to stem this vital outflow, a heavy export tax was put on the metal in October. This was China's first step away from a full silver standard. A gentleman's agreement between domestic and foreign banks in Shanghai in April 1935 sought to stop the exportation of silver altogether. The Chinese also took the severe measure of divorcing the internal from the external price of silver. In 1935 silver was selling for the equivalent of 40

cents inside China; in the United States the price exceeded 60 cents (a particularly high year). To illustrate once again that precious metals will flow through and around all legal barriers when a profit is to be made, an estimated 173.5 million ounces were smuggled out in that year (*Finance and Commerce*, a Shanghai weekly, April 8, 1936).

Beginning in the last half of 1934 China began a series of protests against the American silver policy. In one note, the Minister of Finance requested that silver purchases be confined to silver already in America, to avoid draining vital stocks from China. This, and many such subsequent communications, were referred to the State Department. Secretary Hull was diplomatically sympathetic and continued to assure that all possible considerations would be given to the effects on China of American silver purchases in regard to place. time, and volume of such purchases. He stressed with propriety, however, the mandatory elements of the silver program as laid down by Congress.

Sino-Japanese hostilities were always a factor in the muddled American situation vis-à-vis China and her silver problems. Hull scrupulously sought an impartial position. Time and again he refused to take action that could be construed as anti-Japanese. Because of the limitations of neutrality legislation there was a constant conflict in U.S. government circles. It was obvious to all parties that China's economic condition could not be separated from her international relations, especially her difficulties with Japan. Since China's economic problems were largely monetary and were sensitive to the American silver purchases program, it was inevitable that jurisdiction should be seen differently by Secretaries Morgenthau and Hull.

Morgenthau warned President Roosevelt that American policies, especially the increased price of silver, were giving great aid to Japan by weakening China's currency position. He was constantly embarrassed by the results of the policy he was required to carry out; as he wrote in his diary, he felt as if he might as well be in the pay of the Japanese.

With the approval of Roosevelt, Morgenthau in December of 1934 assembled a group of experts to write a financial program for China. The eminent team included such figures from academia as Dr. Jacob Viner and Professor John H. Williams of Harvard. The result was a report that started out to be confidential to the President. The document emphasized the conflicting silver policies of China and the United States and made it clear that if America refused to moderate its silver purchase program it would mean the withdrawal of the United States as an active in-

fluence in Far Eastern affairs, leaving that part of the world to Japan, Great Britain, and other countries.

Not even a Roosevelt could keep such a finding from his Secretary of State. All lines of action proposed in the Viner report were opposed by the State Department, which was, however, silent on alternatives.

Morgenthau and the Treasury then formulated a program for amelioration of China's situation. China was invited to send a representative to discuss the common silver problem.

After China had accepted the invitation, opposition to the meeting boiled up in Washington. Senator Pittman declaimed that the visit should not take place unless China first entered into an agreement that silver would not be discussed—a condition that would make the entire exercise futile. Secretary Hull suggested that the visit either be postponed or canceled because of the bad effects failure would have on diplomatic relations—a wise suggestion under the circumstances.

When confronted with differing views from his chief advisors—and intransigency from a Senator whose help on other matters he badly needed in the Senate—President Roosevelt called off the visit of T. V. Soong. He suggested, lamely, that visit would not accomplish anything that could not as well be done by cable.

The subsequent communications by cable and notes came to nothing, mainly because of the friction they generated between State and Treasury, a not uncommon condition.

The series of notes came to Secretary Hull through diplomatic channels. He intended to treat them with the usual diplomatic method, a noncommittal reply. When consulted on the text, Morgenthau commented flatly that such a reply was of no help whatever to anyone, and that he was going to keep hands off unless and until Hull decided it was a monetary matter that could be handled outside diplomatic channels. In that event, he would be perfectly willing to assume responsibility and manage negotiations from the Department of Treasury.

While Hull and Morgenthau were at polite loggerheads, William Bullitt, then a commissioner from State on a roving basis, received an astonishing note from the Chinese Ambassador. He was asked to deliver it to the President personally and, most particularly, outside State Department channels. In this odd way Roosevelt learned that Japan had told China she would be willing to help her on the condition that Japan be given economic control of all China north of the Yellow River. In return, Japan would join China in fighting the U.S. silver policy.

Obviously this was news of the utmost gravity. An alignment of the two enemies to contravene America's silver policy was bad enough. But collaboration in silver could lead to a fundamental restructuring of the entire international balance of influence in the Far East. Roosevelt immediately instructed Hull to suppress his note. Apparently making a judgment that Japan's proferred succor on silver threw the whole discord into the monetary arena, Roosevelt further instructed Hull to inform China that this was a monetary matter and that henceforth Treasury would be responsible for the negotiations.

Secretary Hull never got over his resentment of what he considered Morgenthau's unwarranted efforts to intrude into the field of monetary affairs. In his *Memoirs* he wrote of Morgenthau:

> Despite the fact that he was not fully or accurately informed on a number of questions of foreign policy with which he undertook to interfere, we found from his earliest days in the Government that he seldom lost an opportunity to take long steps across the line of State Department jurisdiction.

With Treasury and State unable to cooperate, Roosevelt received no word of agreement from his advisors. Lacking this, he did not change America's course of action. China's crisis simply worsened as the United States drove silver to its speculative heights of better than 80 cents in April 1935.

At the close of October in 1935, the Chinese had reached their limit of patience—even endurance. They proposed the sale of a huge amount of silver in preparation for putting their money on a paper basis. On November 3 they nationalized all domestic silver and ordered it exchanged for paper notes.

China was the last major nation to abandon the silver standard and only she made the leap directly to paper. All others had passed from silver through gold to paper. If China was going to adopt the new managed currency eventually, at least she avoided the intermediate stage of gold, the subsequent departure from which would have brought an additional trauma of its own. This can be entered as a small plus in no way repaying for the devastating consequences of the American silver policy.

While no other country felt the full impact of the American silver program as China did, many had reason to be frightened. Spain was one

of the largest holders of silver in 1933. Her stock was in legal tender coins with a melting point at a world price of 94 cents an ounce. When America pushed the price for foreign silver to 81 cents—with a stated objective of $1.29—Spain was fearful for her currency. In rising order, Philippine currency would be threatened at 97 cents, Siam at $1.04, India at $1.08, Indochina at $1.12, Australia at $1.17, and Japan at $1.26 (Allan Seymour Everest, *Morgenthau and the New Deal in Silver*).

The American policy was to change, but no one knew it then and the uncertainty and tension created were enormous. Four nations were on the silver standard in 1933; 4 years later only Ethiopia remained.

The stimulation of the world price of silver by successive American purchases in 1935 forced the silver market into an upward spiral that benefited no one but producers and speculators. Its effect on Mexico was drastic. When silver passed 72 cents, an incentive was created to melt down Mexico's silver coins for export.

The Mexican government, acting under duress, called in all silver coins in exchange for paper, declared a bank holiday, and forbade the melting or export of silver coins. Mexico was then and still is the greatest producer of silver in the world and so welcomed at first the rise in silver prices. Morgenthau also meant to keep the world price below Mexican parity but the Administration increased the price to 77 cents in short order and the bullion value of pesos rose above monetary value.

The ensuing problems between Mexico and the United States were continually exacerbated by the differing aims of Treasury and State. Morgenthau wanted to help Mexico through her severe depression and "keep a friendly neighbor on the South," and Hull wanted to use silver purchases as a threat to force Mexico to pay for the American oil and mining interests she had expropriated. Hull wanted to use silver as a political lever; Morgenthau fought against it but lost. Silver purchases from Mexico were suspended. Mexico now had to face a loss of both her oil and silver markets with all the unemployment and loss of revenues entailed.

Morgenthau, backed by President Roosevelt, offered Mexico a large loan in an attempt to soothe the situation, but Secretary Hull was still adamant against any help that would injure the oil companies case. Negotiations were deadlocked for years. World War II forced solutions, directly or indirectly, to all the vexing claims.

In 1941 negotiations between State, Treasury, and the Mexican gov-

ernment began, resulting in, among many other items, the agreement to purchase 6 million ounces of silver monthly. The U.S. settlement was generous then but proved to be both wise and timely. The Good Neighbor Policy carried the day just 3 weeks before Pearl Harbor.

When the rising price passed the bullion parities of other Latin American nations, they were forced to follow the Mexican example. Bolivia, Colombia, Costa Rica, Ecuador, Guatemala, Peru, and Uruguay were among the reluctant recoiners.

The world currencies threatened by rising silver prices and those forced into paper or reissue of debased coins never regained confidence in silver. They knew themselves to be always at the mercy of shifts in American political influence. Although there was some revival, monetary silver never regained the place it had had before the price gyrations caused by the Silver Purchase Act of 1934.

An amusing little detail will show how far Morgenthau went in using silver to serve his causes and ends. When the Spanish coin consignment arrived in New York harbor, the Federal Reserve Bank of New York, acting as agent for the Treasury, received a claim against it entered by the Franco interests. Morgenthau convinced President Roosevelt that he should accept the representations of the, at that time, only recognized government of Spain and the original contract was honored.

Then to show he could not be bluffed, Morgenthau contracted for another 5 million ounces. Not wanting to be bothered again by the punctilious New York Fed, Morgenthau contrived what he called in his diary "a little hijacking." As expected, the rebel government of Franco filed another claim. Treasury officials took the initiative. A senior agent and his assistants boarded the ship while it was still in the Hudson River. Over protests by the United States Lines, the silver was unloaded and hauled away by Treasury agents.

With less derring-do, the Treasury continued to buy Spanish silver. In the end an extreme measure was adopted. Through negotiation by the Treasury's Chief Counsel, the United States Line was commissioned as a government in receiving and transporting monetary metals to American ports.

Needless to say, Secretary Hull did not look with equanimity upon Secretary Morgenthau's incursions into the affairs of the war-torn Iberian Peninsula. There seems to be a certain justification for the bitter words that later appeared in his *Memoirs*.

THE END OF SILVER AS MONEY

The purely military events of World War II had no lasting consequences for silver in the United States. But the truly nascent aspect was the impetus given to the electronics industry where research, development, and outright invention laid the ground for a tremendous growth in the industrial use of silver. This will be taken up in the chapter on silver's industrial revolution.

A dominant parameter of the postwar silver position in the United States was the stock of the Treasury. Under the legislation of the 1930s and subsequent proclamations the Treasury acquired 3 trillion and 200 million ounces of silver by 1962. Until 1955 its support price was higher than the market price for newly mined native silver, so domestic supplies flowed into the Treasury while industrial users purchased lower priced silver from abroad. This Ferris wheel of silver went on.

From 1955 until almost 1962 the support price and the market price stayed just about even, and industry purchased from both foreign and governmental sources. In any event, in something more than a quarter-century the Treasury managed a sixfold increase in the physical volume used for currency or stock piled. Even so, the silver program fell short of both objectives stated in the Silver Purchase Act of 1934. It gained neither a market price equal to its monetary value of $1.2929 or a 1 : 3 ratio of the monetary stocks of silver to gold. Prior to the decade of the 1960s market and governmental pressures failed to get silver off the $0.9050 floor.

Finally, however, the world market accomplished what a century of governmental fussing failed to do. Late in the 1950s world consumption began increasing about 4 percent annually while world production grew by only 1.5 percent per year. By late 1961 world-wide demand, industrial plus coinage, approximated 300 million ounces annually, whereas world-wide production was close to 235. The gap was filled by sales from the so-called free silver stocks of the U.S. Treasury; that is, silver that was not earmarked for coinage or the backing of paper currency.

This stock of free silver had peaked at 222 million ounces in early 1959. By the end of 1960 it was down by a half, and a piddling 22 million ounces were left near the close of 1961. There did remain, however, 1700 million ounces in bullion reserve against circulating paper money.

Against this background President Kennedy wrote to Treasury Secretary Dillon in November 1961, "I have reached the decision that silver metal should gradually be withdrawn from our monetary reserves." The President therewith ordered the Secretary to suspend further sales of the free silver, to suspend the use of free silver for coinage, and to secure whatever was needed for coinage by retiring from circulation $5 and $10 silver certificates. By this move about 400 million ounces of the total currency reserve of 1700 million were released for purposes of coinage. Within 24 hours of the President's statement the restless metal jumped 10 percent in price and was off to another 30 percent increase the following year.

Close on Kennedy's move was the outright repeal in June 1963 of the Silver Purchase Act of 1934 and all subsequent silver legislation. Of added importance, the Act authorized Federal Reserve notes down to the denomination of $1 and $2, making way for the elimination of silver backing for the buck and the deuce. The net effect was to demonetize silver except for its use in subsidiary coinage.

A mild silver hysteria became endemic. It was as emotional as a chain-letter craze. Children were collecting coins in emulation of their elders. Wild tales of fabulous prices that could be got for a simple dime (if it had just the right combination of markings) were the centerpiece of conversations over bridge tables and corner bars. The amount of circulating coins had increased by 50 percent from 1945 to 1955. Then it more than doubled again in the decade following. Small-change mills, such as vending machines, parking meters, and pay telephones, sales taxes, and even school lunches were burgeoning more rapidly than population growth itself. These accounted for the chronic shortage of coins. But the collecting and the hoarding craze that flamed was both a cause and a result of further dearth that followed. The Philadelphia and Denver Mints couldn't keep up. The alarm set off by this failure did its part to sweep coins out of circulation and into the cookie jars.

What epitomized all this stir was the plight of the silver dollar. In the Mints' attempt to supply the public demand for lesser coins they had not issued silver dollars during the entire postwar period. The last of the cartwheels had been dated 1937. At the start of 1964, only 28 million were on stock in the Treasury. Many of these went out into circulation in the first quarter of the year. Then the House Appropriations Committee rejected a Treasury request to start minting them again. This blew

the top off the demand for what remained. Fewer than 3 million were still in stock when *The Wall Street Journal* aptly wrote, "Secretary Dillon drove the money changers out of his temple." Under a clause in the 1963 legislation Dillon decreed that silver certificates would be redeemed only in silver bullion at their historic monetary value of $1.2929 per ounce. No more silver cartwheels at their high numismatic value were handed out—only slivers of silver in an envelope.

In the 1963 hearings Secretary Dillon had assured Congress that the legislation he proposed would meet the nation's coinage requirements "for the next ten to twenty years." But the next 2 years, alone, proved him wrong. Even the draconian measures of the Act of 1963 had failed to solve the Treasury's problems.

The shortage of coins turned truly critical in mid-1964 and became a problem affecting the entire economy. Merchants found it difficult—often impossible—to make change. Bankers rationed dimes and nickels. Entrepreneurial types made a buck of their own (so to speak) by acquiring assorted coins, bagging them, and selling them to the highest bidder. (Recently such bags have been selling at over 13 times their face value.)

According to official figures the increase in coin production should have been adequate to compensate for all normal developments. From mid-1959 through mid-1964 the Mint had increased the output of coins from 1.6 to 4.3 billion pieces, a near tripling of physical volume. During the same time span population had increased only 8 percent, GNP 28 percent, and vending machine sales 47 percent. Looked at another way, 48 billion coins were available for an average of 240 coins for every woman, man, and baby in the entire nation. Someone was stashing it away.

The withdrawal of coins accelerated when the Treasury—with a bizarre sense of timing—issued the Kennedy half-dollar in March 1964. It was intended to circulate freely as just another coin to help mitigate the shortage. Instead it immediately became an emotion-charged international prize. In no time at all it was selling for $5 in Hong Kong and up to $15 in Italy. Many U.S. citizens were unable to find the "Kennedy" at all as it went directly from mint to personal hoards.

Whatever the genesis of the coin shortage—and shortages tend to have a cumulative dynamic of their own—the Treasury finally decided it really had to do something. Midway in 1964 the two operating mints went on the crash program of a 168 hour week. All possible equipment and facilities were put to work. One maneuver was to obtain Congres-

sional authorization to put the date 1964 on all coins, regardless of the year actually produced, in order to destroy the special cachet that that year seemed to have for collectors and dealers. Such tacky little tricks don't promote the integrity of the American monetary system viewed from abroad.

Actually, the Treasury did quite well in its crash program. Taking 1964 as a whole 5.5 billion coins were minted compared with 3.4 billion the year before. In fact in the last 6 months of 1964 it produced as many coins as in all of 1962. To take another measure, slightly over 200 million ounces of silver were used during the outpouring of coins in 1964. It must be said, however, that 73 million ounces went into 200 million Kennedy half-dollars, which moved right out of circulation so rapidly that they hardly helped at all. (For a more extended treatment of the 1960s see William Burke and Yvonne Levy, *Silver: End of An Era*, Federal Reserve Bank of San Francisco, 1969.)

But solving one problem was causing another. By mid-1965 silver devoted to coinage was at a 300 million ounces annual rate. The Treasury's total stock was down to 1000 million ounces. Going on that way, the Treasury stood to deplete its total supply in short order. The portent was that the Mints would have to cease making dimes, quarters, and halves of the current kind. Even more ominous, the market price of silver could rise above $1.3824. This was the figure at which the silver content of small change would be equal to its face value. Beyond this they would be worth more as bullion than as coins; their complete disappearance from circulation was predictable. The Treasury—the United States—was really in a bind.

By this time most nations throughout the world had either eliminated or drastically decreased the use of silver in their coins. The precedent was there and the solution of the American problem might have seemed obvious. But nothing has ever been done without controversy in this country when silver was concerned.

In May 1965 the Treasury made a statement that was really quite historic:

> The world and the U.S. silver supply and production situation and outlook do not warrant continuation of the large-scale use of silver in the U.S. coinage.

The Treasury proposed a once-and-for-all change. Silver was to be completely eliminated from the currency. Otherwise, with some silver

content retained, the subsidiary coinage would always be hostage to future silver prices that a free market might boost above the melting point.

The need to reduce the silver content was so patently clear no argument evolved around that. What was charged with emotion was the question How much? Silver producers and silver users lined up on opposite sides. The vending industry, with its handle of some $3.5 billion a year, didn't much care whether or how silver was retained. What they did insist on was a machine-compatibility of the new coins with the old. Then, too, all trade associations whose members had a candidate to replace silver vociferously put forward their claims—from aluminum to zirconium.

The final compromise (the Coinage Act of 1965) was to leave some silver in half-dollars, but to take it all out of dimes and quarters. The latter were to be made of cupronickel clad on a copper core. The half-dollar would be cut from 90 to 40 percent silver, but with no change in appearance to the naked eye. If the Mint ever were to coin a piece at 900-fine in the future it was to be inscribed with the mendacious date 1964.

As the nation went into the Christmas season of 1965 the entire inventory of quarters in the Federal Reserve was only 15 million pieces. This was small change indeed to a country of 200 million people. But under the new Coinage Act the Mint achieved an unprecedented rate of output. In November 1965 alone 230 million new clad quarters went into circulation. This was four times as high as any production rate previously recorded. The coinage crisis had been licked. For a while, though, it was a cliffhanger.

But troubles were not over. Only 54 million ounces of silver were used for coins in 1966 (as against the peak at the previous year of 320); however, stocks continued to decline as domestic and industrial users increased their take. Treasury stocks dropped from 1218 million ounces in December 1964 to 594 million 2 years later. Then, of course, there was still the ominous overhang of paper currency in the form of silver certificates that might at any time be turned in for redemption.

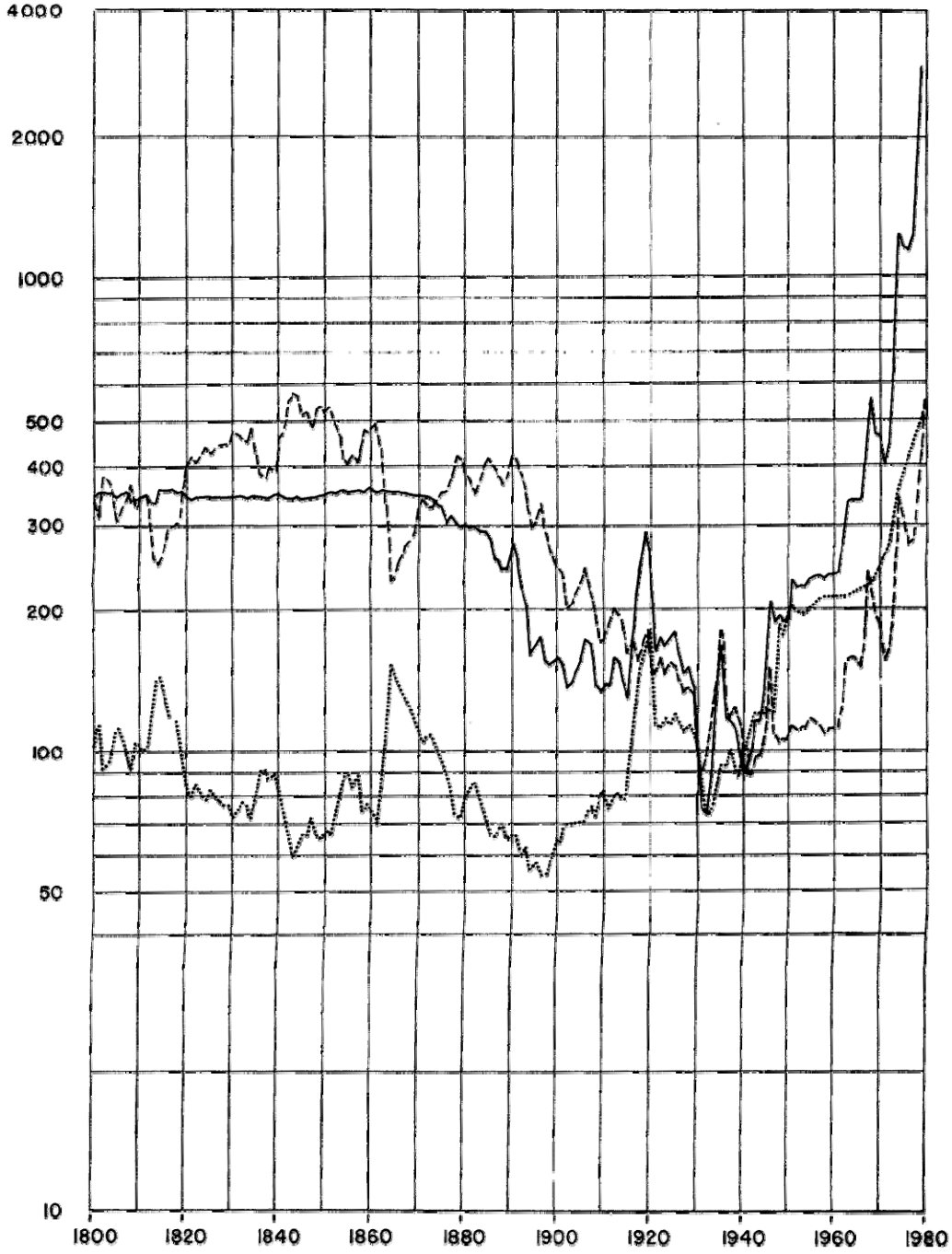
Legislation was rushed through on June 24, 1967 mitigating this peril and limiting the time of redemption of silver certificates to one year. The crisis would not accommodate. During the spring of 1967 Treasury was swamped by orders in unprecedented volume. In the first 2 weeks of May alone 33 million ounces went out; much of it right out of the country. Using the latent authority which it had, the Treasury cut off

sales to all but "legitimate domestic concerns." It also banned the export and melting of coins. The predictable result was a two-tier market. While the price laid down in New York remained at $1.30 an ounce (based on $1.2929), prices abroad rose sharply. By July the London price was around $1.70. Producers understandably sold their supplies in the foreign markets while domestic industry bought from the U.S. Treasury. This debilitating cycle was rapidly depleting the silver of the latter.

On July 14 the Treasury ceased all sales at the old monetary value of $1.2929. It announced that there would be a limit of 2 million ounces a week, which would go at the free market price. (Sales by the General Services Administration from Treasury stock ended altogether November 10, 1970.) This, plus a 9 month copper strike that began the next day, caused an explosive price situation. By June 1968, the price of silver in New York hit $2.565 an ounce.

The demonetization of silver in the United States was finally completed on June 24, 1968 when the right to redeem silver certificates was denied. First the silver went from the coinage; then the silver backing was removed from the paper.

CHART III PRICE AND PURCHASING POWER OF SILVER, COMMODITY PRICES
UNITED STATES 1800 - 1979
1930 = 100.0



PRICE OF SILVER INDEX
WHOLESALE COMMODITY PRICES
PURCHASING POWER OF SILVER

4 The Purchasing Power of Silver in the United States

From 1800 to 1870 the price of silver in the United States was nearly constant, especially so following 1820 when it was seldom below an index level of 340.0 and seldom above 350.0. A fluctuation of some 3 percent was remarkably small for this precious metal, considering the thinness of the economy and the turbulent times. Such stability survived even the War Between the States—a most astonishing rigidity.

For this reason the ratio of exchange between silver and other commodities at wholesale was affected almost entirely by price fluctuations in the latter. As can be seen in Chart III, the curve of the purchasing power of silver was essentially a reverse image of the curve of the wholesale commodity index number. True, the purchasing power of silver fluctuated, but for the first 70 years of this new economy it moved around a horizontal plane. The trend of operational wealth represented by silver remained horizontal.

1873 saw an entirely new picture. The revolution of the precious metals occurred and silver went into its precipitous, prolonged decline. As it happened, between 1873 and 1890 other commodity prices as a whole slumped concurrently so the *purchasing power* of silver continued its steady, level course for 17 years, even after the drastic fall of the price of silver per ounce.

Beginning in 1890 the continued fall in silver destroyed utterly the stability of its purchasing power. For 40 years, until its nadir in 1931, the purchasing power of silver eroded at an annual average compounded rate of −4 percent. Its reputation as a storehouse of value was certainly not borne out in this country during this time.

Except for the spike on the chart centered in 1935—an abnormal year for silver—the purchasing power of the metal stayed in the doldrums near its all-time low between 1933 and 1944.

As early as 1945 the price of silver per ounce then took off on its way to an index high of 2903.0 at the close of this record in 1979. The purchasing power over other commodities first lagged behind as the wholesale commodity price index spurted at a pace matching silver. Then in 1962 the rate of increase in silver prices began far to exceed inflation in commodity prices generally and the purchasing power of silver was enhanced at a handsome rate.

In the United States, then, the history of the purchasing power of silver can be parcelled into three epochs:

- A horizontal trend from 1800–1890.
- A persistent decline from 1890–1931.
- Moderate to soaring values from 1943–1979.

It is highly significant that the prime mover of changes in the purchasing power of silver came from the price of silver itself. From an average price per ounce of roughly $1.34 from 1800 to 1870 silver fell to 28 cents in 1932—a decrease of about 80 percent. The index of the purchasing power of silver fell from the region of 400.0 down to 89.1 in 1932, a percentage decrease of the same amount. When in the 1940s a clear reversal took place in purchasing power, it was, of course, the revived and explosive price of silver that initiated and sustained the move.

This is opposite from the story of gold in the United States, at least until 1968. It was gold, much of the time under governmental control, that stayed nearly constant in price. Short-run cycles in purchasing power were generated by movements in commodity prices. Gold as a precious metal tended to hold its purchasing power over the long run; silver most certainly did not. (See Jastram, *The Golden Constant*, New York, Wiley, 1977, especially Chapters 6 and 7.)

The implication of the preceding two paragraphs is that wholesale commodity prices fluctuated around a horizontal plane for the first 14 decades of our history. This is true. The wholesale commodity price in-

dex of Table 21 is on the base 1930 = 100.0. The following is a listing of the other years for which the commodity index was at, or very nearly on, this level:

Year	Price Index = 100.0
1800	1871
1804	1874
1811	1916
1819	1927
1837	1930
1863	1941

From this it can be seen that, taking the long view, it was not commodity prices in general that were changeable—it was silver.

In the preceding pages we followed the purchasing power of silver chronologically from 1800 through 1979 in the United States. Periods of commodity price inflation and price deflation were encountered, with some intervals of price stability in between. All these periods were treated as ordered in time, creating a linear history.

Let us now go back and collect the separate episodes of price inflation and search for generalities; all periods of price deflation will be gathered in a similar way for collective analysis. Various economic and historical events occurring during these episodes are described in order to give perspective to the price behavior in each. Because the two precious metals are so often linked in popular discussion, the change in the purchasing power of gold will be given along with variations in the buying power of silver in each period. Changes in the purchasing power of gold are from the author's book *The Golden Constant*.

This is the same schema used for England in Chapter 2. In that chapter there is a discussion of the difficulties of definition lurking in the terms "inflation" and "deflation." Here I will simply remind the reader that the terms are used solely as descriptive of price behavior.

With all the caveats expressed earlier, I would select the following designated episodes of price history for the United States.

Inflationary	Deflationary
1808–1814	1814–1830
1843–1857	
1861–1864	1864–1897
1897–1920	1929–1933
1933–1951	
1951–1978	

1808–1814: INFLATIONARY, 6 YEARS

Commodity prices	+58%
Purchasing power of silver	−33%
Purchasing power of gold	−37%

The first period of sustained price inflation, after the establishment of the United States as an independently governed economy, began to be felt in 1809, although it had its antecedents in the preceding years. War with England was already threatening in 1807 when trade restrictions became severe. By 1808 the paralysis of commerce along the coast had spread inland. Stagnation set in for the industrial centers of New England by 1809, and in agriculture an abnormally small wheat crop sent that price sharply upward. The United States was supported by an extremely thin economy at that time and was hyperreactive to shocks of these kinds. The inflation was shortage induced. The closure of the United States Bank in 1811 further weakened confidence in the youthful economy.

Great Britain declared war in June 1812 and laid a blockage along the coast. In 1813 and 1814 prices continued to soar, and there was no surcease until peace was declared in December of the latter year. Wholesale commodity prices had gone up nearly 60 percent in 6 years. The price of silver, however, fluctuated within a narrow band, with the consequence that its purchasing power fell drastically by one-third. Gold did no better as a conservator, declining almost 40 percent in its exchange rate against commodities at wholesale.

1814–1830: DEFLATIONARY, 16 YEARS

Commodity prices	−50%
Purchasing power of silver	+89%
Purchasing power of gold	+100%

With the blockade ended, imports flooded the United States in the first quarter of 1815. Speculation in new land had been growing in the past

few years, and now there were many failures. Money became very tight in financial centers and the failures of speculators added to the financial chaos. The military victory at New Orleans was ironic as it came after our surrender to the British and during the most severe economic disarray of the new nation.

Unemployment in 1816 was severe and was aggravated by enormous imports flooding the domestic markets. The second United States Bank was organized by the middle of the year but afforded no help; credit contractions caused widespread financial difficulties in 1818. In the preceding years the price of slaves had been bid up on a speculative basis. The collapse of this speculation in the slave markets of the South added to the economic difficulties of the nation.

Incidentally, the availability of vast public lands in the new nation was not the unmitigated blessing we might assume. It led to much speculative purchasing of land. Shortages of credit forced selling, contributing to the financial confusion.

Dullness in trade and industry continued. Trade decreased further when in 1826 England forbade her remaining colonies to deal with the United States. The election of Jackson to the Presidency in 1828 did not help the business climate and his message of hostility to the United States Bank in December 1830 simply confirmed the fears of the business and financial community.

In this national adversity, holders of silver did very well. Its purchasing power surged by nearly 90 percent and thereby set a record for appreciation during commodity price deflation never to be exceeded in the subsequent history of the United States.

Gold did even better, doubling its purchasing power over the same period.

1843–1857: INFLATIONARY, 14 YEARS

Commodity prices	+48%
Purchasing power of silver	−30%
Purchasing power of gold	−33%

No dramatic events spurred the onset of this inflationary period. Prosperity gradually increased and became general again by 1845. Active rail-

road speculation began, and wheat speculation was rampant by the last quarter.

War with Mexico was declared in May of 1840. The Oregon controversy with England was settled in June. Foreign trade was completely revitalized and thriving in 1847. Great domestic activity in trade and industry brought about full employment.

There were swift victories in Mexico with the capture of Vera Cruz in March and Mexico City in September. The United States was an ebullient, confident, and chauvinistic nation by now.

Gold was discovered in California in January 1848, and what can be called a California boom gave a great psychological lift to the Eastern states by the end of the year.

The treaty with Mexico was signed in February. Mexican indemnity payments to the United States were a stimulus to the young economy.

The gold in California had a dual effect by 1849. It encouraged expansion but induced unhealthful speculations. Active railroad construction was under way, and foreign trade was booming.

The year 1850 was unusually prosperous for the same reasons, and the influx of gold bullion from the mines of California began to be felt in the East.

These same factors fed and swelled the economy through most of 1857, with the added fillip that trade with Japan was opened to the United States in 1854. Commodity prices rose by almost half during the period but holders of silver lost nearly one-third of their operational wealth. Gold did equally poorly.

1861–1864: INFLATIONARY, 3 YEARS

Commodity prices	+117%
Purchasing power of silver	−53%
Purchasing power of gold	− 6%

This, of course, was the period of the Civil War. From the monetary standpoint the main event was the suspension of specie payments and the flood of unsupported greenbacks, discussed at length elsewhere.

Commodity prices soared but the price of silver remained essentially

constant—this was one of the rare occasions in price history anytime, anywhere, when a precious metal did not respond to a national calamity. As a result, the purchasing power of silver collapsed by over one-half in only 3 years.

Gold, on the other hand, took off overnight. It doubled in price by 1864 and came within 6 percent of holding its purchasing power. A hoard of gold was protection against the national disaster of the greenbacks.

Sadly enough for holders of silver, they might just as well have had their wealth in the paper currency without redemption. The purchasing power of the metal was halved in 3 years.

1864–1897: DEFLATIONARY, 33 YEARS

Commodity prices	−65%
Purchasing power of silver	+27%
Purchasing power of gold	+40%

The postwar depression was tragic and prolonged, although it had its bright spots between 1880 and 1885.

Lee surrendered in April of 1865. Lincoln was assassinated in the same month. The Civil War was formally ended in August. The South was in economic chaos, with a complete collapse of currency and government finance.

As early as 1866 there was a slackening of trade in the North. The economic record for the following years until 1879 (the year of resumption of specie payment) is a dreary account.

The years 1880 through 1885 were comparatively good, but even in 1884 there were numerous bank failures, and the device of issuing clearing house certificates for money was employed.

Labor strife became severe. The anti-Chinese riots of 1885 were symptomatic. In 1886 the Knights of Labor went on railroad strike, widespread coal strikes were called, and the "Haymarket Massacre" exploded in Chicago.

Matters wobbled along until 1893 when extreme depression was felt in the last half of the year. Business failures were prevalent and a new type of failure hit the country: railroads went into receiverships.

The year 1894 was one of deep depression as well. Serious strikes occurred in the bituminous coal industry, railroads again were struck, and Coxey's armies marched in the spring of the year. Severe depression was suffered in 1896 and commodity prices hit a bottom in 1897.

The precious metals held their reputation as a bulwark against deflation. Gold, uncontrolled by the Treasury for part of the period, climbed in purchasing power by 40 percent. Silver, though falling precipitously after 1873, returned an increment of 27 percent in operational wealth to those who held it from 1864 to the end.

1897–1920: INFLATIONARY, 23 YEARS

Commodity prices	+232%
Purchasing power of silver	−49%
Purchasing power of gold	−70%

It was in the 1890s that business cycles began to take on an international pattern.

In the United States prosperity returned in 1898. The era of industrial combinations began. The short war with Spain started in April and ended in August. The Philippines and the Hawaiian Islands were acquired. The boom in immigration began in 1899, bringing with it implications of what was in store for the supply of labor and increased demand for industrial output.

1900 and 1901 were years of great prosperity. New records for production were established. The achievement of economies of large-scale industry was epitomized by the U.S. Steel Corporation, formed in the latter year.

There were numerous labor troubles in 1903, but foreign labor poured in. By 1905 great expansion was taking place with iron and steel in the vanguard. An anomaly of prosperity was felt in the land: severe railroad freight congestion was endemic.

Prosperity continued throughout 1906 and until the autumn of 1907. Then panic struck, touched off by the failure of the Knickerbocker Trust Company, and the financial sector was paralyzed. Many banks suspended payments and clearing house certificates were issued. Stocks collapsed.

The year 1908 was one of depression but revival set in during 1909. Real prosperity returned for 1912 and 1913. In the latter year the Income Tax Amendment to the Constitution was ratified; few then realized what an impact this was to have on the economy of the twentieth century.

Curiously, the first year of World War I was a time of depression in the United States; certainly foreign trade fell off drastically. By 1915, however, the beginning of war industries manufacturing led to recovery, and exports increased enormously.

The record of economic prosperity continued through the war and until the last half of 1920. Then industrial orders were canceled at an unprecedented rate, money became extremely tight, and there was a near collapse in the stocks and bonds markets. Prohibition became effective in January, and Harding was elected in November. Cataclysm all.

Gold was controlled in price by the Treasury, and in consequence lost 70 percent of its purchasing power—twice the loss in any other single period of inflation in the United States. Silver, free to move but not prospering until 1916, lost nearly one-half its operational wealth.

1929–1933: DEFLATIONARY, 4 YEARS

Commodity prices	−31%
Purchasing power of silver	− 5%
Purchasing power of gold	+44%

The United States saw a tremendous drop in prices in the single year from 1920 to 1921 (−37%), but thereafter, unlike England, wholesale commodity prices held steady until 1929. In the United States, therefore we count from 1929 on as the deflationary period.

The Great Depression did not catch American economists by surprise to the same extent it did the general public; warning signals were evident before. Agriculture had been in recession during most of the 1920s, without any signs of recovery. Economists were well aware of the tendencies of business cycles to become international, and Europe was already experiencing a state of depression. The signals were there, which is not to say they were widely heeded.

The spectacular behavior of the stock market disguised the fact that

the American economy was moving toward complete disarray. Public attention, to an extent unprecedented in American history, was focused instead on the booming activity of the stock exchanges.

The first shock was felt in October 1929 with the collapse of prices on the New York Stock Exchange. There followed a certain amount of soothing public utterances about mere paper values and the fundamental soundness of America. But the domestic economy, running poorly and with growing unemployment since the end of 1929, was in serious trouble.

Bank failures are economic tragedies in themselves, but they are also an index of more pervasive problems. At the beginning of 1930 there were 24,079 banks. In 1930 1352 of these suspended payments. In 1931 bank failures rose to 2294. An additional 1456 failed in 1932. From January until March 1933 alone, there were 408 new failures.

Banking disasters at the local level are the kinds of economic events everyone can understand. The national psychology was reversed abruptly. The overconfidence of the late 1920s turned to deep pessimism by the early 1930s.

In the latter part of 1931 the second shock was felt. It was foreign in origin and fundamental, because it struck at the monetary base of our economy. European countries (Austria, Germany, then England and France) were no longer able to meet their debts. Their gold exportation was placed under exchange controls. The various gold standards were abandoned, and national currencies were disarranged. Around $2 billion of American investments abroad suddenly became next to worthless.

The rapid decrease in the amount of commercial paper eligible for the issuance of Federal Reserve notes meant that more than before the notes had to be backed by gold. The demand for actual currency was increasing enormously because of the public's growing distrust of banks. The Glass-Steagall Act was hurriedly passed in February 1932 authorizing the Federal Reserve Banks to use government bonds for 1 year, instead of commercial paper, as collateral for Federal Reserve notes. Even this might not have assuaged the public if the 40 percent gold reserve had not been maintained.

But confidence in the solvency of banks continued to fade. Some writers have inferred from this a comparable lack of confidence in the national currency. This was not true. People withdrew their deposits from banks to *secure currency*. It is undoubtedly true that some of the latter was then converted into gold, but certainly not in the same measure. (This period has been well covered by Milton Friedman and Anna Schwartz in *Monetary History of the United States, 1897–1960.*)

That portion of the American public that was sufficiently alarmed to create an internal drain on gold was joined by foreign creditors and investors. From February 1933 until Roosevelt's inauguration on March 4, $624 million in gold was withdrawn from the Treasury and the Federal Reserve Banks.

On Monday, March 6, at one o'clock in the morning the newly sworn in President Roosevelt declared a nationwide bank holiday. After the holiday an uneasy calm prevailed. On March 12, 1933 President Roosevelt gave the first of his "fireside chats," his most influential and important speech until the attack on Pearl Harbor.

On Monday, March 13, 4507 national banks and 567 state member banks were allowed to open for normal business. This was more than three-quarters of the member banks of the Federal Reserve System. After these reopenings, public confidence in banking was restored. Bank withdrawals were redeposited to a large extent and gold was returned to exchange for the more convenient paper money.

The precipitous decline in wholesale prices had ended by the close of 1933. Gold, with its price supported by the Treasury, was an excellent way to hold wealth. Its operational value was enhanced by more than 40 percent.

Silver was another matter. Its price per ounce fell by −35 percent in just 4 years. The consequence of this disastrous decline in the metal was that its purchasing power over other commodities fell by −5 percent, even as wholesale commodity prices were falling by nearly a third. No wonder the silver interests were crying for relief.

1933–1951: INFLATIONARY, 18 YEARS

Commodity prices	+168%
Purchasing power of silver	− 4%
Purchasing power of gold	−37%

Although this is essentially a book about silver, now gold must lead the discussion. The reason is that the American monetary system was overturned at this time as a result of the manipulation of gold.

From the time of the Coinage Act of 1792 until March 10, 1933 the United States was on a form of gold standard, whether jointly with

silver or functioning alone.[1] The official price of gold was established by various acts of Congress. Market prices were congruent with those so long as bank notes were redeemable in gold; this continued to be true except for the suspension of specie payments between 1861 and 1879.

On March 10, 1933 President Roosevelt, relying on the Emergency Banking Act, prohibited by executive order the export of gold and gold certificates *as well as payments in gold by banks*. The United States was, of course, then off the classic gold standard.

At the end of August 1933 the President authorized the Treasury to purchase gold at $29.62 an ounce, a substantial move from the preexisting statutory price of $20.67. On October 25, 1933 the purchase price was raised to $31.36 in a similar manner.

In accord with a presidential message of January 15, 1934, Congress passed, on January 30, the Gold Reserve Act, which gave an entirely new basis to the American monetary system. No more gold was to be coined—all was to be kept in bars. The new gold weight of the dollar was to be as proclaimed by the President alone.

On the next day the President made his proclamation. Although couched in more technical terms, the essence of this decree was that the new price of gold was to be $35 per fine ounce. However, since no gold coins were to be issued and no paper money was to be redeemed in gold, the gold *coin* standard was abandoned. Nor was the gold *bullion* standard adopted under which, up to 1931, the Bank of England had to sell bullion to all comers at a specified minimum of paper money. Yet a new kind of gold standard was put in place, since the concept was upheld that the exclusive definition of the monetary unit was to be in terms of gold. Henceforth, however, the gold value of the dollar was to be managed by the Treasury.

After 141 years of relative orthodoxy the United States purposely induced a monetary revolution.

The short-run purpose for which Roosevelt seems to have undertaken this most fundamental long-run move, and how he failed, are vividly discussed by John Kenneth Galbraith in *Money*, Chapters XIV and XV. A journalistic treatment that catches the spirit of the experimentation is in "Annals of Finance, Gold Standard on the Booze," *New Yorker*,

[1] To put a fine point on it, President Wilson did bar the free export of gold between September 1917 and June 1918 using, oddly enough, the Espionage Act of June 1917. The domestic convertibility of notes into gold remained legal, however, and that is probably the key point of the gold standard in the popular conception.

September 13, 1969. All that needs to be noted here is that the immediate stimulus to commodity prices that Roosevelt sought through gold did not come about. The long upward move from 1933 to 1951 was due to a host of other factors, including the outbreak of World War II in 1939.

The price of silver was marching to a different drummer—the influential silver lobby. From its all time low of "two-bit silver" in 1932 to the close of this period in 1951, the price of the metal went up by +220.5 percent. Part of this surge was time-matched with the boom in commodity prices so that the purchasing power of silver almost held its own. It missed by just 4 percent. This was the first time it had come that close in all of the inflationary periods in the history of the United States.

The United States gold price stood at $35 per ounce from 1934 through 1951; that is, during the entire period under present discussion. The high point of the purchasing power of gold in all United States history up to that date occurred in 1934 through the action of President Roosevelt, as just described. Thereafter, slowly, and with some backtracking, commodity prices began to rise.

Gold's purchasing power held up until 1940, when commodity prices began a steady rise in 1941. Because of this rise the purchasing power of gold suffered continuous erosion. Just between 1940 and 1951 it fell off by −56 percent.

Gold would have been a dismal holding for a United States citizen as a wartime haven for his wealth even had personal possession been legally possible. Silver was legal to hold and did well by comparison.

1951–1979: INFLATIONARY, 28 YEARS

Commodity prices	+158%
Purchasing power of silver	+380%
Purchasing power of gold	+240%

For the first decade of this period the price of silver changed very little. A fine ounce troy cost only 2.5 cents more in 1961 than 10 years earlier. It was in 1963 that the most rapid rise in the history of silver began. Even

so, its *purchasing power* was actually less in 1971 than in 1965. After that, the accelerating rise in silver bullion prices far outstripped the wholesale price level, and the purchasing power of silver ended the period nearly four times ahead of where it was in 1951. The purchasing power of gold did handsomely but not as well.

In a time of volatility like this the rise in annual *average* prices does not fully portray the explosive events of the bullion market. To illustrate this, the average price for all of 1978 was $5.40; the average for all of 1979 was $11.09—a doubling. However, this price increase is mild compared with what actually happened between the beginning of 1978 and the end of 1979—a quadrupling from $4.97 to $20.85. To dramatize the difference between monthly patterns and annual averages another way, the *rise* from the lowest to the highest silver price in the year 1979 was twice the size of the average price struck for the year as a whole.

Therefore, properly to record this momentous peaking in silver prices, and the abrupt collapse of the market soon after, Table 3 is drawn up on a monthly basis.

The historic topping off of the silver market occurred on January 21, 1980 at $48 in New York. Frenzy ruled before and after. It was the highest ascent in recorded history, the most rapid runup the world has seen.

Table 3

SILVER PRICES MONTHLY, 1978–1980

	1978	1979	1980
January	$ 4.97	$ 5.97	$48.75
February	4.98	7.48	34.65
March	5.44	7.18	24.40
April	5.19	7.31	14.30
May	5.07	8.49	12.75
June	5.25	8.47	15.80
July	5.25	9.11	15.17
August	5.42	9.16	15.75
September	5.61	13.15	
October	5.90	17.57	
November	5.73	15.87	
December	5.88	20.85	

Source. The Wall Street Journal, Handy & Harman mid-month base price, various issues.

and the most abysmal collapse ever recorded. What Jay Gould and "Jubilee Jim" Fisk did to the gold market in 1869 was peanuts by comparison.

The swoops and slumps of this unprecedented churning are conveyed by the monthly prices given. However, the day-to-day price behavior should be made a matter of record as well. On January 15, silver elevated to $43.75, which was twice as high as it had been 4 weeks earlier. It eased up to $47.00 the next day, then it finally reached $48.00 48 hours later. The very next day it tumbled by a quarter of its value to $36.00. There was no recovery. What had happened? The COMEX had stopped all trading except for the purpose of liquidating existing contracts.

As to cause, we should notice first that there was a constellation of circumstances that in any case was highly bullish for precious metals (gold reached its top of $850 at the London afternoon "fixing" of January 21, 1980; COMEX in New York peaked out at $875 the same day). There was a marked acceleration of world inflation; the dollar was weakening, the oil supply situation was worsening, the issue of the hostages in the U.S. Embassy in Teheran was heated, the U.S. government had frozen Iranian assets, Iran was trying every means to withdraw its dollar balances, and the fighting was escalating in Afghanistan.

In addition there was an apogee of speculation in the silver markets, specifically. To paraphrase the cool appraisal of Handy & Harman in their Sixty-Fourth Annual Review:

> During 1979, trading in silver on COMEX was dominated by speculators whose actions were based on factors other than the economic forces of supply and demand for silver as an industry commodity. According to frequently repeated rumors, a number of wealthy individuals embarked on a program involving purchases of very substantial quantities of silver. Although these rumors were never confirmed, large purchases for private accounts did take place on COMEX during the year. This buying, which was often surprisingly aggressive, took place in perhaps the world's most visible arena, the New York Commodity Exchange, and unquestionably had a very significant effect on the silver market and, therefore, on the prices paid by commercial users.
>
> Prices climbed throughout the year, spurred on by speculative activity and the increasing uncertainty in world economics. New records became commonplace and the year closed at 2800.0¢ which established a new all-time high. The dramatic developments of 1979 even exceeded the performance of the market in 1974. In just one year the price of silver went from a low of 596.1¢ an ounce to 2800.0¢ an ounce. This performance must be

characterized as truly astounding. Furthermore, the high of 1979 scarcely lasted over the year-end and was quickly surpassed by substantial margins in the opening days of 1980.

The popular press then and later was citing names of individuals thought to be responsible. The American fascination with the conspiracy theory of history was extravagantly catered to by the media. At this writing a congressional investigation is underway with unpredictable results. All the facts may never be known; such is the world of precious metals. In any case, it seems singularly inappropriate to speculate about the speculators in this book, which presumably will be read after the results of the official investigations are known.

On March 27, 1980 the price of silver hit $10.80 on the COMEX. The whirlpool touched bottom.

A SUMMARY OF AMERICAN INFLATIONS AND DEFLATIONS

In 1800 the United States were 16 in number and largely concentrated along the Atlantic coast. They were a puny economy even by contemporary standards. With the admission of California in 1850 the United States had established itself firmly on the other side of a vast land mass. For decades thereafter, the demographic and economic history of the nation was dominated by the opportunities for growth between the two oceans. In the process of filling in this central void, she became the strongest economy of the world.

Throughout this period and up to the present, we have reviewed the price history of the country and focused on episodes of inflation and deflation. Let us now draw these two kinds of episodes together to see if any generalizations can be made and examine especially the behavior of the purchasing power of silver and gold in each.

First, we summarize with regard to inflation. It is important to realize that several methods can be used for statistical measurement of the extent of inflation. These differ in degree of sophistication and in the particular view of inflation that the statistician wishes to represent. In order of complexity they are:

1. The net change in price, or some defined price level measurement, from the beginning to the end of a designated inflationary period.

2. The simple annual average rate of inflation obtained by dividing the net change in (1) by the number of years involved, in the case of annual data.
3. The average compounded inflation rate. (For a fuller discussion of these measures and their merits, see Chapter 2.)

The following is a statistical summary of the inflationary and deflationary episodes in the United States since 1800.

Years	Duration	Net Change (%)	Simple Average Annual Rate (%)	Average Annual Compound Rate (%)
		Inflationary		
1808–1814	6	+58	+9.7	+7.9
1843–1857	14	+48	+3.4	+2.8
1861–1864	3	+117	+39.0	+29.5
1897–1920	23	+232	+10.1	+5.4
1933–1951	18	+168	+9.3	+5.6
1951–1979	28	+158	+5.7	+3.4
		Deflationary		
1814–1830	16	−50	−3.1	−4.2
1864–1897	33	−65	−2.0	−3.1
1929–1933	4	−31	−7.8	−8.9

We observe:

- Since 1800, the United States has had many more years of inflation than deflation (92 years versus 53).
- There have been twice as many periods of inflation as deflation (but we must be aware of definition).
- The most recent deflation was short, sharp, and at an annual rate twice any other.
- The present period of inflation since 1951 is the longest in our history, but by no means the most severe. All other inflations have exceeded it in annual average compound rate since the beginning of the Civil War.

Now that we have summarized periods of inflation and deflation separately for the United States, we are in a position to draw together the

experience with silver and gold in each of them. From earlier results we have the following net changes in the index of wholesale price and the purchasing power of silver. From the author's *The Golden Constant* the comparable changes in the purchasing power of gold are entered.

	Inflation			Deflation		
		Purchasing Power of			Purchasing Power of	
Years	Prices (%)	Silver (%)	Gold (%)	Prices (%)	Silver (%)	Gold (%)
1808–1814	+58	−38	−37			
1814–1830				−50	+89	+100
1843–1857	+48	−29	−33			
1861–1864	+117	−54	−6			
1864–1897				−65	+29	+40
1897–1920	+232	−50	−70			
1929–1933				−31	−6	+44
1933–1951	+168	−4	−37			
1951–1979	+158	+380	+240			

The record of the two precious metals is remarkably similar. Both lost purchasing power in every inflation in the United States until the present one. In three of the five previous inflations the loss in operational wealth of the two metals was about equally severe. In a similar but opposite way, when the two metals showed an inflationary gain in purchasing power as of now, the gain has been about the same.

What adds to the interest of this similarity is that silver was effectively demonetized as early as 1834, whereas the gold standard prevailed a century longer. It is true that Congress was fiddling with the silver markets during the inflation of 1897–1920 and after, but the effect was to put a floor under silver. It was not government action that prevented silver from rising with other commodities in order to maintain a parity. With gold, of course, the matter was different: price was artificially restricted, upward and downward, or the public not permitted to buy, until 1975.

Even so, where *did* the precious metals get their long-standing reputation as hedges against inflation? Not validly, from the experience of a century and a half in the United States and more than three centuries in England. From our present perspective we may be able to go back and rationalize why the lore was not borne out by the facts, but where did the lore begin in the first place?

It is easier to understand why the two precious metals gained operational wealth in deflations. As early as the Bland-Allison Act of 1878 silver had received market support from the government. Gold had had a floor under it since the Coinage Act of 1792.

If we take the long view, gold has held its purchasing power very well in the United States. As early as 1802 it exchanged for wholesale commodities at the same rate it did in 1930. Forty-two years later it was still close to the same level. One and three-quarters of a century is quite a record of regularity. This is displayed in the first column in the following in which years are selected to show how close to 100.0 the purchasing power remained.

Year	Purchasing Power of Gold	Purchasing Power of Silver
1802	101.1	382.4
1820	111.5	412.6
1836	110.6	380.4
1855	114.7	402.3
1865	107.3	238.7
1874	111.2	334.6
1882	116.7	348.2
1916	101.1	175.9
1927	90.5	133.6
1930	100.0	100.0
1947	98.7	109.6
1972	106.1	165.7

The long view of silver is quite another matter. This can be seen when its purchasing power index is matched up with gold in the adjoining column. Silver did not do at all badly until 1890. Then it collapsed in its power to exchange against other commodities, and it has been highly erratic ever since. In the 40 years following 1890 it lost 76 percent of its purchasing power, cataclysmic for a precious metal. Gold never behaved that way in all the history of Britain and America.

5 Silver's Industrial Revolution

Silver has undergone a metamorphosis over time. Its primary role has changed from a metal considered precious because of its beauty and monetary usage to an industrial good on the modern scene. To illuminate this statistically I will work backward from the most recent annual data available to the historically more distant figures. The reason is that recent figures are far more detailed and sound, whereas the more distant data are progressively less detailed and less certain. Within the confines of the conclusions drawn, all statistics are considered sufficiently accurate for our purpose.

The most comprehensive data on world consumption are given in Table 4 for the period 1972 through 1979. At the beginning of this record total consumption of silver for coinage was down to 9 percent of the aggregate consumed in the world. This had fallen to 5 percent by 1979. When silver was used for coinage it was predominantly in the European areas of ancient wealth. Austria, France, and West Germany together accounted for 72 percent in 1979.

Put the other way around, 95 percent of world silver consumption was for industrial uses in 1979. We shall see later, this was only 47 percent as

Table 4

WORLD SILVER CONSUMPTION, 1972–1979

(Excluding Communist-Dominated Areas)

(millions of ounces)

	1979	1978	1977	1976	1975	1974	1973	1972
Industrial uses								
United States	165.6	160.2	153.6	170.5	157.7	177.0	196.4	151.7
Canada	9.2	9.0	8.8	9.5	10.6	8.6	9.6	7.4
Mexico	6.2	5.8	5.5	6.5	5.6	6.5	11.8	7.0
United Kingdom	26.5	29.0	32.2	28.0	28.0	35.0	31.0	27.0
France	21.5	22.2	20.6	19.0	21.2	13.2	14.3	16.5
West Germany	37.1	26.4	59.5	50.8	38.9	49.4	64.7	60.0
Italy	33.0	41.8	33.8	32.1	28.9	30.0	33.5	32.0
Japan	65.5	64.3	63.2	60.7	46.4	57.7	69.0	54.3
India	19.0	20.0	17.6	18.0	13.0	15.0	13.0	13.0
Other countries	26.4	25.8	22.7	26.9	26.5	25.0	28.0	20.0
Total industrial uses	410.0	404.5	417.5	422.1	376.8	417.4	471.3	388.9
Coinage								
United States	0.1	0.1	0.4	1.3	2.7	1.0	0.9	2.3
Canada	0.3	0.3	0.3	8.4	10.4	8.6	1.4	0.1
Austria	5.0	3.5	3.0	6.9	13.4	5.6	6.6	5.8
France	7.7	11.1	6.9	6.7	5.2	3.6	0.1	0.3
West Germany	3.7	3.6	2.6	2.9	4.3	8.8	9.5	22.6
Other countries	6.0	10.4	6.0	3.5	2.8	0.1	10.7	7.3
Total coinage	22.8	29.0	19.2	29.7	38.8	27.7	29.2	38.4
Total consumption	432.8	433.5	436.7	451.8	415.6	445.1	500.5	427.3

Source. Handy & Harman, various *Annual Reviews.*

late as 1965. The proportion of the world's silver going into industry had doubled in a decade and a half.

Another salient feature of the table is the dominant position of the United States in the industrialization of silver. In the last year recorded it used 90 percent of the total used by Japan, Italy, West Germany, France, and the United Kingdom, combined.

In Table 5, figures are given for 1949 through 1971. The same detail

Table 5

WORLD SILVER CONSUMPTION, 1949–1971

(millions of troy ounces)

Year	Industrial	%	Coinage	%	Total
1949	132.5	61.3	83.8	38.7	216.3
1950	157.4	78.1	44.1	21.9	201.5
1951	165.0	64.6	90.5	35.4	255.5
1952	142.1	55.4	114.3	44.6	256.4
1953	168.3	65.0	90.7	35.0	259.0
1954	160.8	65.8	83.4	34.2	244.2
1955	192.8	78.6	52.6	21.4	245.4
1956	215.9	79.2	56.6	20.8	272.5
1957	212.6	71.6	84.2	28.4	296.8
1958	190.5	70.6	79.5	29.4	270.0
1959	212.9	71.1	86.4	28.9	299.3
1960	224.6	68.4	103.9	31.6	328.5
1961	239.5	63.6	137.1	36.4	376.6
1962	258.5	67.0	127.6	33.0	386.1
1963	260.7	61.0	166.4	39.0	427.1
1964	299.2	52.8	267.1	47.2	566.3
1965	336.6	46.9	381.1	53.1	717.7
1966	355.1	73.3	129.5	26.7	484.6
1967	348.7	76.8	105.3	23.2	454.0
1968	350.8	79.7	89.3	20.3	440.1
1969	350.6	89.8	40.0	10.2	390.6
1970	338.4	92.6	26.9	7.4	365.3
1971	387.9	93.4	27.3	6.6	415.2

is not available, but a division can be made between noncoinage uses and coinage. Called "Industrial" in the table, the second column also includes private and government purchases of bullion to be held as such.

It is from this table that we see industrial demand swell—three times as high by weight in 1971 as in 1949—and coinage consumption dwindle. The latter move is especially striking between 1965 and 1971, as it fell by 93 percent in physical volume in the short span of 6 years. This decline in coinage silver is the principal point to be brought by Table 5.

Since in the domain of industrial demand the United States is shown to be preeminent, let us now look at a breakdown for America, by end uses, from 1972 through 1979.

Table 6

UNITED STATES INDUSTRIAL CONSUMPTION OF SILVER BY END USE, 1972–1979

(millions of ounces)

	1979	1978	1977	1976	1975	1974	1973	1972
Electroplated ware	9.3	7.3	6.8	9.5	8.7	13.2	14.5	12.7
Sterling ware	14.9	17.9	16.7	19.8	23.7	22.2	27.5	22.1
Jewelry	5.9	6.8	8.1	11.0	12.7	5.2	5.8	4.9
Photographic materials	64.9	64.3	53.7	55.5	46.1	49.6	52.0	38.3
Dental and medical supplies	2.4	2.0	2.2	1.9	1.5	2.4	3.0	2.0
Mirrors	1.9	1.9	2.1	4.6	3.1	3.9	2.6	1.2
Brazing alloys and solders	11.7	11.0	12.4	11.2	13.6	14.5	17.7	12.2
Electrical and electronic products								
Batteries	5.3	6.0	5.8	3.5	4.3	4.2	4.2	6.1
Contacts and conductors	36.5	30.8	31.3	32.3	27.2	31.3	40.2	36.4
Bearings	0.3	0.4	0.5	0.3	0.5	0.4	0.4	0.4
Catalysts	8.8	8.2	8.9	12.3	8.8	7.3	6.0	5.4
Coins, medallions and commemorative objects	2.6	2.7	4.2	8.2	7.2	22.3	22.0	11.5
Miscellaneous	1.1	0.9	0.9	0.4	0.3	0.5	0.5	0.5
Total industrial consumption	165.6	160.2	153.6	170.5	157.7	177.0	196.4	151.7

Note. Based on data from Mineral Industry Surveys for gold and silver, published by Bureau of Mines, United States Department of the Interior.

The dominant usage through the years is for photographic materials. In fact, this application of industrial silver soared throughout the period, rising to 39 percent of total industrial usage in 1979 from a lower 25 percent 7 years earlier. This speaks of the continued growth of photography in the United States, plus the price inelasticity of the demand for silver for this application. Note that over this same period the price of silver increased five and one-half times per ounce.

On the other hand, ounces of silver in electric/electronic applications actually diminished a bit; the proportionate usage went from 28 down to 25 percent. The electronics industry found satisfactory substitutes for silver as rising prices led to a hard look. Also, the industry found how to use less silver in the same application with equal effectiveness.

Still, those two industries were of utmost importance for silver's industrial market, accounting for two-thirds of the total in 1979. Jewelry accounted for only 3.5 percent of silver's industrial market; the silver used in jewelry reached its peak of 4 percent in 1972. Sterlingware, another traditional usage went from 14.5 percent in 1972 to less than 9 percent in 1979. Not only is industry taking over, but within industry silver has taken on a utilitarian role—not just an ornamental one.

More on the history of industrial consumption in the United States can be found in a useful volume edited by Lawrence Addicks (*Silver in Industry*, 1940). In a chapter written by the editor, he attempts to reconstruct the statistics of industrial consumption between 1880 and 1938. He acknowledges the assistance of brokers and bullion dealers who accumulate private knowledge of customer use, citing in particular Handy & Harman of New York, Matthey & Company of London, and the Gold-und-Silber-Scheideanstalt of Frankfurt-am-Main. Among government agencies he places heavy reliance on the Bureau of the Mint "which has painstakingly collected unclassified totals for the United States since 1880 by means of questionnaires sent annually to all known silver refiners and bullion dealers, every effort being made to avoid duplication due to the appearance of the same silver in different hands at various stages of its manufacturing life. These forms also call for separation of primary from secondary or scrap materials."

I may be ungracious for complaining that Addicks does not provide a table of his figures, but only a graph. I have read the numbers from this and have set these down in Table 7 for the years 1880 to 1924.

Beginning with 1925 I would switch reliance to a series entitled "U.S. Consumption" attributed to the Bureau of the Mint and furnished by the Bureau of Mines. A comparison of the years of overlap with the Handy & Harman data in Table 8 assures me that this Bureau of the Mint series is in fact for industrial consumption, exclusive of coins, in this country over the years 1925–1979. This has been confirmed recently by the Bureau of Mines.

In Chart IV Addicks data and the continuation from the Bureau of the Mint are plotted against an index of manufacturing production. This itself is a composite, being a spliced version of Edwin Frickey's Index of Manufacturing Production (1899 = 100.0) up to 1914, and the Federal Reserve Index of Manufacturing Production (1967 = 100.0) from then through 1979. Both can be found in *Historical Statistics of the United States: Colonial Times to 1970*, Bicentennial Edition, Department of

Table 7

GROSS INDUSTRIAL CONSUMPTION OF SILVER IN THE UNITED STATES, 1880–1924

(millions of troy ounces, fine)

Year	Ounces	Year	Ounces
1880	2.5	1903	20.0
1881	3.0	1904	20.2
1882	5.0	1905	23.5
1883	4.5	1906	21.0
1884	4.5	1907	24.0
1885	4.0	1908	23.0
1886	4.2	1909	27.5
1887	4.3	1910	25.0
1888	6.0	1911	31.5
1889	6.5	1912	29.8
1890	7.0	1913	30.5
1891	7.5	1914	29.5
1892	7.0	1915	30.0
1893	7.3	1916	32.0
1894	8.5	1917	26.5
1895	9.0	1918	35.0
1896	7.5	1919	32.0
1897	8.5	1920	27.5
1898	9.2	1921	35.0
1899	11.5	1922	38.0
1900	12.5	1923	36.5
1901	13.5	1924	33.0
1902	19.0		

Commerce. The FRB series is brought forward to 1979 from the *Economic Report of the President 1980*. The final spliced index is on the base 1976 = 100.0. The Addicks and the Bureau of the Mint lines are not joined on the chart because of the uncertainty of common definition. However, the plotting is purposely on a logarithmic scale, so that it is slopes and comparative rates of change that signify and not necessarily absolute amounts.

Two lines on a chart can't prove anything but they can suggest hypotheses. One such hypothesis is that there have been in this century

Table 8

NET INDUSTRIAL CONSUMPTION OF SILVER IN THE UNITED STATES, 1925–1979

(millions of troy ounces, fine)

Year	Ounces	Year	Ounces
1925	29.9	1953	106.0
1926	29.4	1954	86.0
1927	28.4	1955	101.4
1928	24.9	1956	100.0
1929	30.9	1957	95.4
1930	26.8	1958	85.5
1931	24.3	1959	101.0
1932	14.4	1960	102.0
1933	10.8	1961	105.5
1934	11.4	1962	110.4
1935	5.2	1963	110.0
1936	19.1	1964	123.0
1937	27.7	1965	137.0
1938	20.1	1966	150.0
1939	44.6	1967	145.0
1940	44.4	1968	145.0
1941	72.4	1969	142.0
1942	101.4	1970	128.5
1943	118.0	1971	129.1
1944	120.1	1972	151.7
1945	126.3	1973	196.4
1946	87.0	1974	177.0
1947	98.5	1975	157.7
1948	105.3	1976	170.5
1949	88.0	1977	153.6
1950	110.0	1978	160.2
1951	105.0	1979	165.6
1952	96.5		

two structural shifts in our industrial economy that have had major repercussions for the industrial consumption of silver. One took place in the period 1900–1910; the other between 1938 and 1945. These are roughly coincident with the electrification of America and the war that was the genesis of the electronic age. I do not intend to probe the hypothesis deeply here, but I suggest that each of these structural shifts im-

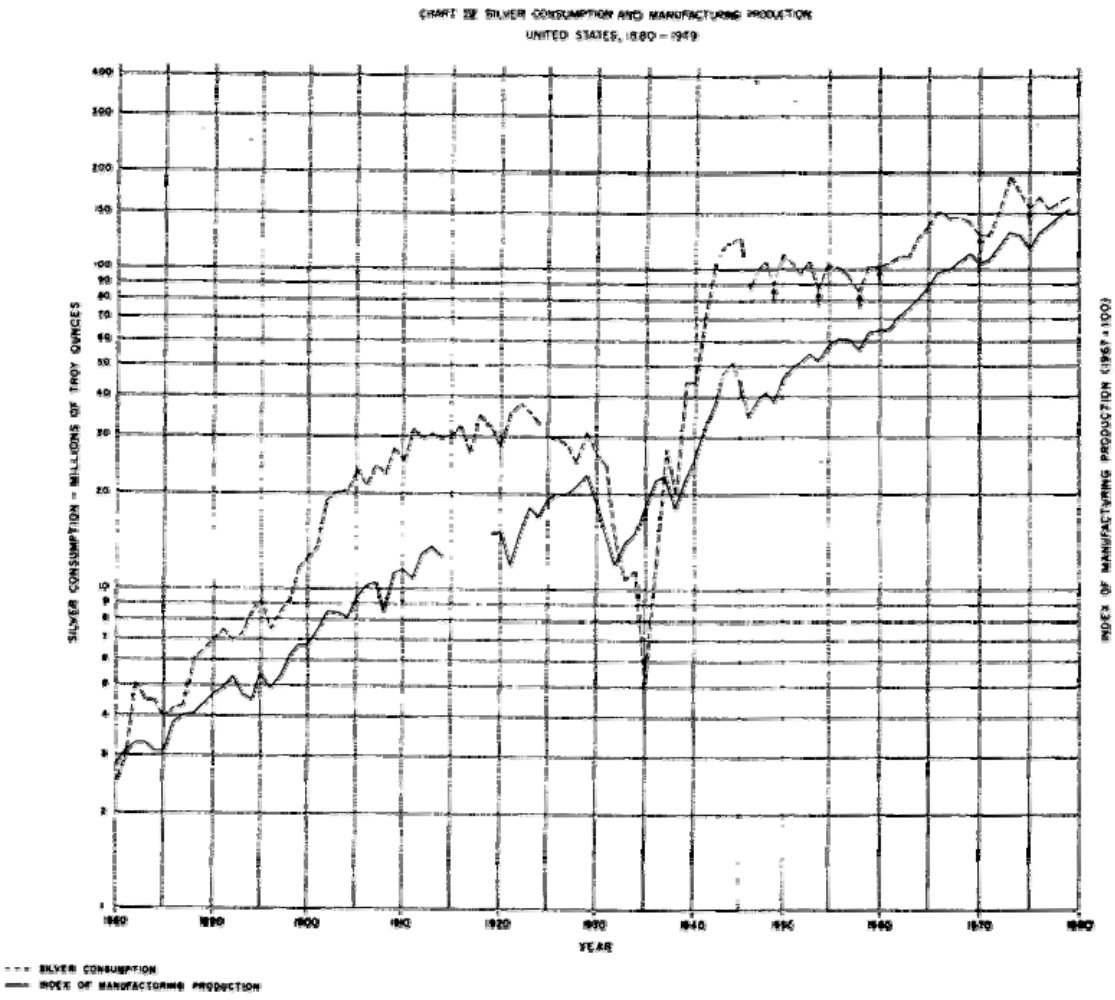


Chart IV Silver Consumption and Manufacturing Production: United States, 1880–1979.

planted silver more deeply into our industrial establishment, and planted it there to stay.

In line with this hypothesis, between 1880 and 1900 on the chart silver consumption by industry proceeded by about the same *rate* of increase as industry itself. Then between 1900 and 1910 silver consumption shot up at a far more rapid pace than did the industrial base. From there until 1929 the two series proceed at about the same proportionate pace. Again during World War II the ratio of industrial silver to manufacturing production increased dramatically. After this the silver coefficient tended to settle down and the industrial usage of silver increased roughly

in proportion to industry itself. Something of a narrowing of the rates of change between the two in later years could be explained by the unprecedented increase in silver prices, leading to economies of silver usage per increment of industrial output achieved.

What is remarkable, in any case, is the congruence of the two lines between 1929 and 1938, the years of the Great Depression. The consequences of this will be considered later.

Again following our procedure of moving from the more recent data into the past and, perforce, from the more detailed information to the less so, let us take up supply. This is done in Table 9.

On the supply side the United States is far from dominant. Of total new production world-wide it contributes only 15 percent, versus its consumption of 38 percent. The difference it makes up by net imports (56.2 million troy ounces in 1979) and scrap recycling. In millions of ounces the gap between total industrial consumption and new production was 126.1 in 1979. The former has exceeded the latter since 1941. Further to exacerbate the situation U.S. mine production peaked in 1940 and has been substantially lower ever since. In the former year new production in this country amounted to 70 million ounces; in 1979 it was but 39.5 million. More of this in the next chapter.

Silver is now predominantly a product of the Western Hemisphere, especially of the intercontinental upthrust ranging from Alaska south through the Andes. In 1979 all of 72 percent of new production in the world came from that extended mountain chain.

World production of new silver has remained substantially level in recent years. The net rise between 1972 and 1979 was by 10 percent only. Total supplies from all sources new and old, went up even less, with the total in 1979 effectively the same as in 1972.

For 1961–1971 we can reconstruct a definable approximation to total world silver supplies by taking figures for world new production from the Bureau of Mines and combining them with data for silver scrap, melted coins, and Indian exports from an unpublished report of Consolidated Gold Fields, Limited.

Time and again the evidence of this chapter underscores the fact that silver has become an industrial commodity, whatever aspects it still retains of something precious.

Addicks would have us believe that this once was touch-and-go. His volume, published in early 1940, was under the aegis of the National Bureau of Standards. A sense of mission is imparted by the Preface:

Table 9

WORLD SILVER SUPPLIES, 1972–1979

(Excluding Communist-dominated Areas)

(millions of ounces)

	1979	1978	1977	1976	1975	1974	1973	1972
New production								
Western Hemisphere								
United States	39.5	39.4	38.2	34.3	34.9	37.5	38.8	37.5
Canada	38.1	39.9	42.8	41.2	39.7	33.8	37.3	37.2
Mexico	56.0	50.8	47.0	42.6	38.0	42.8	47.5	44.5
Peru	38.5	37.0	36.1	35.6	37.5	41.0	42.0	40.2
Other countries	23.5	22.3	20.5	18.8	18.9	18.9	17.2	18.2
Total	195.6	189.4	184.6	172.5	169.0	174.0	183.0	177.9
Outside the Western Hemisphere:								
Australia	22.9	24.9	27.4	25.1	23.3	21.6	22.4	21.9
Other countries	52.5	50.7	55.4	49.0	47.8	45.9	49.7	45.9
Total	75.4	75.6	82.8	74.1	71.3	67.5	72.1	67.8
Total new production	271.0	265.0	267.4	247.0	241.5	241.5	255.1	245.7
Other sources of supply								
From U.S. Treasury	0.1	0.1	0.4	1.3	2.7	1.0	0.9	2.3
From stocks of foreign gov'ts	3.1	8.4	5.0	7.0	18.4	20.0	50.0	10.0
From demonetized coin	14.5	14.0	23.0	55.0	35.0	35.0	15.0	15.0
From Indian stocks	33.5	45.5	40.6	70.0	66.0	42.0	39.0	19.0
Salvage and other miscellaneous sources	80.5	86.5	80.2	76.1	73.2	55.6	60.5	45.3
Liquidation of (additions to) private bullion stocks	30.1	14.0	20.1	(4.6)	(21.2)	50.0	80.0	90.0
Total other supplies	161.8	168.5	169.3	204.8	174.1	203.6	245.4	181.6
Available for world consumption	432.8	433.5	436.7	451.8	415.6	445.1	500.3	427.3

Note. Figures for 1979 are preliminary. Some of the figures for 1975 through 1978 as published in last year's Review have been revised. (Handy & Harman)

Table 10

WORLD SILVER SUPPLIES, 1961–1971

(millions of troy ounces)

Year	New Production	Silver Scrap	Coin Melt	Indian Export	Total
1961	237.0	45.0	20.0	2.0	304.0
1962	245.8	50.0	20.0	2.0	318.0
1963	250.0	55.0	15.0	3.0	323.0
1964	243.6	60.0	20.0	12.0	336.0
1965	257.4	65.0	30.0	16.0	368.0
1966	266.7	69.0	28.0	16.0	380.0
1967	258.2	68.0	35.0	35.0	396.0
1968	275.3	79.0	50.0	76.0	480.0
1969	295.7	83.0	50.0	41.0	470.0
1970	301.0	60.0	25.0	32.0	418.0
1971	294.7	71.0	20.0	32.0	418.0

> The thesis is that the way to "do something for silver" is to help it find its rightful place in the family of useful metals. . . . Total collapse of the market has been avoided solely by the buying operations of the United States Treasury. Industrial consumption is the only refuge, and the ultimate issue may well depend upon to what extent and how quickly the industrial uses for silver can be developed.

Certainly, industrial uses have been developed, almost to the exclusion of the use of physical silver for anything else. Some of the consequences are not altogether good.

6 The Future of the Restless Metal

What of the future? For silver prices the answer is clear: they will rise. The open questions are when and how much.

The bases for the directional forecast are to be found in the rather peculiar aspects of the supply and demand for silver today. They are not mysterious but they are different from the supply and demand functions for most commodities. We will take up supply and demand in order, put them together, and close with some general observations about the future of silver.

SUPPLY

Mine Production

Of overwhelming importance to the primary supply of silver is the fact that it is not found alone. Between 60 and 70 percent of the new silver produced world-wide comes as a by-product of copper, lead, and zinc. Illustrative of this relationship is Table 11.

Table 11

WORLD BY-PRODUCT SILVER OUTPUT, 1971

From	Ounces of Silver (thousands)		Tons of Base Metal (thousands)		Ounces Per Ton of Base Metal
Lead ores	10,828		897		13
Zinc ores	25,059		1,502		17
Copper ores	15,202		626		24
Lead-zinc	83,270		4,247		20
Unclassified	9,412		43		219
Total	143,771	÷	7,255	=	20

Source. Unpublished memorandum from Consolidated Gold Fields Limited.

With the price of silver around $1.50 in 1971 the mines were returning only about $30 worth of silver for a ton of base metal. It is easily seen that such silver was not being mined for its own sake. Actually, the ratio was worsening. The yield of silver derived at the foot of the last column had slumped from 32 ounces/ton in 1962, to 25 ounces/ton in 1966, and to 20 ounces/ton in 1971.

There is a reasonable hypothesis to explain this declining ratio of silver per ton of base metal mined. Geologists call it "epithermal deposition." When the earth was formed the richer mixes of silver were put near the surface of the globe. The further down the less the silver per ton of earth. In contrast, the base metals occur in about a constant proportion. As the miner goes further and further down for the base metals, he gets less silver per ton of ore. This is sufficient to explain why silver has a low elasticity of supply with regard to its own price; yet has a high cross-elasticity of supply in response to changes in the base-metals markets. Between 1972 and 1979 world production of new silver went up by only 10 percent, whereas its price increased by 556 percent.

Silver Scrap

Silver scrap—often called "recycled" or "recovered"—is consistently the largest source of secondary supply. This is silver recovered from the in-

termediate and end products of industrial processes; from old silverware and jewelry on one end to old batteries and film on the other. As silver soared toward $50 an ounce in January 1980 Eastman Kodak was even reprocessing the tiny rounds of film punched out so that the sprockets in a camera can engage the edge of a film.

Apart from such striking examples, fluctuations in scrap supply seem to depend more on the size of the recoverable silver pool than on price. The influence of price is steady and persistent because of the long-standing gap between primary and secondary supply. The incentive is always there as long as a pool of used silver exists. This pool expands and contracts, however, depending largely on cyclical fluctuations in the photographic industry, electronics, and other industries that are sizable users of the metal. Even this source of silver supply is hard to predict -year by-year because of the varying time lags between initial usage of silver industrial processes and the time when it becomes economical to convert the earlier end-products into scrap. Price plays a role in how much scrap is generated, but in recent times it operates only at the level of marginal recovery processes.

Coin Melt

The supply of silver afforded by the melting of coins is highly sensitive to the market price of bullion. When a fragment of silver becomes more valuable in the market than in a monetary medium the coin takes the heat. At least it would do so in simple theory. In practice, the corollary to Graham's Law does not work quite so smoothly. Since coinage became a sovereign prerogative centuries ago, the state has periodically banned the melting of coins within its jurisdictions. As with laws against counterfeiting and debasing, these bans have worked imperfectly in their intended purpose. They may delay or diminish the sensitivity of coin melt to bullion price. However, even when such laws are in effect they seem not to negate a high price elasticity of the supply of silver from this source. Melting of coins is easy to do and easy to hide.

Not related to price is another source of coin melt: foreign government recovery of silver from demonetized coins. This was particularly prevalent in the latter part of the 1960s. It happened again in 1976 on a singular occasion when Germany had a one-time coin melt of 28 million ounces.

Indian Exports

The amount of silver in India (and Pakistan) is not known. Estimates by seasoned observers suggest a ceiling of 4 billion ounces, with the actual amount considerably less than that. We are talking about vast quantities of personal jewelry, tableware, and old coins, plus religious objects and art collected over centuries. Much of it is simply not for sale. Personal adornment represents an inordinate hoard of silver because of the sanctified practice that wealth can be passed as female inheritance only in the form of personal jewelry. Therefore, although the amounts are huge, they do not represent an economic overhang for the silver markets of the world that their sheer mass might imply. New silver is not produced in India.

Until 1974, private export of silver was usually illegal; the smuggling trade thrived, however. The major bullion dealers of the world have informed estimates of its volume, thanks to an intelligence network that might be the envy of the KGB. It is from this surveillance that we have the figures given earlier in this book. Beginning with 1974, the export of silver was legalized and government agencies actually cooperated with private interests in developing marketing facilities abroad. Then new restrictive regulations were applied in early 1976 that allowed only rationed exports through Bombay, Calcutta, Madras, and New Delhi. Later in the year all official silver outflow had to be channeled through the State Trading Corporation. Then in February 1979 the government decided to ban the export of silver again. Smuggling goes on. To keep perspective, the reader should remember that even in 1979 the Indian outflow approximated the total production of new silver in the United States.

Historically the export of silver from India has been notoriously sensitive to world price, especially when fed by illegal channels: one would expect this to be so, given the risk involved. An example of this price elasticity of supply is noted in 1968. Between 1967 and 1968 world price went up +38 percent and smuggling volume more than doubled. The next year prices fell nearly −20 percent. Smuggling fell by nearly one-half. When dealing with a criminal element, one is working in a highly reactive market environment.

In more recent times, supplies from Indian stocks have behaved differ-

ently. In the booming years of price from 1973 to 1979 there has been a net decline in annual outflow. We might surmise that the readily available personal stocks have been depleted and that future supplies from India will be much less sensitive to increases in world prices than previously.

To give perspective to the supply-side potential, data on world silver stocks are relevant. These are given for 1978 and 1979 (Table 12) directly from the Handy & Harman's 64th Annual Review (1979). The reader will notice that Handy & Harman have omitted any estimate of the unknown stocks in India. In Handy & Harman's explanatory remarks: "The following table summarizes on a world-wide basis, excluding Communist countries, reported and unreported stocks of silver both in bullion and coin. In some cases, figures are available from published reports, both governmental and private, at least on a preliminary basis. In the case of 'Stocks of foreign governments,' only partial information is reported, and there are no figures available for what we term 'Conjectural stocks.' "

Putting it all together, what are we to conclude about the future price elasticity of world silver supply?

1. Newly mined supplies are price-inelastic, to say the least. To say the most, they are not connected to silver price at all.
2. The great bulk of silver scrapping is profitable at a considerable range around current price and will be carried on in any case. The pool available for recycling is the more critical element. Higher prices can only bring in marginal recovery processes. This source of supply, then, is price-inelastic upward.
3. Coin melt has diminished steadily since 1976, being only a quarter as much in 1979 as in the former year. The doubling of silver price was not a positive influence and the prospective price elasticity appears to be low. We must be aware, however, of the tremendous overhang of the hoarded silver coins in the world, and especially in the United States. Perhaps the appearance of $50 silver in early 1980 has brought these out in substantial measure. We won't know until the annual data for the current year have been compiled. In any case, it seems reasonable to take market behavior between 1976 and 1979 as indicative, and to conclude that this supply of silver is price-inelastic.
4. India is an enigma. Again, as in coin melt, we will take recent behav-

Table 12

SUMMARY OF WORLD STOCKS

(millions of ounces)

	1979	1978	Increase (Decrease)
Reported private stocks			
New York Commodity Exchange	73.8	58.2	15.6
Chicago Board of Trade	58.3	59.9	(1.6)
London Metal Exchange	13.1	23.0	(9.9)
Industry stocks in the United States	23.7[a]	28.8	(5.1)
Total	168.9	169.9	(1.0)
U.S. Government stocks			
U.S. strategic stockpile	139.5	139.5	—
U.S. Defense Department	5.2[a]	6.3	(1.1)
U.S. Treasury (Mint)	39.1[a]	39.2	(.1)
Total	183.8	185.0	(1.3)
Stocks of foreign governments (estimated)	138.0	143.0	(5.0)
Conjectural stocks			
Unreported bullion stocks in the U.S. & abroad	50.1	66.0	(15.9)
U.S. silver coins potentially available	712.0	716.0	(4.0)
Foreign silver coins potentially available	34.5	45.0	(10.5)
Total	796.6	827.0	(30.4)
Total world silver stocks	1287.3	1324.9	(37.6)

[a] As of September 30, 1979.

ior as indicative and attribute price-inelasticity to this source of world supply. But as with coin melt, we must remain aware of an overhang that could significantly affect world markets.

In all, the conclusion is that the world supply of silver is price-inelastic into the foreseeable future. This is consistent with recent years: between 1972 and 1979 price went up by 550 percent, yet total silver available for world consumption increased by only 1 percent.

DEMAND

Industrial Demand

Silver for industrial purposes sells against a *derived* demand. That is to say, the quantities of it purchased depend on the consumer demand for the final products into which silver enters. This typically gives silver a wide latitude for price movements per ounce of the metal without appreciably affecting the quantity of silver sold in a particular application.

For example, suppose $200 worth of silver goes into a desk-top computer with a final retail price of $10,000. Then the price of silver could double and the selling price of the computer would go up to $10,200 even if all the silver cost increase were passed on to the final purchaser. An increase of +2 percent at the computer sales level is not going to reduce the sale of computers very much. Hence the sale of silver for computers is not going to be reduced by very much, either. We may take it as a general rule that the price elasticity of a derived demand is a mere fraction of the elasticity of final demand for the end product into which industrial silver enters. Moreover, this fractional relationship is roughly equal to the fraction of the price of the end product that the cost of the intermediate product (e.g., silver) represents. Thus in the example above the silver is one-fiftieth of the price of the computer. The price elasticity of demand for silver in computer construction would therefore tend to be only one-fiftieth of the price elasticity of demand for computers themselves. Following this line of reasoning we can say it is generally true that derived demands in industry are inelastic with respect to price and that this is certainly true for silver.

Apart from its status as an intermediate good selling against a derived demand there is another possible effect of future price increases on the demand for industrial silver. Other metals might be substituted for it on a price basis. Guarding against this is the fact that of all the metals silver has the highest electrical and thermal conductivity and the highest optical reflectivity. Only gold exceeds it in ductility and malleability. Silver possesses remarkable resistance to a wide variety of corrosive agents. It also forms salts and compounds with valuable photosensitive and bactericidal properties. In its largest application, photographic materials, research has been conducted for decades to find an acceptable substitute

for it with only marginal success in a few applications. This is not to say that silver has no substitutes; rather, most of the economically feasible substitutions have already been made, given the price history of silver over the last 6 years. As we look to the future we cannot see much further substitution in its high-volume industrial uses.

Investment and Speculative Demand

Investment demand for silver depends largely on three factors: expectations of silver prices, expectations of price inflations, generally, and geopolitical uncertainties in the world. Because I expect the first to rise and the other two to be endemic in the foreseeable future, I expect investment demand to be on the rise at a varying pace over time. This will reinforce the forecast for rising silver prices already made. In this connection it is significant to note that the central banks of some of the silver producing countries are buying native silver as a liquid asset, intending to hold it for capital appreciation.

Speculative demand can be enormously influential in the short run; in the long run it cannot sustain a trend acting alone. It is always with us where precious metals are concerned, weaving a pattern of short-run fluctuations around a trend of silver prices established by other, more basic and persistent forces.

Coinage Demand

The demand for silver for subsidiary coinage is still considerable in some parts of the world. This demand may someday be priced out of the market entirely, but in the foreseeable future it is only marked as a demand dependent on national policy and substantially independent of market fluctuations in silver prices.

Putting our observations together, what can we say about the future price elasticity of demand for silver?

In volume, industrial demand and investment demand will swing the result. The first is clearly and pronouncedly price-inelastic; the second bears both a positive association with price and expectations of future higher prices. The clear conclusion is that the foreseeable aggregate demand for silver is price-inelastic.

We come out, then, with a model of a commodity market for which both supply and demand are inelastic with respect to movements in price, especially in an upward direction. This means that an increase in price by any given percentage, once touched off, will result in a less than proportionate increase in supply *and* a less than proportionate diminution of demand. Such a market is highly unstable in an upward direction. For a commodity like silver this bullish potential can be realized overnight or over a decade. Overnight, because a geopolitical catastrophe could cause a swift movement of funds out of all national currencies and into precious metals; over a decade, because precious metals are considered a protection of assets against the erosions of inflation. A distinct strengthening of industrial demand could have the same result.

On this basis rests the forecast of rising prices for silver. The only questions remaining are when and by how much.

In the late 1930s the Bureau of Standards launched a veritable campaign to rescue silver by promoting it for industrial use. I say "campaign" because that is exactly what Addicks called it in the Preface to the resulting volume, *Silver in Industry* (1940). The authors were eminent scientists and engineers, and their various chapters explained and extolled the properties of silver for industrial purposes. The sponsors were a Who's Who of mining companies, refiners, and bullion dealers.

The campaign was a success. Silver had been used in industry before; no question. But the rise in its industrial consumption surged in the late 1930s and early 1940s as pictured in Chart IV. Certainly the timing was propitious, and the surge might have come anyway. But all credit to the Bureau's effort.

However, this further implantation of silver on the industrial scene was not an unmixed blessing. The penalty was that demand for silver took on a susceptibility to the same business cycles to which industry is prone.

This phenomenon is graphically shown in Chart IV. There the small arrows point to years of recession. These years are adduced from the monthly turning points designated by the National Bureau of Economic Research. The National Bureau, a private organization, has been accorded generally the authoritative role of dating business cycles in the United States. It can be seen that the recessions in silver consumption match very closely the recession of the industrial economy. This is an un-

derstandable price that silver must pay for becoming predominantly an industrial good.

But silver has not left behind it the characteristics of a precious metals market. It is still bought by individuals and institutions as an investment, as a protection against inflation, and as a speculation.

The principal conclusion that arises from this line of thought is that silver now can reflect the worst of two worlds: it is subject to the cyclical swings of the industrial world; it is also influenced by the speculative and acquisitive motives of the world of precious metals.

This conclusion is nowhere better illustrated than by the events of early 1980. By late January of that year silver had been driven up almost to 50 dollars an ounce—only slightly less than five times as high as the average of the preceding year. Congressional hearings have been held, conflicting accounts have been given, and, consistent with the nature of the world of precious metals, the full explanation may never be known. But it is clear that the fantastically powerful driving force was speculation. The price collapsed in a matter of days; by March silver was selling for just over $10.

What is an industrial buyer to do in the face of volatility like that? Fortunately, there is a futures market in which the purchasing agent can hedge his predictable needs. Ironically, this is the same futures market that makes such volatile speculative movements possible.

7 Reflections on the Restless Metal

The preceding chapters have described in some detail the linear history of silver, its rise and fall in price over centuries, its ceaseless fluctuations in purchasing power, its physical ebb and flow from one continent to another. Now, in this concluding note, it seems useful to distill from the detail the three major phases of silver's evolution: when it was a monetary standard for all countries; when it was money for none; and when it was money for some but not for others—a most unsettling hybrid.

In the first phase, when silver was universally monetized, it was the business of the mints of the world to keep its price within relatively narrow limits and maintain the limits over substantial periods of time. This was predominantly the situation between the middle of the sixteenth century and the last of the nineteenth. Then silver alone, or in bimetallic partnership with gold, ruled the monetary base of the world economy. The stability of the price of silver over these three centuries is a striking feature of Chart I.

Then, in the last half of the nineteenth century came the great shifts away from silver as a monetary base to gold alone: France, Germany, Holland, Belgium, Italy, Scandinavia, Switzerland, Greece, Romania, Russia, Japan, and the United States made the change. England had

made the move earlier, de facto. Silver as a monetary standard lingered on only in the East and in some South American countries. With official purchases greatly diminished and rigid support prices at the mints largely removed, those countries that lagged behind the exodus had their currency systems sorely tried. The treatment of a metal as a monetary standard and as a free-market commodity are two quite different matters and are essentially inimical to each other. Silver became the focus of serious international turmoil.

The centuries of stability terminated in the 1870s as silver prices fell swiftly. Then, in 1890, the ball rolled off the billiard table. The response in the United States to this disaster for the silver interests and the advocates of cheap money was to attempt to remove the free-market aspect of silver. There were two thrusts to this: one was to leave it as a commodity but to favor it with government price supports; the other was to remonitize it. Both were political solutions and both failed. What they did accomplish was to create an intolerably unstable set of expectations in world markets. The charts reflect this instability from 1870 onward.

Attempts to "do something" for silver continued to fail for decades. In 1932 silver was selling in New York for two bits an ounce. Once proud silver, the darling of centuries, stood utterly degraded. Then Franklin Delano Roosevelt charged to the rescue. His was an administration that understood support prices and the single-issue constituencies behind them. Silver was embraced along with other selected commodities.

Here we have a shocking example of how nonmonetary purchase programs undertaken unilaterally for purely domestic reasons can have devastating effects on other countries. The silver purchase program of the New Deal averaged at its height only about $220 million a year, yet it drove China off the silver standard in November 1935. Mexico and other silver-using countries also suffered severely.

The third phase of silver was reached in 1936: silver was no longer a money standard for any nation except Ethiopia. As late as 1939 Professor Anatole Murad of Rutgers University felt able to write its epitaph: "Silver is no longer of interest to anyone except those unfortunate enough to be producing this unwanted commodity" (*The Paradox of the Metal Standard*).

But between China's departure from the silver standard and 1980 the price of silver sailed up beyond imagination. As this is written the annual average for 1980 just became available: $21.60. Since silver turned the corner into the nonmonetary world its price has risen by 4700 percent

in terms of annual averages. (When silver peaked in January 1980, it had soared by 10,000 percent since Professor Murad had made his prediction.)

What had happened? What was going on? The explanation is found in a constellation of causes that had never come together before.

First, silver was cast loose by all the monetary authorities to find its own level on the free market.

Industrial demand was rapidly coming to the fore. An explosive combination of derived demand and by-product supply was formed as the aggregate demand function rose on the accelerating trend of industry, especially in the burgeoning new technologies.

Some central banks were buying silver along the way and continue to do so today, adding to the aggregate demand from the private sector.

Then in the early 1960s it became apparent to some analysts that the commodity market was developing into a marvelous speculation for silver, since newly mined supplies were running behind total demand with every prospect that the gap would widen. Another part of this reasoning was that inflationary expectations were rising with the Johnsonian financing of the Vietnam War, and silver, in its age-old defensive role as a precious metal, was being accumulated in anticipation.

During this decade, 1970–1980, it was well known in the bullion markets of the Continent and London that title was being taken to large amounts of silver by families and government instrumentalities in the Middle East. In the United States the Hunt brothers began accumulating silver on a speculative (investment) basis in the early 1970s when it was selling in the region of $1.60. In the summer of 1980, well after the silver market collapse, they still held 63 million ounces (*Fortune,* August 11, 1980). Other large operators made accumulations of their own but escaped the Hunts' publicity.

Thus a large base was being built for a vigorous price move. In 1979 and early 1980 speculative buying reached a crescendo. New silver price records being set daily stimulated the speculative motive further. Then, dramatically, from a high of $48.00 the price collapsed to $10.80 within seven weeks. The restless metal showed how explosive it could be.

The surge and collapse of 1980 is but the most recent and violent of this volatile metal. It has been erratic since 1875. Anyone who enters the silver market, on whatever terms, is surely put on guard by history's lessons.

Here it might be well to dispel a persistent belief that there is a magical ratio of 16 : 1 between gold and silver prices to which silver must

surely return. That ratio belongs to the phase when silver was money, often in partnership with gold. That ratio has not held true for a century and a quarter (see Table 19). It has gone as high as 95 : 1 and there is no rational reason for it to return to a ratio that is now in the realm of myth.

EPILOGUE

Examination of the past is not worth the effort if the same mistakes are simply to be repeated in the future. However, an objective look at what succeeded in the past, and what went wrong, can sometimes illuminate present dilemmas—and dilemmas we have aplenty.

It is obvious, even from the most cursory look at the past history of silver, that use of this metal as money has been, with regrettably few exceptions, ill-advised, unintelligent, shortsighted, and greedy. We have never understood, except for few and fleeting periods, how to use it or how to control it.

We have escaped from clipped, debased, and manipulated coinage into manipulated, debased, and politicized paper—not much of an exchange. World stability rests on money. Where can discipline be found?

Appendix A Spanish Statistics

Table 13

TREASURE IMPORTS INTO CASTILE FROM THE INDIES, 1503–1660

Year	Public		Private		Totals in Kilograms of Silver
	In Kilograms of Silver	Percentage of Total	In Kilograms of Silver	Percentage of Total	
1503–1510	13,155	26%	37,054	74%	50,209
1511–1520	24,260	26	68,308	74	92,568
1521–1530	12,992	26	36,595	74	49,587
1531–1540	75,410	32	160,901	68	236,311
1541–1550	99,397	22	343,052	78	442,449
1551–1560	219,771	29	535,686	71	755,457
1561–1570	236,994	22	834,957	78	1,071,951
1571–1580	420,697	34	812,364	66	1,233,061
1581–1590	659,433	29	1,590,601	71	2,250,034
1591–1600	887,952	30	2,055,866	70	2,943,818
1601–1610	637,264	27	1,722,774	73	2,360,038
1611–1620	488,881	21	1,821,767	79	2,310,648
1621–1630	402,158	18	1,795,353	82	2,197,511
1631–1640	398,571	28	1,014,929	72	1,413,500
1641–1650	266,786	25	813,013	75	1,079,799
1651–1660	120,527	27	330,248	73	450,575
Totals	4,964,038	26	13,973,468	74	18,937,506

Source. Adapted from Earl J. Hamilton, *American Treasure and the Price Revolution in Spain, 1501–1650* (Cambridge: Harvard University Press, 1934), p. 34.

Table 14

PUBLIC REVENUES REMITTED TO CASTILE FROM MEXICO AND PERU, IN KILOGRAMS OF SILVER, 1591–1800

Years	Remitted from Peru	Remitted from Mexico	Total Remitted to Castile	Remissions of Public Treasure to Castile (E. J. Hamilton)	Percentage from Peru	Percentage from Mexico
1591–1600	510,133	238,563	748,696	887,952	68%	32%
1601–1610	440,912	273,793	714,705	637,264	62	38
1611–1620	299,362	156,042	455,404	488,881	66	34
1621–1630	295,315	168,873	464,188	402,158	64	36
1631–1640	446,927	223,211	670,138	398,571	67	33
1641–1650	382,302	76,208	458,511	266,786	83	17
1651–1660	219,706	110,350	330,056	120,327	67	33
1661–1670	91,214	102,020	193,234		47	53
1671–1680	53,400	254,770	308,170		17	83
1681–1690	7,857	121,951	129,808		6	94
1691–1700	21,525	65,958	87,483		25	75
1701–1710	42,381	133,951	176,332		24	76
1711–1720	1,978	183,700	185,678		1	99
1721–1730	26,473	155,891	182,364		15	85
1731–1740	35,409	211,142	246,551		14	86
1741–1750	13,522	159,680	173,201		8	92
1751–1760	0	400,007	400,007			100
1761–1770	0	185,641	185,641			100
1771–1780	0	385,729	385,729			100
1781–1790	0	723,050	723,050			100
1791–1800	0	966,062	966,062			100
Total	2,888,415	5,296,592	8,185,008		35	65

Source. Adapted from John J. TePaske, "New World Silver, Castile, and the Philippines (1590–1800)" (unpublished paper, 1979).

Appendix B English Statistics

Table 15, which follows, is basic to the history of silver in England. It presents on a comparable basis the price of silver bullion from 1273 through 1977—that is, until the recent gyrations that have represented such a break with the past. To the best of my knowledge no other source has given silver prices with the consistency and for the length of time represented here.

Essentially the only reliable and regular information from the thirteenth to the late seventeenth century was the Mint price of silver, which represented the face value of the silver coinage into which the Mint was obliged to coin a given quantity of metal. It should be noticed that this is an officially fixed price and makes no allowance for free market fluctuations that undoubtedly took place.

A reasonable guide to genuine market prices becomes available only in the late seventeenth century, with a weekly register of prices that gradually evolved into "Castaing's Course of the Exchange," which was published twice weekly and distributed on the streets of London. This collection, which exists in the Goldsmith Library, University of London, provides the prime source for prices throughout the eighteenth century, together with market reports of a similar character put out by Lloyds and later by Lutyens.

From 1833 on, reliance is placed on the annual average silver price chart compiled by Sharps Pixley Ltd., London. Since Sharps itself entered into the regular silver business in London from 1811, and by the 1830s was an important member of the London market, its quotations are obviously a realistic guide to market movements over the period since.

In the final column of the table, special events pertaining to the behavior of silver prices have been noted in order to keep the reader oriented over such a long span of time.

The statistics here were originally prepared by Mr. Timothy Green for the use of Mocatta Metals Corporation.

Table 15

SILVER PRICES IN POUNDS AND DOLLARS ENGLAND, 1273–1977

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1273–1278	0.0896 (242d per Tower pound)	n/a		
1279–1334	0.0900 (243d per Tower pound)	n/a		
1335–1343	0.0933 (252d per Tower pound)	n/a		
	0.0941 (254d per Tower pound)	n/a		
1344–1350	0.0985 (266d per Tower pound)	n/a		
	0.10 (270d per Tower pound)	n/a		
1351–1411	0.1111 (300d per Tower pound)	n/a		
1412–1464	0.1333 (360d per Tower pound)	n/a		
1465–1523	0.1667 (450d per Tower pound)	n/a		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1524–1541	0.1875 (45s per troy pound)	n/a		In the early 1520s troy measure was introduced into England
1542–1551	0.20 (48s per troy pound)	n/a		
1552–1600	0.25 (£3 per troy pound)	n/a		
1601–1692	0.2583 (£3.2s per troy pound)	n/a		
1693	0.2583 (£3.2s per troy pound)	0.2625[c]		
1694	0.2583 (£3.2s per troy pound)	0.2629[d]		Bank of England founded
1695	0.2583 (£3.2s per troy pound)	0.2882[e]		
1696	0.2583 (£3.2s per troy pound)	0.2771[f]		Great recoinage of 1696–1699
1697	0.2583 (£3.2s per troy pound)	0.25[g]		
1698	0.2583 (£3.2s per troy pound)	0.2605[h]		
1699	0.2583 (£3.2s per troy pound)	No quotations		
1700[i]	0.2583 (£3.2s per troy pound)	0.2584		
1701[i]	0.2583 (£3.2s per troy pound)	0.2579		
1702–1709	0.2583 (£3.2s per troy pound)	No quotation available		
1710[j]	0.2583 (£3.2s per troy pound)	0.2625		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1711–1717	0.2583 (£3.2s per troy pound)	No quotation available		
1718[j]	0.2583 (£3.2s per troy pound)	0.2721		
1719	0.2583 (£3.2s per troy pound)	0.2692		
1720	0.2583 (£3.2s per troy pound)	0.2725		
1721	0.2583 (£3.2s per troy pound)	0.2693		
1722	0.2583 (£3.2s per troy pound)	0.2669		
1723	0.2583 (£3.2s per troy pound)	0.2662		
1724–1725	0.2583 (£3.2s per troy pound)	0.2647		
1726	0.2583 (£3.2s per troy pound)	0.2675		
1727	0.2583 (£3.2s per troy pound)	0.2652		
1728	0.2583 (£3.2s per troy pound)	0.2690		
1729	0.2583 (£3.2s per troy pound)	0.2731		
1730	0.2583 (£3.2s per troy pound)	0.2714		
1731	0.2583 (£3.2s per troy pound)	0.2685		
1732	0.2583 (£3.2s per troy pound)	0.2673		
1733	0.2583 (£3.2s per troy pound)	0.2681		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1734	0.2583 (£3.2s per troy pound)	0.2621		
1735	0.2583 (£3.2s per troy pound)	0.2622		
1736	0.2583 (£3.2s per troy pound)	0.2650		
1737[c]	0.2583 (£3.2s per troy pound)	0.2666		
1738	0 2583 (£3.2s per troy pound)	0.2625		
1739–1740	0.2583 (£3.2s per troy pound)	0.2731		
1741	0.2583 (£3.2s per troy pound)	0.2821		
1742–1744	0.2583 (£3.2s per troy pound)	0.2584		
1745	0.2583 (£3.2s per troy pound)	0.2553		
1746[d]	0.2583 (£3.2s per troy pound)	0.2666		
1747	0.2583 (£3.2s per troy pound)	0.2722		
1748[e]	0.2583 (£3.2s per troy pound)	0.2684		
1749	0.2583 (£3.2s per troy pound)	0.2692		
1750	0.2583 (£3.2s per troy pound)	0.2698		
1751	0.2583 (£3.2s per troy pound)	0.2715		
1752	0.2583 (£3.2s per troy pound)	0.2754		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1753	0.2583 (£3.2s per troy pound)	0.2789		
1754	0.2583 (£3.2s per troy pound)	0.2756		
1755	0.2583 (£3.2s per troy pound)	0.2685		
1756	0.2583 (£3.2s per troy pound)	0.2678		
1757	0.2583 (£3.2s per troy pound)	0.2679		
1758	0.2583 (£3.2s per troy pound)	0.2782		
1759	0.2583 (£3.2s per troy pound)	0.2801		
1760	0.2583 (£3.2s per troy pound)	0.2791		
1761	0.2583 (£3.2s per troy pound)	0.2849		
1762	0.2583 (£3.2s per troy pound)	0.2757		
1763	0.2583 (£3.2s per troy pound)	0.2747		
1764	0.2583 (£3.2s per troy pound)	0.2652		
1765	0.2583 (£3.2s per troy pound)	0.2687		
1766	0.2583 (£3.2s per troy pound)	0.2781		
1767	0.2583 (£3.2s per troy pound)	0.2784		
1768	0.2583 (£3.2s per troy pound)	0.2757		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1769	0.2583 (£3.2s per troy pound)	0.2800		
1770	0.2583 (£3.2s per troy pound)	0.2817		
1771	0.2583 (£3.2s per troy pound)	0.2807		
1772	0.2583 (£3.2s per troy pound)	0.2789		
1773	0.2583 (£3.2s per troy pound)	0.2680		
1774	0.2583 (£3.2s per troy pound)	0.2629		
1775	0.2583 (£3.2s per troy pound)	0.2680		
1776	0.2583 (£3.2s per troy pound)	0.2721		
1777	0.2583 (£3.2s per troy pound)	0.2814		
1778	0.2583 (£3.2s per troy pound)	0.2739		
1779	0.2583 (£3.2s per troy pound)	0.2625		
1780	0.2583 (£3.2s per troy pound)	0.2681		
1781	0.2583 (£3.2s per troy pound)	0.2629		
1782	0.2583 (£3.2s per troy pound)	0.2918		
1783	0.2583 (£3.2s per troy pound)	0.2852		
1784	0.2583 (£3.2s per troy pound)	0.2887		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1785	0.2583 (£3.2s per troy pound)	0.2584		
1786	0.2583 (£3.2s per troy pound)	0.2633		
1787	0.2583 (£3.2s per troy pound)	0.2644		
1788	0.2583 (£3.2s per troy pound)	0.2658		
1789[m]	0.2583 (£3.2s per troy pound)	0.2630		Start of the French Revolution
1790	0.2583 (£3.2s per troy pound)	0.2618		
1791	0.2583 (£3.2s per troy pound)	0.2624		
1792	0.2583 (£3.2s per troy pound)	0.2669		
1793	0.2583 (£3.2s per troy pound)	0.2593		Outbreak of the Napoleonic Wars
1794	0.2583 (£3.2s per troy pound)	0.2556		
1795	0.2583 (£3.2s per troy pound)	0.2624		
1796	0.2583 (£3.2s per troy pound)	0.2650		
1797	0.2583 (£3.2s per troy pound)	0.2632		Suspension of cash payments by the Bank of England from February 26, 1797
1798	0.2583 (£3.2s per troy pound)	0.2530		

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1799	0.2583 (£3.2s per troy pound)	0.2716		
1800	0.2583 (£3.2s per troy pound)	No quotations		
1801	0.2583 (£3.2s per troy pound)	0.2962		
1802	0.2583 (£3.2s per troy pound)	0.2820		
1803	0.2583 (£3.2s per troy pound)	0.2801		
1804	0.2583 (£3.2s per troy pound)	0.2782		
1805	0.2583 (£3.2s per troy pound)	0.2920		
1806	0.2583 (£3.2s per troy pound)	No quotations		
1807	0.2583 (£3.2s per troy pound)	0.2807		
1808	0.2583 (£3.2s per troy pound)	No quotations		
1809	0.2583 (£3.2s per troy pound)	No quotations		
1810	0.2583 £3.2s per troy pound)	No quotations		
1811[n]	0.2583 (£3.2s per troy pound)	0.2962		
1812	0.2583 £3.2s per troy pound)	0.3197		
1813[o]	0.2583 (£3.2s per troy pound)	0.3406	1.2779	
1814	0.2583 £3.2s per troy pound)	0.3134	1.2802	

Table 13 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1815	0.2583 (£3.2s per troy pound)	0.3161	1.4282	
1816	0.2750 (£3.6s per troy pound)	0.2345	1.2034	Bank of England assumed responsibility for providing the Mint with silver bullion for coinage
1817	0.2750 (£3.6s per troy pound)	0.2406	1.1753	
1818	0.2750 (£3.6s per troy pound)	0.2693	1.1964	
1819[p]	0.2750 (£3.6s per troy pound)	0.2763	1.1928	
1820	0.2750 (£3.6s per troy pound)	0.2318	1.1332	
1821	0.2750 (£3.6s per troy pound)	0.2458	1.1829	Resumption of cash payments by Bank of England on May 1, 1821
1822	0.2750 (£3.6s per troy pound)	0.2470	1.2386	
1823	0.2750 (£3.6s per troy pound)	0.2460	1.1723	
1824	0.2750 (£3.6s per troy pound)	0.2511	1.2152	
1825	0.2750 (£3.6s per troy pound)	0.2536	1.2194	
1826	0.2750 (£3.6s per troy pound)	0.2479	1.2148	
1827	0.2750 (£3.6s per troy pound)	0.2490	1.2255	
1828	0.2750 (£3.6s per troy pound)	0.2498	1.2259	

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1829	0.2750 (£3.6s per troy pound)	0.2440	n/a	
1830	0.2750 (£3.6s per troy pound)	0.2473	n/a	
1831	0.2750 (£3.6s per troy pound)	0.2495	n/a	
1832	0.2750 (£3.6s per troy pound)	0.2381	n/a	
1833[q]	0.2750 (£3.6s per troy pound)	0.2466	n/a	Renewal of bank charter, bank notes, and legal tender in the United Kingdom
1834	0.2750 (£3.6s per troy pound)	0.2497	n/a	
1835	0.2750 (£3.6s per troy pound)	0.2487	n/a	
1836	0.2750 (£3.6s per troy pound)	0.2500	n/a	
1837	0.2750 (£3.6s per troy pound)	0.2482	n/a	Accession of Queen Victoria
1838	0.2750 (£3.6s per troy pound)	0.2479	n/a	
1839–1840	0.2750 (£3.6s per troy pound)	0.2516	n/a	
1841	0.2750 (£3.6s per troy pound)	0.2503	n/a	
1842	0.2750 (£3.6s per troy pound)	0.2477	n/a	
1843	0.2750 (£3.6s per troy pound)	0.2466	n/a	

Table 13 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1844	0.2750 (£3.6s per troy pound)	0.2479	n/a	Bank Charter Act passed in the United Kingdom
1845	0.2750 (£3.6s per troy pound)	0.2469	n/a	
1846	0.2750 (£3.6s per troy pound)	0.2471	n/a	
1847	0.2750 (£3.6s per troy pound)	0.2487	n/a	
1848	0.2750 (£3.6s per troy pound)	0.2480	n/a	
1849	0.2750 (£3.6s per troy pound)	0.2490	n/a	
1850	0.2750 (£3.6s per troy pound)	0.2503	n/a	
1851	0.2750 (£3.6s per troy pound)	0.2542	n/a	
1852	0.2750 (£3.6s per troy pound)	0.2521	n/a	
1853	0.2750 (£3.6s per troy pound)	0.2563	n/a	
1854	0.2750 (£3.6s per troy pound)	0.2560	n/a	Crimean War, 1854–1856
1855–1856	0.2750 (£3.6s per troy pound)	0.2555	n/a	
1857	0.2750 (£3.6s per troy pound)	0.2573	n/a	The Indian Mutiny
1858	0.2750 (£3.6s per troy pound)	0.2560	n/a	
1859	0.2750 (£3.6s per troy pound)	0.2586	n/a	

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1860[r]	0.2750 (£3.6s per troy pound)	0.2570		
1861	0.2750 (£3.6s per troy pound)	0.2534		American Civil War, 1861–1865
1862	0.2750 (£3.6s per troy pound)	0.2560		
1863	0.2750 (£3.6s per troy pound)	0.2557	1.8198	
1864	0.2750 (£3.6s per troy pound)	0.2577	2.5546	£13 million silver exported from France
1865	0.2750 (£3.6s per troy pound)	0.2544	1.8959	
1866	0.2750 (£3.6s per troy pound)	0.2547	1.7170	
1867	0.2750 (£3.6s per troy pound)	0.2523	1.2252	
1868	0.2750 (£3.6s per troy pound)	0.2521	1.2276	
1869	0.2750 (£3.6s per troy pound)	0.2518	1.2187	
1870	0.2750 (£3.6s per troy pound)	0.2523	1.2235	Franco-Prussian War, 1870–1871
1871	0.2750 (£3.6s per troy pound)	0.2521	1.2250	
1872	0.2750 (£3.6s per troy pound)	0.2513	1.2173	Beginning of decline in price of silver
1873[s]	0.2750 (£3.6s per troy pound)	0.2469	1.1854	German demonetization of silver
1874	0.2750 (£3.6s per troy pound)	0.2480	1.1804	

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1875	0.2750 (£3.6s per troy pound)	0.2370	1.1485	Continued decline in price of silver
1876	0.2750 (£3.6s per troy pound)	0.2198	1.0696	Remarkable fluctuations in rates of Indian Exchanges and Gen silver
1877	0.2750 (£3.6s per troy pound)	0.2284	1.1066	Russo-Turkish War, 1877–1878
1878	0.2750 (£3.6s per troy pound)	0.2190	1.0585	
1879	0.2750 (£3.6s per troy pound)	0.2135	1.0320	
1880	0.2750 (£3.6s per troy pound)	0.2177	1.0504	
1881	0.2750 (£3.6s per troy pound)	0.2154	1.0355	
1882	0.2750 (£3.6s per troy pound)	0.2151	1.0405	
1883	0.2750 (£3.6s per troy pound)	0.2107	1.0164	Discovery of silver at Broken Hill, New South Wales
1884	0.2750 (£3.6s per troy pound)	0.2109	1.0192	
1885	0.2750 (£3.6s per troy pound)	0.2026	0.9814	Broken Hill Proprietory Silver Mines opened
1886	0.2750 (£3.6s per troy pound)	0.1891	n/a	
1887	0.2750 (£3.6s per troy pound)	0.1859	n/a	
1888	0.2750 (£3.6s per troy pound)	0.1786	n/a	

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1889	0.2750 (£3.6s per troy pound)	0.1779	n/a	U.K. coinage of silver unusually large
1890	0.2750 (£3.6s per troy pound)	0.1977	n/a	Extension of silver legislation in the United States
1891	0.2750 (£3.6s per troy pound)	0.1878	n/a	Failure of U.S. legislation to maintain silver prices; large continental orders
1892	0.2750 (£3.6s per troy pound)	0.1659	n/a	Further depression in silver
1893	0.2750 (£3.6s per troy pound)	0.1484	n/a	Indian mints closed to free coinage of silver; repeal of Sherman Act in the United States
1894	0.2750 (£3.6s per troy pound)	0.1206	n/a	
1895	0.2750 (£3.6s per troy pound)	0.1245	n/a	Duty of 5% imposed on silver entering India
1896	0.2750 (£3.6s per troy pound)	0.1281	n/a	Defeat of Silver Party in U.S. election; extensive coinage of silver by Russia
1897	0.2750 (£3.6s per troy pound)	0.1148	n/a	
1898	0.2750 (£3.6s per troy pound)	0.1132	n/a	

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1899	0.2750 (£3.6s per troy pound)	0.1143	n/a	Boer War, 1899–1902
1900[c]	9.2750 (£3.6s per troy pound)	0.1177	0.5783	Large coinage of rupees
1901	0.2750 (£3.6s per troy pound)	0.1133	0.5528	Death of Queen Victoria
1902	0.2750 (£3.6s per troy pound)	0.1003	0.4891	Heavy fall in silver
1903	0.2750 (£3.6s per troy pound)	0.1031	0.5019	Large purchases of silver by Indian government
1904	0.2750 (£3.6s per troy pound)	0.1099	0.5354	Russo-Japanese War, 1904–1905; silver buying continued by Indian government
1905	0.2750 (£3.6s per troy pound)	0.1159	0.5640	Mexican mints closed to free coinage of silver; continued buying of silver by Indian government
1906	0.2750 (£3.6s per troy pound)	0.1286	0.6246	Heavy purchases of silver by Indian government
1907	0.2750 (£3.6s per troy pound)	0.1259	0.6128	Cessation of Indian silver buying; sharp fall in silver price
1908	0.2750 (£3.6s per troy pound)	0.1016	0.4946	General depression of trade
1909	0.2750 (£3.6s per troy pound)	0.0987	0.4813	Some improvement in trade
1910	0.2750 (£3.6s per troy pound)	0.1028	0.5004	Indian import duty on silver increased

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Standard Silver[b]	*Standard Silver*[b]	*Standard Silver*[b]	
1911	0.2750 (£3.6s per troy pound)	0.1023	0.4978	
1912	0.2750 (£3.6s per troy pound)	0.1168	0.5688	Purchase by Indian government of £6 million of silver
1913	0.2750 (£3.6s per troy pound)	0.1148	0.5588	Purchase by Indian government of £5.5 million of silver; failure of Indian Specie Bank
1914	0.2750 (£3.6s per troy pound)	0.1055	0.5153	First World War 1914–1918; record U.K. coinage of silver
1915	0.2750 (£3.6s per troy pound)	0.0987	No rates given	Heavy coinage of silver both in the United Kingdom and abroad
1916	0.2750 (£3.6s per troy pound)	0.1305	No rates given	
1917	0.2750 (£3.6s per troy pound)	0.1703	No rates given	
1918	0.2750 (£3.6s per troy pound)	0.1982	No rates given	Armistice signed by U.K. and enemy countries on November 11; Pittman Silver Act passed in the United States
1919	0.2750 (£3.6s per troy pound)	0.2378	1.0532	Peace treaties with Central Powers signed; wide fluctuations in international exchanges

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	0.500 Silver[a]	*Standard Silver*[b]	*Standard Silver*[b]	
1920	0.2750 (£3.6s per troy pound)	0.2560	0.9572	Heavy continental sales of demonetized silver; Indian silver import duty remitted
1921	0.2750 (£3.6s per troy pound)	0.1336	0.5907	Continental silver sales continued; U.K. mint started selling surplus silver from debased coinage
1922	0.2750 (£3.6s per troy pound)	0.1435	0.6858	Sales of surplus silver by U.K. mint and continental silver sales continued
1923	0.2750 (£3.6s per troy pound)	0.1351	0.6088	U.K. mint and continental silver sales continued; purchases of silver by U.S. Treasury under Pittman Act completed
1924	0.2750 (£3.6s per troy pound)	0.1417	0.6259	Large continental purchases of silver for coinage
1925	0.2750 (£3.6s per troy pound)	0.1339	0.6466	
1926	0.2750 (£3.6s per troy pound)	0.1195	0.5808	General strike in the United Kingdom
1927	0.2750 (£3.6s per troy pound)	0.1085	0.5274	Sale by Indian government of 9 million ounces surplus silver in London

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	0.500 Silver[a]	*Standard Silver*[b]	*Standard Silver*[b]	
1928	0.2750 (£3.8s per troy pound)	0.1115	0.5426	Sales of demonetized silver coin by France, Belgium, and India offset by large purchases by China
1929	0.2750 (£3.8s per troy pound)	0.1018	0.4944	Wall Street crash in the United States and other financial failures; Indian government sales of silver continued
1930	0.2750 (£3.6s per troy pound)	0.0737	0.3583	World-wide trade depression; Indian government sales of silver continued and import duty on silver reimposed
1931	0.2750 (£3.6s per troy pound)	0.0608	0.2954 0.2246	Britain abandons gold standard; continued trade depression; Indian silver import duty increased
1932	0.2750 (£3.6s per troy pound)	0.0743	0.2603	Continued trade depression
1933	0.2750 (£3.6s per troy pound)	0.0757	0.3193	Signs of trade revival in the United Kingdom
1934	0.2750 (£3.6s per troy pound)	0.0884	0.4456	Dollar devalued to 59.06%; U.S. Silver Purchase Act passed; heavy silver

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	0.500 Silver[a]	*Standard Silver*[b]	*Standard Silver*[b]	
				buying in the United States: Indian import duty on silver reduced
1935	0.2750 (£3.6s per troy pound)	0.1208	0.5923	Italo-Abyssinian War; huge purchases of silver in London by U.S. Treasury; Hong Kong and China abandon silver standard; Indian silver import duty further reduced
1936	0.2750 (£3.6s per troy pound)	0.0936	0.4156	Large shipment of silver to India; civil war in Spain
1937	0.2750 (£3.6s per troy pound)	0.0936	0.4133	
1938	0.2750 (£3.6s per troy pound)	0.0801	0.3917	Germany annexed Austria; war scare in Europe
1939	0.2750 (£3.6s per troy pound)	0.0850	0.3791	Outbreak of World War II
1940	0.2750 (£3.6s per troy pound)	0.0928	0.3740	Indian silver currency reduced to 0.500 fine
1941	0.2750 (£3.6s per troy pound)	0.0977	0.3937	
1942–1944	0.2570 (£3.6s per troy pound)	0.0979	0.3945	
1945	0.2750 (£3.6s per troy pound)	0.1271	0.5122	World War II ends with victory for the

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	0.500 Silver[m]	*Fine Silver*[o]	*Fine Silver*[o]	
				United States and British allies
1946	0.2750 (£3.6s per troy pound)	0.2029	0.8177	Silver coinage demonetized in the United Kingdom and cupronickel substituted; shipments of silver to India started again
	Cupronickel[m]	*Fine Silver*	*Fine Silver*	
1947	0.2750 (£3.6s per troy pound)	0.1852	0.7464	Partition of India; imports of silver into India suspended
1948	0.2750 (£3.6s per troy pound)	0.1875	0.7556	
1949	0.2750 (£3.6s per troy pound)	0.2051	0.7548	Pound devalued from $4.03 to $2.80 from September 1, 1949
1950	0.2750 (£3.6s per troy pound)	0.2699	0.7557	India becomes a republic
1951	0.2750 (£3.6s per troy pound)	0.3243	0.9080	
1952	0.2750 (£3.6s per troy pound)	0.3098	0.8643	
1953	0.2750 (£3.6s per troy pound)	0.3081	0.8658	Large amounts of Russian silver and gold consigned to London
1954	0.2750 (£3.6s per troy pound)	0.3061	0.8601	

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Cupronickel[b]	*Fine Silver*	*Fine Silver*	
1956	0.2750 (£3.6s per troy pound)	0.3230	0.9018	
1956	0.2750 (£3.6s per troy pound)	0.3297	0.9213	Britain returned 66 million ounces of lend-lease silver to the United States
1957	0.2750 (£3.6s per troy pound)	0.3289	0.9189	All lend-lease silver returned to the United States; surplus silver sold in London
1958	0.2750 (£3.6s per troy pound)	0.3176	0.8925	
1959	0.2750 (£3.6s per troy pound)	0.3294	0.9226	More countries returned to silver coinage; labor troubles in the United States lead to temporary shortage of silver in the United Kingdom and abroad
1960	0.2750 (£3.6s per troy pound)	0.3307	0.9266	
1961	0.2750 (£3.6s per troy pound)	0.3344	0.9370	China sold a large amount of silver; U.S. Treasury stopped selling silver to industrial users; sharp price advances in New York and London
1962	0.2750 (£3.6s per troy pound)	0.3815	1.0707	Mexico stopped selling silver in

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Cupronickel[b]	*Fine Silver*	*Fine Silver*	
				New York, September 24; record high prices for silver in London and New York in October
1963	0.2750 (£3.6s per troy pound)	0.4589	1.2849	U.S. Silver Purchase Act repealed. Futures market reopened June 12
1964	0.2750 (£3.6s per troy pound)	0.4664	1.0631	Heavy sales of U.S. Treasury silver continued; London prices reach new record levels
1965	0.2750 (£3.6s per troy pound)	0.4648	1.2996	Heavy sales of U.S. Treasury silver continued; Soviet Union shipped 9 million ounces silver to the United Kingdom
1966	0.2750 (£3.6s per troy pound)	0.4659	1.3013	Sales of U.S. Treasury silver continued
1967	0.2750 (£3.6s per troy pound)	0.5904	1.6472 1.4248	Silver sales by U.S. Treasury ceased May 18; wide fluctuations followed; heavy buying of gold and silver owing to currency fears; pound devalued to $2.40 on November 17

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
	Cupronickel[b]	*Fine Silver*	*Fine Silver*	
1968	0.2750 (£3.6s per troy pound)	0.9143	2.1887	Wide fluctuations in silver prices owing to speculative pressures
1969	0.2750 (£3.6s per troy pound)	0.7529	1.7997	Continued fluctuations in silver and gold prices
1970	0.2750 (£3.6s per troy pound)	0.7370	1.7663	U.S. Treasury withdrew from silver market November 10
1971	0.2750 (£3.6s per troy pound)	0.6308	1.5414	Decimalization of sterling, February 11; United States dollar devalued by 7.9% December 18
1972		0.6735	1.6846	United States removed ceiling price for silver August 10
1973		1.0363	3.3388	In March United States announced proposed sale of 117.5 million ounces of silver from official stockpile
1974		1.9930	4.6427	In February India legalized export of silver
1975		2.0025	4.4267	Silver exports from India increased by more than 50% to over 43 million ounces in 1975

Table 15 (Continued)

Year	Mint Price Per Troy Ounce[a] (£)	Average Market Price Per Troy Ounce (£)	Average Market Price Per Troy Ounce ($)	Special Events
		Fine Silver	*Fine Silver*	
1976		2.4166	4.3506	
1977		2.6445	4.6144	

[a]The Mint price of silver was the face value of the silver coinage into which the Mint was by law obliged to coin a given quantity of the metal. In the early days of the Mint quantities were calculated in Tower pounds (a Tower pound being 5400 grains or one-sixteenth lighter than a troy pound of 5760 grains). For purposes of comparison, the Mint silver price has been converted into price per troy ounce. From 1324 until 1971 and the introduction of decimal coinage, the Mint price of silver was calculated in troy pounds. A troy pound was made up of 12 troy ounces. In this table the silver price has been converted into price per troy ounce.

[b]Standard silver is sterling silver or silver 0.925 fine. The silver prices quoted throughout this table relate to silver in bars and not to silver coins.

[c]A weekly register dating back to the late seventeenth century gives only one silver price for 1695, and this is the price quoted here. It relates to the price of silver on December 22, 1695.

[d]This was the average silver price for 1694. The lowest price quoted that year (on January 26 and July 20) was £0.2584, and the highest quoted (on November 23) was £0.2710.

[e]This was the average price of silver for 1695. During that year the lowest price quoted (on May 24) was £0.2684, and the highest quoted (on September 13 and November 29) was £0.3210.

[f]Only two prices were quoted for 1696: £0.2962 (on January 10) and £0.2584 (on July 10).

[g]Only one price was quoted for 1697, on January 29, and this is the price given above.

[h]Only four prices were quoted in 1698, the two lower being £0.2584 (on September 2 and 30) and the two higher, £0.2625 (on August 26 and September 23).

[i]The market prices given for the years 1700, 1701, and 1710 are the prices paid by the Bank of England in those years for its silver, as there are no quotations available in respect to silver prices in the Course of the Exchange for these years.

[j]From 1718 to 1736 the average market price of silver each year is taken from Castaing's Course of Exchange, which was published twice weekly.

[k]The average market price of silver each year from 1737 to 1746 is the average price paid by the Bank of England for silver bullion in those years. Castaing's Course of Exchange is not available from 1737 to 1746.

[l]From 1749 to 1810 the average annual price of silver is calculated from the prices given in Castaing's and Lloyd's lists.

[m]By an act of July 31, 1789 until an act of March 3, 1873 the pound was reckoned as

being equivalent to $4.44. Rates were quoted in terms of a premium or discount against this fictitious rate.

[n] The annual average sterling price of silver from 1811 to 1818 is taken from figures given in the Report of the Secret Committee of the House of Commons on the Expediency of the Bank resuming Cash Payments, 1819, Appendix No. 14.

[o] The dollar price of silver quoted from 1813 on is the dollar conversion of the relevant sterling price each year where it has been possible to calculate this from the available tables giving the premium or discount against the fictitious exchange rate of $4.44 to the pound. The dollar conversion from 1813 to 1828 are taken from a report of the International Monetary Conference held in Paris in August 1878.

[p] The average market price of silver per year from 1819 to 1832 is calculated from the quotations for the price of silver in bars given in Lutyens's Course of Exchange during those years.

[q] Information on the annual average price of silver from 1833 until 1975 is taken from a table compiled by Sharps Pixley Ltd., London.

[r] The dollar price of silver from 1860 is calculated from average annual exchange rates of the dollar against the pound given in the Final Report of the Royal Commission appointed to inquire into the Recent Changes in the Relative Values of the Precious Metals, 1888, Appendix 16.

[s] Until 1873 when an act of March 3 abolished the fictitious exchange rate of $4.44 to the pound, the rates are given as premiums or discounts on $100. From 1874 the annual average exchange rates are given as so many dollars to the pound. The table given in Appendix 16 of the 1888 Report, mentioned in table footnote *p*, gives the dollar to pound rates from 1860 to 1885.

[t] The dollar price of silver from 1900 to 1967 is calculated from the average annual exchange rates of the dollar against the pound taken from a table published for the London & Cambridge Economic Service by Times Newspapers Ltd. as part of The *British Economy: Key Statistics*.

[u] In 1920 the U.K. subsidiary coinage (i.e., sixpence, shillings, two-shilling pieces, half crowns), which had until then been standard (sterling) silver was reduced to 0.500 fine

[v] From 1945 on the average annual market prices per ounce of silver relate to fine (0.999) silver, whereas up to this time they have related to standard (0.925) silver.

[w] From 1947 onwards the U.K. "silver" coinage has contained no silver but consists of cupronickel alloy.

Table 16

THE INDEX OF THE PRICE OF SILVER

England, 1273–1979

(1930 = 100.0)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1273	123.4	1320	124.1	1367	153.2
1274	123.4	1321	124.1	1368	153.2
1275	123.4	1322	124.1	1369	153.2
1276	123.4	1323	124.1	1370	153.2
1277	123.4	1324	124.1	1371	153.2
1278	123.4	1325	124.1	1372	153.2
1279	124.1	1326	124.1	1373	153.2
1280	124.1	1327	124.1	1374	153.2
1281	124.1	1328	124.1	1375	153.2
1282	124.1	1329	124.1	1376	153.2
1283	124.1	1330	124.1	1377	153.2
1284	124.1	1331	124.1	1378	153.2
1285	124.1	1332	124.1	1379	153.2
1286	124.1	1333	124.1	1380	153.2
1287	124.1	1334	124.1	1381	153.2
1288	124.1	1335	128.7	1382	153.2
1289	124.1	1336	128.7	1383	153.2
1290	124.1	1337	128.7	1384	153.2
1291	124.1	1338	128.7	1385	153.2
1292	124.1	1339	128.7	1386	153.2
1293	124.1	1340	128.7	1387	153.2
1294	124.1	1341	128.7	1388	153.2
1295	124.1	1342	128.7	1389	153.2
1296	124.1	1343	128.7	1390	153.2
1297	124.1	1344	135.8	1391	153.2
1298	124.1	1345	135.8	1392	153.2
1299	124.1	1346	135.8	1393	153.2
1300	124.1	1347	135.8	1394	153.2
1301	124.1	1348	135.8	1395	153.2
1302	124.1	1349	135.8	1396	153.2
1303	124.1	1350	135.8	1397	153.2
1304	124.1	1351	153.2	1398	153.2
1305	124.1	1352	153.2	1399	153.2
1306	124.1	1353	153.2	1400	153.2
1307	124.1	1354	153.2	1401	153.2
1308	124.1	1355	153.2	1402	153.2
1309	124.1	1356	153.2	1403	153.2
1310	124.1	1357	153.2	1404	153.2
1311	124.1	1358	153.2	1405	153.2
1312	124.1	1359	153.2	1406	153.2
1313	124.1	1360	153.2	1407	153.2
1314	124.1	1361	153.2	1408	153.2
1315	124.1	1362	153.2	1409	153.2
1316	124.1	1363	153.2	1410	153.2
1317	124.1	1364	153.2	1411	153.2
1318	124.1	1365	153.2	1412	183.8
1319	124.1	1366	153.2	1413	183.8

Table 16 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1414	183.8	1461	183.8	1508	229.9
1415	183.8	1462	183.8	1509	229.9
1416	183.8	1463	183.8	1510	229.9
1417	183.8	1464	183.8	1511	229.9
1418	183.8	1465	219.9	1512	229.9
1419	183.8	1466	229.9	1513	229.9
1420	183.8	1467	229.9	1514	229.9
1421	183.8	1468	229.9	1515	229.9
1422	183.8	1469	229.9	1516	229.9
1423	183.8	1470	229.9	1517	229.9
1424	183.8	1471	229.9	1518	229.9
1425	183.8	1472	229.9	1519	229.9
1426	183.8	1473	229.9	1520	229.9
1427	183.8	1474	229.9	1521	229.9
1428	183.8	1475	229.9	1522	229.9
1429	183.8	1476	229.9	1523	229.9
1430	183.8	1477	229.9	1524	258.5
1431	183.8	1478	229.9	1525	258.5
1432	183.8	1479	229.9	1526	258.5
1433	183.8	1480	229.9	1527	258.5
1434	183.8	1481	229.9	1528	258.5
1435	183.8	1482	229.9	1529	258.5
1436	183.8	1483	229.9	1530	258.5
1437	183.8	1484	229.9	1531	258.5
1438	183.8	1485	229.9	1532	258.5
1439	183.8	1486	229.9	1533	258.5
1440	183.8	1487	229.9	1534	258.5
1441	183.8	1488	229.9	1535	258.5
1442	183.8	1489	229.9	1536	258.5
1443	183.8	1490	229.9	1537	258.5
1444	183.8	1491	229.9	1538	258.5
1445	183.8	1492	229.9	1539	258.5
1446	183.8	1493	229.9	1540	258.5
1447	183.8	1494	229.9	1541	258.5
1448	183.8	1495	229.9	1542	275.8
1449	183.8	1496	229.9	1543	275.8
1450	183.8	1497	229.9	1544	275.8
1451	183.8	1498	229.9	1545	275.8
1452	183.8	1499	229.9	1546	275.8
1453	183.8	1500	229.9	1547	275.8
1454	183.8	1501	229.9	1548	275.8
1455	183.8	1502	229.9	1549	275.8
1456	183.8	1503	229.9	1550	275.8
1457	183.8	1504	229.9	1551	275.8
1458	183.8	1505	229.9	1552	344.7
1459	183.8	1506	229.9	1553	344.7
1460	183.8	1507	229.8	1554	344.7

Table 16 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1555	344.7	1602	356.2	1649	356.2
1556	344.7	1603	356.2	1650	356.2
1557	344.7	1604	356.2	1651	356.2
1558	344.7	1605	356.2	1652	356.2
1559	344.7	1606	356.2	1653	356.2
1560	344.7	1607	356.2	1654	356.2
1561	344.7	1608	356.2	1655	356.2
1562	344.7	1609	356.2	1656	356.2
1563	344.7	1610	356.2	1657	356.2
1564	344.7	1611	356.2	1658	356.2
1565	344.7	1612	356.2	1659	356.2
1566	344.7	1613	356.2	1660	356.2
1567	344.7	1614	356.2	1661	356.2
1568	344.7	1615	356.2	1662	356.2
1569	344.7	1616	356.2	1663	356.2
1570	344.7	1617	356.2	1664	356.2
1571	344.7	1618	356.2	1665	356.2
1572	344.7	1619	356.2	1666	356.2
1573	344.7	1620	356.2	1667	356.2
1574	344.7	1621	356.2	1668	356.2
1575	344.7	1622	356.2	1669	356.2
1576	344.7	1623	356.2	1670	356.2
1577	344.7	1624	356.2	1671	356.2
1578	344.7	1625	356.2	1672	356.2
1579	344.7	1626	356.2	1673	356.2
1580	344.7	1627	356.2	1674	356.2
1581	344.7	1628	356.2	1675	356.2
1582	344.7	1629	356.2	1676	356.2
1583	344.7	1630	356.2	1677	356.2
1584	344.7	1631	356.2	1678	356.2
1585	344.7	1632	356.2	1679	356.2
1586	344.7	1633	356.2	1680	356.2
1587	344.7	1634	356.2	1681	356.2
1588	344.7	1635	356.2	1682	356.2
1589	344.7	1636	356.2	1683	356.2
1590	344.7	1637	356.2	1684	356.2
1591	344.7	1638	356.2	1685	356.2
1592	344.7	1639	356.2	1686	356.2
1593	344.7	1640	356.2	1687	356.2
1594	344.7	1641	356.2	1688	356.2
1595	344.7	1642	356.2	1689	356.2
1596	344.7	1643	356.2	1690	356.2
1597	344.7	1644	356.2	1691	356.2
1598	344.7	1645	356.2	1692	356.2
1599	344.7	1646	356.2	1693	356.2
1600	344.7	1647	356.2	1694	356.7
1601	356.2	1648	356.2	1695	391.0

Table 16 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1696	376.0	1743	350.8	1790	355.2
1697	339.2	1744	350.6	1791	358.0
1698	353.5	1745	346.4	1792	362.1
1699	366.2	1746	361.7	1793	351.8
1700	350.6	1747	369.3	1794	346.8
1701	349.9	1748	364.2	1795	356.0
1702	352.3	1749	365.3	1796	359.6
1703	360.8	1750	366.1	1797	357.1
1704	359.4	1751	368.4	1798	343.3
1705	362.1	1752	373.7	1799	368.5
1706	358.3	1753	378.4	1800	392.9
1707	354.3	1754	373.9	1801	401.9
1708	355.0	1755	364.3	1802	382.6
1709	357.3	1756	363.4	1803	380.1
1710	356.2	1757	363.5	1804	377.6
1711	357.8	1758	377.5	1805	396.2
1712	357.3	1759	380.1	1806	384.5
1713	359.0	1760	378.7	1807	380.9
1714	361.6	1761	386.6	1808	370.3
1715	362.1	1762	374.1	1809	384.5
1716	362.5	1763	372.7	1810	390.1
1717	353.4	1764	359.8	1811	401.9
1718	369.2	1765	364.6	1812	433.8
1719	365.3	1766	377.3	1813	462.1
1720	369.7	1767	377.7	1814	425.2
1721	365.4	1768	374.1	1815	428.9
1722	362.1	1769	379.9	1816	345.3
1723	361.2	1770	382.2	1817	353.6
1724	359.2	1771	380.9	1818	365.4
1725	359.2	1772	378.4	1819	361.3
1726	363.0	1773	360.9	1820	341.7
1727	359.8	1774	356.7	1821	333.5
1728	365.0	1775	363.6	1822	335.1
1729	370.6	1776	369.2	1823	333.8
1730	368.2	1777	381.8	1824	340.7
1731	364.3	1778	371.6	1825	344.1
1732	362.7	1779	356.2	1826	336.4
1733	363.6	1780	363.8	1827	337.9
1734	355.6	1781	383.9	1828	338.9
1735	355.8	1782	395.7	1829	331.1
1736	359.6	1783	382.9	1830	335.5
1737	361.7	1784	360.5	1831	338.5
1738	356.2	1785	350.6	1832	323.1
1739	370.6	1786	357.3	1833	334.6
1740	370.6	1787	358.8	1834	338.8
1741	382.8	1788	360.7	1835	337.4
1742	350.6	1789	356.9	1836	339.2

Table 16 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1337	336.8	1886	256.6	1935	163.9
1338	336.4	1887	252.2	1936	127.0
1339	341.4	1888	242.3	1937	127.0
1340	341.4	1889	241.4	1938	108.7
1341	339.6	1890	268.2	1939	115.3
1342	336.1	1891	254.8	1940	125.9
1343	334.6	1892	225.1	1941	132.6
1344	336.4	1893	201.4	1942	132.8
1345	335.0	1894	163.4	1943	132.8
1346	335.3	1895	168.9	1944	132.8
1347	337.4	1896	173.8	1945	159.7
1348	336.5	1897	155.8	1946	254.9
1349	337.9	1898	152.2	1947	232.7
1350	339.6	1899	155.1	1948	235.6
1351	344.9	1900	159.7	1949	257.7
1352	342.1	1901	153.7	1950	339.1
1353	347.8	1902	136.1	1951	407.4
1354	347.9	1903	139.9	1952	389.2
1355	346.7	1904	149.1	1953	387.1
1356	346.7	1905	157.3	1954	384.6
1357	349.1	1906	174.5	1955	405.8
1358	347.4	1907	170.8	1956	414.2
1359	350.9	1908	137.9	1957	413.2
1360	348.7	1909	133.9	1958	399.0
1361	343.8	1910	139.5	1959	412.6
1362	347.4	1911	138.8	1960	415.5
1363	346.9	1912	158.5	1961	420.1
1364	346.9	1913	155.8	1962	479.0
1365	345.2	1914	143.1	1963	576.5
1366	345.6	1915	133.9	1964	586.0
1367	342.3	1916	177.1	1965	583.9
1368	342.1	1917	231.1	1966	585.3
1369	341.7	1918	258.9	1967	741.7
1370	342.3	1919	322.7	1968	1148.7
1371	342.1	1920	247.4	1969	945.9
1372	341.0	1921	208.4	1970	925.9
1373	335.0	1922	194.7	1971	792.5
1374	329.7	1923	180.6	1972	846.1
1375	321.6	1924	192.3	1973	1301.9
1376	298.2	1925	181.7	1974	2503.9
1377	309.9	1926	162.1	1975	2515.8
1378	297.2	1927	147.2	1976	3036.1
1379	289.7	1928	151.3	1977	3322.4
1380	295.4	1929	138.1	1978	3834.6
1381	292.3	1930	100.0	1979	7875.1
1382	291.9	1931	82.5		
1383	285.9	1932	100.8		
1384	286.2	1933	102.7		
1385	274.9	1934	119.9		

Table 17

THE INDEX OF WHOLESALE COMMODITY PRICES

England, 1560–1979

(1930 = 100.0)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1560	40.0	1607	63.3	1654	85.9
1561	42.6	1608	64.1	1655	87.7
1562	25.7	1609	62.4	1656	90.6
1563	39.9	1610	63.1	1657	92.1
1564	32.0	1611	65.2	1658	96.0
1565	41.1	1612	65.5	1659	85.2
1566	48.7	1613	66.2	1660	80.7
1567	49.6	1614	68.6	1661	83.3
1568	49.6	1615	67.4	1662	80.2
1569	48.4	1616	66.6	1663	82.3
1570	48.1	1617	67.0	1664	82.4
1571	49.2	1618	68.2	1665	87.1
1572	46.5	1619	65.7	1666	84.5
1573	49.0	1620	65.8	1667	82.0
1574	48.1	1621	66.1	1668	78.1
1575	45.1	1622	66.3	1669	75.7
1576	45.5	1623	63.5	1670	77.9
1577	45.0	1624	64.9	1671	77.4
1578	44.2	1625	65.4	1672	79.4
1579	44.5	1626	66.0	1673	80.8
1580	45.9	1627	69.8	1674	79.9
1581	45.7	1628	72.2	1675	73.9
1582	45.8	1629	69.9	1676	78.8
1583	49.9	1630	70.9	1677	79.5
1584	48.3	1631	72.5	1678	74.7
1585	48.7	1632	72.0	1679	79.6
1586	57.0	1633	71.9	1680	80.6
1587	56.8	1634	74.1	1681	81.7
1588	57.5	1635	74.2	1682	81.5
1589	57.7	1636	74.0	1683	82.6
1590	57.6	1637	76.1	1684	86.1
1591	57.7	1638	73.7	1685	83.7
1592	59.6	1639	73.4	1686	76.8
1593	60.6	1640	77.4	1687	70.9
1594	62.6	1641	89.1	1688	82.9
1595	51.1	1642	78.0	1689	82.9
1596	55.0	1643	74.2	1690	86.8
1597	54.7	1644	75.0	1691	82.8
1598	53.6	1645	76.4	1692	88.5
1599	55.9	1646	80.0	1693	88.7
1600	55.7	1647	89.0	1694	91.1
1601	56.2	1648	88.1	1695	93.7
1602	63.1	1649	91.9	1696	88.1
1603	57.2	1650	87.0	1697	86.4
1604	57.2	1651	86.8	1698	88.8
1605	60.3	1652	92.4	1699	86.9
1606	61.7	1653	86.9	1700	82.7

Table 17 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1701	35.5	1748	95.3	1795	124.1
1702	81.1	1749	85.9	1796	125.4
1703	82.3	1750	88.3	1797	114.7
1704	85.8	1751	87.7	1798	116.6
1705	86.9	1752	83.2	1799	134.6
1706	85.6	1753	85.1	1800	163.1
1707	86.6	1754	87.9	1801	168.2
1708	89.3	1755	89.1	1802	132.0
1709	92.2	1756	91.7	1803	133.5
1710	98.5	1757	91.8	1804	134.3
1711	94.6	1758	92.3	1805	147.1
1712	97.4	1759	91.7	1806	145.3
1713	97.6	1760	91.5	1807	141.7
1714	98.4	1761	84.6	1808	156.1
1715	97.5	1762	90.2	1809	167.4
1716	98.1	1763	99.2	1810	165.7
1717	96.4	1764	100.2	1811	157.1
1718	96.4	1765	100.9	1812	176.8
1719	103.2	1766	101.7	1813	182.5
1720	86.0	1767	97.2	1814	166.0
1721	91.8	1768	96.9	1815	140.3
1722	90.9	1769	92.3	1816	128.1
1723	101.0	1770	93.1	1817	142.5
1724	92.7	1771	100.7	1818	149.8
1725	93.5	1772	102.7	1819	138.4
1726	94.3	1773	102.2	1820	124.7
1727	92.7	1774	102.1	1821	107.7
1728	92.7	1775	104.2	1822	95.0
1729	87.7	1776	105.3	1823	105.4
1730	89.3	1777	92.2	1824	110.1
1731	89.3	1778	90.7	1825	122.1
1732	85.1	1779	87.2	1826	108.0
1733	81.4	1780	88.3	1827	107.3
1734	81.0	1781	89.7	1828	104.1
1735	83.9	1782	98.1	1829	103.5
1736	80.1	1783	95.4	1830	102.1
1737	79.9	1784	90.1	1831	102.9
1738	80.3	1785	89.3	1832	98.8
1739	86.0	1786	90.6	1833	95.7
1740	100.1	1787	95.9	1834	93.4
1741	98.4	1788	90.7	1835	91.3
1742	92.5	1789	96.7	1836	102.8
1743	90.8	1790	96.5	1837	101.9
1744	91.8	1791	96.9	1838	105.7
1745	94.3	1792	95.2	1839	112.7
1746	104.6	1793	104.4	1840	110.7
1747	94.6	1794	106.4	1841	105.5

Table 17 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1842	95.9	1889	74.2	1936	91.8
1843	86.1	1890	74.2	1937	105.2
1844	87.6	1891	74.2	1938	98.8
1845	90.0	1892	70.1	1939	-
1846	92.9	1893	70.1	1940	-
1847	104.6	1894	64.9	1941	-
1848	88.4	1895	63.9	1942	-
1849	79.8	1896	62.9	1943	-
1850	79.4	1897	63.9	1944	-
1851	77.3	1898	66.0	1945	-
1852	80.4	1899	70.1	1946	162.0
1853	97.9	1900	77.3	1947	177.4
1854	105.2	1901	72.2	1948	202.8
1855	104.1	1902	71.1	1949	212.7
1856	104.1	1903	71.1	1950	248.0
1857	108.2	1904	72.2	1951	365.7
1858	93.8	1905	74.2	1952	375.1
1859	96.9	1906	79.4	1953	375.5
1860	102.1	1907	82.5	1954	377.8
1861	101.0	1908	75.3	1955	389.4
1862	104.1	1909	76.3	1956	406.1
1863	106.2	1910	80.4	1957	419.0
1864	108.2	1911	82.5	1958	421.7
1865	104.1	1912	87.6	1959	423.2
1866	105.2	1913	87.6	1960	428.9
1867	103.1	1914	87.6	1961	440.3
1868	102.1	1915	111.3	1962	450.1
1869	101.0	1916	140.2	1963	456.2
1870	99.0	1917	184.5	1964	471.4
1871	103.1	1918	197.9	1965	493.1
1872	112.4	1919	212.4	1966	506.8
1873	114.4	1920	258.8	1967	513.3
1874	105.2	1921	159.8	1968	536.1
1875	99.0	1922	135.1	1969	557.0
1876	97.9	1923	133.0	1970	596.3
1877	96.9	1924	143.3	1971	650.0
1878	89.7	1925	140.2	1972	684.6
1879	85.6	1926	129.9	1973	734.7
1880	90.7	1927	125.8	1974	906.4
1881	87.6	1928	123.7	1975	1125.3
1882	86.6	1929	118.6	1976	1248.4
1883	84.5	1930	100.0	1977	1495.8
1884	78.4	1931	85.6	1978	1631.8
1885	74.2	1932	82.5	1979	1830.5
1886	71.1	1933	81.4		
1887	70.1	1934	84.5		
1888	72.2	1935	86.6		

Table 18

THE INDEX OF THE PURCHASING POWER OF SILVER

England, 1560–1979

(1930 = 100.0)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1560	861.8	1607	562.7	1654	414.7
1561	809.2	1608	555.7	1655	406.2
1562	1341.2	1609	570.8	1656	393.2
1563	863.9	1610	564.5	1657	386.8
1564	1077.2	1611	546.3	1658	371.0
1565	838.7	1612	543.8	1659	418.1
1566	707.8	1613	538.1	1660	441.4
1567	695.0	1614	519.2	1661	427.6
1568	695.0	1615	528.5	1662	444.1
1569	712.2	1616	534.8	1663	432.8
1570	716.6	1617	531.6	1664	432.3
1571	700.6	1618	522.3	1665	409.0
1572	741.3	1619	542.2	1666	421.5
1573	703.5	1620	541.3	1667	434.4
1574	716.6	1621	538.9	1668	456.1
1575	764.3	1622	537.3	1669	470.5
1576	757.6	1623	560.9	1670	457.3
1577	766.0	1624	548.8	1671	460.2
1578	779.9	1625	544.6	1672	448.6
1579	774.6	1626	539.7	1673	440.8
1580	751.0	1627	510.3	1674	445.8
1581	754.3	1628	493.4	1675	482.0
1582	752.6	1629	509.6	1676	452.0
1583	690.8	1630	502.4	1677	448.1
1584	713.7	1631	491.3	1678	476.8
1585	707.8	1632	494.7	1679	447.5
1586	604.7	1633	495.4	1680	441.9
1587	606.9	1634	480.7	1681	436.0
1588	599.5	1635	480.1	1682	437.1
1589	597.4	1636	481.4	1683	431.2
1590	598.4	1637	468.1	1684	413.7
1591	597.4	1638	483.3	1685	425.6
1592	578.4	1639	485.3	1686	463.8
1593	568.8	1640	460.2	1687	502.4
1594	550.6	1641	399.8	1688	429.7
1595	674.6	1642	456.7	1689	429.7
1596	626.7	1643	480.1	1690	410.4
1597	630.2	1644	474.9	1691	430.2
1598	643.1	1645	466.2	1692	402.5
1599	616.6	1646	445.3	1693	401.6
1600	618.9	1647	400.2	1694	391.5
1601	633.8	1648	404.3	1695	417.3
1602	564.5	1649	387.6	1696	426.8
1603	622.7	1650	409.4	1697	392.6
1604	622.7	1651	410.4	1698	400.3
1605	590.7	1652	385.5	1699	421.4
1606	577.3	1653	409.9	1700	423.9

Table 18 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1701	409.2	1748	382.2	1795	286.9
1702	434.4	1749	425.3	1796	286.8
1703	438.2	1750	414.6	1797	311.3
1704	418.9	1751	420.1	1798	294.4
1705	416.7	1752	449.2	1799	273.8
1706	418.6	1753	444.7	1800	240.9
1707	409.1	1754	425.4	1801	238.8
1708	397.5	1755	408.9	1802	289.8
1709	387.5	1756	396.3	1803	284.7
1710	361.6	1757	396.0	1804	281.1
1711	378.2	1758	409.0	1805	289.3
1712	366.8	1759	414.5	1806	264.6
1713	367.8	1760	413.9	1807	268.8
1714	367.5	1761	457.0	1808	237.2
1715	371.4	1762	414.7	1809	229.7
1716	369.5	1763	375.7	1810	235.4
1717	366.6	1764	359.1	1811	255.8
1718	383.0	1765	343.5	1812	245.4
1719	354.0	1766	371.0	1813	253.2
1720	429.9	1767	388.6	1814	256.1
1721	398.0	1768	386.1	1815	305.7
1722	398.3	1769	411.6	1816	269.6
1723	357.6	1770	410.5	1817	248.1
1724	387.5	1771	378.3	1818	243.9
1725	384.2	1772	368.5	1819	261.1
1726	384.9	1773	353.1	1820	274.0
1727	388.1	1774	349.4	1821	309.7
1728	393.7	1775	348.9	1822	352.7
1729	422.6	1776	350.6	1823	316.7
1730	412.3	1777	414.1	1824	309.4
1731	408.0	1778	409.7	1825	281.8
1732	426.2	1779	408.5	1826	311.5
1733	446.9	1780	412.0	1827	314.9
1734	439.0	1781	428.0	1828	325.6
1735	424.1	1782	403.4	1829	319.9
1736	448.9	1783	401.4	1830	328.6
1737	452.7	1784	400.1	1831	329.0
1738	443.6	1785	392.6	1832	326.7
1739	430.9	1786	394.4	1833	349.6
1740	370.2	1787	374.1	1834	362.7
1741	389.0	1788	397.7	1835	369.6
1742	379.0	1789	369.1	1836	330.0
1743	386.1	1790	368.1	1837	330.5
1744	381.9	1791	367.4	1838	318.3
1745	367.3	1792	380.4	1839	302.9
1746	345.3	1793	337.0	1840	308.4
1747	390.4	1794	325.9	1841	321.9

Table 18 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1842	350.5	1889	325.3	1936	138.3
1843	388.6	1890	361.5	1937	120.7
1844	384.0	1891	343.4	1938	115.9
1845	372.2	1892	321.1	1939	-
1846	360.9	1893	287.3	1940	-
1847	322.8	1894	251.8	1941	-
1848	380.7	1895	264.3	1942	-
1849	423.4	1896	278.3	1943	-
1850	427.7	1897	243.8	1944	-
1851	446.2	1898	230.6	1945	-
1852	426.5	1899	221.3	1946	157.3
1853	365.3	1900	206.6	1947	131.2
1854	350.2	1901	212.9	1948	116.2
1855	333.0	1902	191.4	1949	121.2
1856	333.0	1903	188.8	1950	136.7
1857	322.8	1904	208.5	1951	111.4
1858	370.4	1905	212.0	1952	103.8
1859	362.1	1906	219.8	1953	103.1
1860	341.5	1907	207.0	1954	101.8
1861	340.4	1908	183.1	1955	104.2
1862	333.7	1909	175.5	1956	102.0
1863	326.6	1910	173.5	1957	96.6
1864	320.6	1911	168.2	1958	94.6
1865	331.9	1912	180.9	1959	97.5
1866	328.5	1913	177.9	1960	96.9
1867	332.0	1914	163.4	1961	95.4
1868	335.1	1915	120.3	1962	106.4
1869	338.3	1916	126.3	1963	126.4
1870	345.9	1917	125.3	1964	124.3
1871	331.8	1918	135.9	1965	118.4
1872	303.4	1919	151.9	1966	115.5
1873	292.8	1920	95.6	1967	144.5
1874	313.4	1921	130.4	1968	214.3
1875	324.8	1922	144.1	1969	169.8
1876	304.6	1923	135.8	1970	155.3
1877	319.8	1924	134.2	1971	121.9
1878	331.3	1925	129.6	1972	123.6
1879	338.4	1926	124.8	1973	177.2
1880	325.7	1927	117.0	1974	276.2
1881	333.7	1928	122.3	1975	223.6
1882	337.1	1929	116.4	1976	243.2
1883	338.2	1930	100.0	1977	222.1
1884	342.1	1931	96.4	1978	235.0
1885	370.5	1932	122.2	1979	430.2
1886	360.9	1933	126.2		
1887	359.8	1934	141.9		
1888	335.6	1935	189.3		

Table 19

GOLD/SILVER PRICE RATIOS

England, 1560–1979

1560	10.69	1600	10.64	1640	12.58	1680	14.03
1561	10.69	1601	10.42	1641	12.58	1681	14.03
1562	10.69	1602	10.42	1642	12.58	1682	14.03
1563	10.69	1603	10.42	1643	12.58	1683	14.03
1564	10.69	1604	11.26	1644	12.58	1684	14.03
1565	10.69	1605	11.26	1645	12.58	1685	14.03
1566	10.69	1606	11.26	1646	12.58	1686	14.03
1567	10.69	1607	11.26	1647	12.58	1687	14.03
1568	10.69	1608	11.26	1648	12.58	1688	14.03
1569	10.69	1609	11.26	1649	12.58	1689	14.03
1570	10.69	1610	11.26	1650	12.58	1690	14.03
1571	10.69	1611	12.20	1651	12.58	1691	14.03
1572	10.69	1612	12.49	1652	12.58	1692	14.03
1573	10.69	1613	12.49	1653	12.58	1693	14.03
1574	10.69	1614	12.49	1654	12.58	1694	14.01
1575	10.69	1615	12.49	1655	12.58	1695	12.78
1576	10.69	1616	12.49	1656	12.58	1696	14.63
1577	10.69	1617	12.49	1657	12.58	1697	16.21
1578	10.69	1618	12.49	1658	12.58	1698	15.56
1579	10.69	1619	12.58	1659	12.58	1699	14.67
1580	10.69	1620	12.58	1660	12.58	1700	15.33
1581	10.69	1621	12.58	1661	12.58	1701	15.36
1582	10.69	1622	12.58	1662	12.58	1702	15.25
1583	10.69	1623	12.58	1663	14.03	1703	14.90
1584	10.69	1624	12.58	1664	14.03	1704	14.95
1585	10.69	1625	12.58	1665	14.03	1705	14.84
1586	10.69	1626	12.58	1666	14.03	1706	15.00
1587	10.69	1627	12.58	1667	14.03	1707	15.17
1588	10.69	1628	12.58	1668	14.03	1708	15.14
1589	10.69	1629	12.58	1669	14.03	1709	15.04
1590	10.64	1630	12.58	1670	14.03	1710	15.08
1591	10.64	1631	12.58	1671	14.03	1711	15.02
1592	10.64	1632	12.58	1672	14.03	1712	15.04
1593	10.64	1633	12.58	1673	14.03	1713	14.97
1594	10.64	1634	12.58	1674	14.03	1714	14.86
1595	10.64	1635	12.58	1675	14.03	1715	14.84
1596	10.64	1636	12.58	1676	14.03	1716	14.82
1597	10.64	1637	12.58	1677	14.03	1717	14.86
1598	10.64	1638	12.58	1678	14.03	1718	14.22
1599	10.64	1639	12.58	1679	14.03	1719	14.38

Table 19 (Continued)

1720	14.21	1760	14.13	1800	14.66	1840	15.43
1721	14.37	1761	14.02	1801	14.50	1841	15.51
1722	14.50	1762	14.46	1802	14.69	1842	15.67
1723	14.54	1763	14.63	1803	14.26	1843	15.74
1724	14.62	1764	14.88	1804	14.36	1844	15.66
1725	14.62	1765	14.49	1805	13.68	1845	15.72
1726	14.47	1766	14.21	1806	14.10	1846	15.71
1727	14.60	1767	14.28	1807	14.23	1847	15.61
1728	14.39	1768	14.39	1808	14.64	1848	15.65
1729	14.17	1769	14.31	1809	15.98	1849	15.59
1730	14.26	1770	14.24	1810	15.98	1850	15.51
1731	14.42	1771	14.19	1811	16.86	1851	15.27
1732	14.48	1772	14.33	1812	16.86	1852	15.40
1733	14.44	1773	14.62	1813	15.83	1853	15.15
1734	14.77	1774	14.72	1814	17.53	1854	15.16
1735	14.76	1775	14.46	1815	16.59	1855	15.19
1736	14.60	1776	14.24	1816	15.70	1856	15.19
1737	14.52	1777	13.77	1817	15.03	1857	15.09
1738	14.74	1778	14.15	1818	15.11	1858	15.16
1739	14.17	1779	14.74	1819	15.19	1859	15.01
1740	14.17	1780	14.44	1820	15.45	1860	15.11
1741	13.72	1781	13.63	1821	15.83	1861	15.32
1742	14.98	1782	13.31	1822	15.66	1862	15.16
1743	14.98	1783	13.62	1823	15.72	1863	15.18
1744	14.98	1784	14.64	1824	15.40	1864	15.18
1745	15.16	1785	15.05	1825	15.31	1865	15.26
1746	14.52	1786	14.70	1826	15.60	1866	15.24
1747	14.22	1787	14.64	1827	15.53	1867	15.39
1748	14.42	1788	14.56	1828	15.48	1868	15.40
1749	14.38	1789	14.71	1829	15.91	1869	15.42
1750	14.35	1790	14.79	1830	15.70	1870	15.39
1751	14.26	1791	14.75	1831	15.56	1871	15.40
1752	14.05	1792	14.50	1832	16.30	1872	15.45
1753	13.88	1793	14.93	1833	15.74	1873	15.72
1754	14.05	1794	15.14	1834	15.55	1874	15.98
1755	14.42	1795	14.75	1835	15.61	1875	16.38
1756	14.45	1796	14.60	1836	15.53	1876	17.66
1757	14.45	1797	14.78	1837	15.64	1877	17.00
1758	13.91	1798	15.37	1838	15.66	1878	17.72
1759	13.82	1799	14.29	1839	15.43	1879	18.18

Table 19 (Continued)

1880	17.83	1913	33.81	1946	45.70
1881	18.02	1914	36.81	1947	50.06
1882	18.05	1915	39.34	1948	49.44
1883	18.42	1916	29.74	1949	45.20
1884	18.41	1917	22.79	1950	49.67
1885	19.16	1918	19.59	1951	41.34
1886	20.53	1919	17.34	1952	43.27
1887	20.89	1920	28.35	1953	43.51
1888	21.74	1921	31.89	1954	43.79
1889	21.82	1922	29.77	1955	41.50
1890	19.64	1923	31.04	1956	40.66
1891	20.89	1924	30.25	1957	40.76
1892	23.42	1925	28.85	1958	42.21
1893	26.18	1926	32.53	1959	40.82
1894	32.24	1927	35.82	1960	40.62
1895	31.19	1928	34.85	1961	40.09
1896	30.34	1929	38.18	1962	35.16
1897	33.88	1930	52.78	1963	29.22
1898	34.64	1931	69.61	1964	28.74
1899	33.96	1932	72.73	1965	28.84
1900	33.02	1933	75.50	1966	28.78
1901	34.27	1934	71.27	1967	22.71
1902	38.74	1935	53.84	1968	19.24
1903	37.65	1936	68.52	1969	23.46
1904	35.36	1937	68.82	1970	21.59
1905	33.49	1938	81.38	1971	26.99
1906	30.22	1939	83.50	1972	38.86
1907	30.87	1940	92.52	1973	42.11
1908	38.24	1941	87.86	1974	35.00
1909	39.34	1942	87.72	1975	39.10
1910	37.76	1943	87.72	1976	30.20
1911	37.95	1944	87.72	1977	34.14
1912	33.23	1945	72.94	1978	35.21
				1979	27.76

Appendix C U.S. Statistics

Table 20

THE INDEX OF THE PRICE OF SILVER

United States, 1800–1979

(1930 = 100.0)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1800	345.5	1847	342.3	1894	164.9
1801	350.2	1848	342.3	1895	170.2
1802	354.9	1849	343.9	1896	178.0
1803	351.8	1850	345.5	1897	157.1
1804	351.8	1851	350.8	1898	152.6
1805	342.3	1852	348.2	1899	156.0
1806	348.6	1853	353.4	1900	160.5
1807	351.8	1854	353.4	1901	154.5
1808	337.6	1855	350.8	1902	136.6
1809	339.1	1856	350.8	1903	140.3
1810	342.3	1857	353.4	1904	149.7
1811	348.6	1858	350.8	1905	158.1
1812	336.0	1859	356.0	1906	174.9
1813	332.8	1860	353.4	1907	170.7
1814	359.7	1861	348.2	1908	138.5
1815	354.9	1862	353.4	1909	134.8
1816	354.9	1863	352.1	1910	140.1
1817	358.1	1864	352.1	1911	139.5
1818	351.8	1865	350.0	1912	159.2
1819	353.4	1866	350.5	1913	156.5
1820	347.0	1867	348.2	1914	143.5
1821	339.1	1868	347.1	1915	130.1
1822	342.3	1869	346.9	1916	172.0
1823	342.3	1870	347.6	1917	213.1
1824	342.3	1871	346.9	1918	253.4
1825	345.5	1872	346.1	1919	290.8
1826	342.3	1873	339.5	1920	264.1
1827	343.9	1874	334.6	1921	164.1
1828	342.3	1875	324.6	1922	176.7
1829	342.3	1876	303.7	1923	169.9
1830	340.7	1877	314.1	1924	174.9
1831	343.9	1878	301.0	1925	180.9
1832	343.9	1879	293.2	1926	162.6
1833	339.1	1880	301.0	1927	147.6
1834	343.9	1881	295.8	1928	152.4
1835	343.9	1882	298.4	1929	138.7
1836	343.9	1883	290.6	1930	100.0
1837	342.3	1884	290.6	1931	75.1
1838	342.3	1885	280.1	1932	73.0
1839	347.0	1886	259.2	1933	90.8
1840	347.0	1887	256.5	1934	125.7
1841	343.9	1888	246.1	1935	168.3
1842	340.7	1889	246.1	1936	118.1
1843	339.1	1890	274.9	1937	117.5
1844	342.3	1891	259.2	1938	113.1
1845	339.1	1892	227.7	1939	102.4
1846	340.7	1893	204.2	1940	91.1

Table 20 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1941	91.1				
1942	100.3				
1943	117.3				
1944	117.3				
1945	135.9				
1946	209.9				
1947	188.0				
1948	194.8				
1949	188.2				
1950	194.2				
1951	234.0				
1952	222.3				
1953	223.0				
1954	223.3				
1955	233.2				
1956	237.7				
1957	237.7				
1958	233.0				
1959	238.7				
1960	239.3				
1961	240.8				
1962	285.3				
1963	335.1				
1964	337.7				
1965	337.7				
1966	337.7				
1967	405.8				
1968	560.2				
1969	468.6				
1970	463.4				
1971	403.1				
1972	442.4				
1973	662.3				
1974	1233.0				
1975	1157.1				
1976	1138.7				
1977	1209.4				
1978	1416.4				
1979	2903.0				

Source. The index number for 1925–1979 have been computed from price data furnished by W.C. Butterman of the Bureau of Mines. For 1800–1924 the sources are Director of the Mint Reports for various years.

Table 21

THE INDEX OF WHOLESALE COMMODITY PRICES

United States, 1800–1979

(1930 = 100.0)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1800	102.2	1847	71.3	1894	55.4
1801	112.6	1848	65.0	1895	56.5
1802	92.8	1849	65.0	1896	53.8
1803	93.5	1850	66.6	1897	53.8
1804	100.0	1851	65.9	1898	56.1
1805	111.9	1852	69.7	1899	60.3
1806	106.3	1853	76.9	1900	64.8
1807	103.1	1854	85.7	1901	63.9
1808	91.3	1855	87.2	1902	68.2
1809	103.1	1856	83.2	1903	69.1
1810	103.8	1857	88.1	1904	69.1
1811	100.0	1858	73.8	1905	69.5
1812	103.8	1859	75.3	1906	71.5
1813	128.5	1860	73.8	1907	75.3
1814	144.4	1861	70.6	1908	72.9
1815	134.8	1862	82.5	1909	78.3
1816	119.7	1863	105.4	1910	81.4
1817	119.7	1864	153.1	1911	75.1
1818	116.6	1865	146.6	1912	80.0
1819	99.1	1866	137.9	1913	80.7
1820	84.1	1867	128.5	1914	78.7
1821	80.9	1868	125.3	1915	80.5
1822	84.1	1869	119.7	1916	98.9
1823	81.6	1870	107.0	1917	135.9
1824	77.8	1871	103.1	1918	152.0
1825	81.6	1872	107.8	1919	160.3
1826	78.5	1873	105.4	1920	178.7
1827	77.8	1874	100.0	1921	113.0
1828	76.9	1875	93.5	1922	111.9
1829	76.2	1876	87.2	1923	116.4
1830	72.2	1877	84.1	1924	113.5
1831	74.4	1878	72.2	1925	119.7
1832	75.3	1879	71.3	1926	115.7
1833	75.3	1880	79.4	1927	110.5
1834	71.3	1881	81.6	1928	112.1
1835	79.4	1882	85.7	1929	110.1
1836	90.4	1883	80.0	1930	100.0
1837	91.3	1884	73.8	1931	84.3
1838	87.2	1885	67.5	1932	75.3
1839	88.8	1886	65.0	1933	76.2
1840	75.3	1887	67.5	1934	86.5
1841	72.9	1888	68.2	1935	92.6
1842	65.0	1889	64.1	1936	93.5
1843	59.4	1890	65.0	1937	99.8
1844	61.0	1891	64.6	1938	90.8
1845	65.9	1892	60.3	1939	89.2
1846	65.9	1893	61.9	1940	90.8

Table 21 (Continued)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1941	101.1				
1942	114.1				
1943	120.2				
1944	120.2				
1945	122.4				
1946	139.7				
1947	171.5				
1948	185.7				
1949	176.5				
1950	183.4				
1951	204.3				
1952	198.7				
1953	196.0				
1954	196.4				
1955	196.9				
1956	203.4				
1957	209.2				
1958	212.1				
1959	212.6				
1960	212.6				
1961	212.1				
1962	212.6				
1963	211.9				
1964	212.3				
1965	216.6				
1966	223.8				
1967	224.2				
1968	229.8				
1969	238.8				
1970	247.5				
1971	255.4				
1972	267.0				
1973	302.0				
1974	359.0				
1975	392.2				
1976	410.2				
1977	435.3				
1978	469.2				
1979	527.9				

Source. Wholesale Prices Index, Bureau of Labor Statistics, 1890–1979 on base 1967 = 100.0. Wholesale Price Index, Warren and Pearson, 1749–1890 on base 1910—1914 = 100.0. Used on a spliced basis.

Table 22

THE INDEX OF THE PURCHASING POWER OF SILVER

United States, 1800–1979

(1930 = 100.0)

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1800	338.1	1847	480.1	1894	297.7
1801	311.0	1848	526.6	1895	301.2
1802	382.4	1849	529.1	1896	330.9
1803	376.3	1850	518.8	1897	292.0
1804	351.8	1851	532.3	1898	272.0
1805	305.9	1852	499.6	1899	258.7
1806	327.9	1853	459.6	1900	247.7
1807	341.2	1854	412.4	1901	241.8
1808	369.8	1855	402.3	1902	200.3
1809	328.9	1856	421.6	1903	203.0
1810	329.8	1857	401.1	1904	216.6
1811	348.6	1858	475.3	1905	227.5
1812	323.7	1859	472.8	1906	244.6
1813	259.0	1860	478.9	1907	226.7
1814	249.1	1861	493.2	1908	190.0
1815	263.3	1862	428.4	1909	172.2
1816	296.5	1863	334.1	1910	172.1
1817	299.2	1864	230.0	1911	185.8
1818	301.7	1865	238.7	1912	199.0
1819	356.6	1866	254.2	1913	193.9
1820	412.6	1867	271.0	1914	182.3
1821	419.2	1868	277.0	1915	161.6
1822	407.0	1869	289.8	1916	173.9
1823	419.5	1870	324.9	1917	156.8
1824	440.0	1871	336.5	1918	166.7
1825	423.4	1872	321.1	1919	181.4
1826	436.1	1873	322.1	1920	147.8
1827	442.0	1874	334.6	1921	145.2
1828	445.1	1875	347.2	1922	157.9
1829	449.2	1876	348.3	1923	146.0
1830	471.9	1877	373.5	1924	154.1
1831	462.2	1878	416.9	1925	151.1
1832	456.7	1879	411.2	1926	140.5
1833	450.3	1880	379.1	1927	133.6
1834	482.3	1881	362.5	1928	136.0
1835	433.1	1882	348.2	1929	126.0
1836	380.4	1883	363.3	1930	100.0
1837	375.6	1884	393.8	1931	89.1
1838	392.5	1885	415.0	1932	96.9
1839	390.8	1886	398.8	1933	119.2
1840	460.8	1887	380.0	1934	145.3
1841	471.7	1888	360.9	1935	181.7
1842	524.2	1889	383.9	1936	126.3
1843	570.9	1890	422.9	1937	117.7
1844	561.1	1891	401.2	1938	124.6
1845	514.6	1892	377.6	1939	114.8
1846	517.0	1893	329.9	1940	100.3

Table 22 (Continued)

YEAR	INDEX	YEAR	INDEX
1941	90.1		
1942	87.9		
1943	97.6		
1944	97.6		
1945	111.0		
1946	150.3		
1947	109.6		
1948	104.9		
1949	106.6		
1950	105.9		
1951	114.5		
1952	111.9		
1953	113.8		
1954	113.7		
1955	118.4		
1956	116.9		
1957	113.6		
1958	109.9		
1959	112.3		
1960	112.6		
1961	113.5		
1962	134.2		
1963	158.1		
1964	159.1		
1965	155.9		
1966	150.9		
1967	181.0		
1968	243.8		
1969	196.2		
1970	187.2		
1971	157.8		
1972	165.7		
1973	219.3		
1974	343.5		
1975	295.0		
1976	277.6		
1977	277.8		
1978	301.9		
1979	549.9		

Appendix D Commodity Prices and the Construction of Index Numbers

Central to this book are the use of silver as money and fluctuations in its price through centuries, both in terms of the unit of account and in terms of the exchange rate between silver and other commodities generally. What is needed for England is an index number reflective of commodity prices as a whole to lay off against the index of silver prices per ounce since the Great Recoinage of 1560 (given in Table 16). This appendix is included for those who wish to know how the commodity price index number used in this study was derived and computed (Table 17).

We find the materials for our commodity price index in the work published by Lord Beveridge and his associates in 1939, *Prices and Wages in England from the Twelfth to the Nineteenth Centuries*, Volume 1. A prodigious effort went into this compilation, and a reader is bound to be impressed by the meticulous care used to secure validity. To my knowledge, however, the Beveridge collection of prices was never fully utilized until the preparation of my *The Golden Constant*. In that book I published a wholesale commodity price index from 1560 to 1790 with material drawn from the Beveridge compendium. I explained my method

thoroughly and defended the procedure employed. I am pleased to observe that reviewers of the volume reported the new price index without criticism, and some were kind enough to welcome it as a contribution in its own right to the study of price history in England. I shall review here only the minimum aspects helpful for a new readership. Anyone interested in greater detail of the index number construction can consult Chapter 3 of the original volume.

The great structural virtue that Beveridge valued was a long price series drawn from a single source. For that single source he trusted only the same set of documents compiled for the same purpose over time.

Insistence on time series from a common source (and the rejection of isolated entries) aids the price historian in two ways. Obviously it facilitates interpretation. More subtly, it gets the force of human inertia working for him. Once a person, or an institution managed by persons, sets up a system for procuring a specified quality of a good in a customary quantity and on agreed terms, this procurement system tends to be perpetuated over considerable periods. This sets up a presumption of comparability. It is no guarantee, but it helps. Also, when there is a change it is more likely to be noted down because it is a change in the system itself and not just a random choice.

The Beveridge collection contains price series for nearly 170 commodities.

The price series all came from viable institutions of a substantial, even venerable, character.

Winchester College
Eton College
Westminister (School and Abbey)
Charterhouse
Sandwich (St. Bartholomew's Hospital)
Greenwich Hospital
Chelsea Hospital
Lord Stewards' Department
Lord Chamberlain's Department
Office of Works
Navy Victualling
Naval Stores

Since Beveridge used only price series for commodities that were purchased over substantial periods by these institutions (most for 50 years or

more), we can be sure that his collection is not affected by caprice. The commodities were in the mainstream of commerce on the whole and of a type that was in substantial demand year after year for human consumption or application.

It helps also to remember that we are not seeking a sample of price representative of all commodity money prices at any cross section in time. Our desideratum instead is to represent fairly *changes* in the prices of goods over time, that is, variations in the general price level. This implies that we seek inclusion of prices that are reflective of broad movements that were taking place. The criterion of reflectivity does not, in itself, require that they be for "important" commodities either in volume of trade or any other economic measure.

It is possible to imagine (although I make no nomination here) a commodity that is trivial by any of the usual economic criteria and yet reflects perfectly by its price fluctuations changes in the price level broadly viewed. At an extreme, we could be perfectly well satisfied with a nonprice surrogate variable if only we could trust its price-reflective behavior.

Common sense tells us, however, that we should want large-volume items, not because large volume is a *sine qua non* of reflective value, but because commodities dealt with in large volumes are likely to be buffeted by the winds of trade in the same way as commodities generally would be. To put the negative case, we should probably not want to include rare goods, because they are prone to vagaries of their own in price behavior.

Therefore, there are advantages when dealing with all the uncertainties of price history to be certain at least of the institutions that are the sources of our price materials. Still we must resist the temptation to include price series simply because they are available. The dictum "something is better than nothing" can be particularly misguiding here. This temptation, and the will to resist it, strengthens the further our price research goes back in time. When empirical evidence on prices becomes very scarce, our well-intended desire to utilize what does remain may blind us to its faults and nonreflective character.

The prescription for sample selection really comes down to this: Use common sense and your sensitivity as an economist and statistician. Avoid aberrant sectors of the market and stick to the mainstream of commerce. Do not be inveigled by mere availability. Tell your reader exactly what you have done.

Strangely enough, one of the trickiest problems in the context of this study is to determine what we want our price index to represent. What is the conceptually correct package of commodities to lay against an ounce of silver when measuring the purchasing power of the latter?

I know of no previous model to guide me. Certainly, I do not want a cost-of-living index. It is hardly relevant to think of a wage earner with an ounce of silver in hand shopping for the "typical" market basket at retail of the goods and services that his family consumes. In fact, retail prices themselves do not seem to represent the level of trade meaningful for the purchasing power of a precious metal.

Wholesale prices are the choice. This agrees well enough with the Beveridge collection in which prices paid by institutions are more nearly like the wholesale prices of today than their modern retail counterparts. Beginning with 1790, my own index constructed from the Beveridge data is appropriately spliced into wholesale price indexes published by others. These will be discussed presently. Suffice it to say here that I am seeking for the seventeenth and eighteenth centuries a conceptual counterpart of the wholesale price index published regularly by Her Majesty's Central Statistical Office for contemporary Britain—a general index number of wholesale price movements.

The International Scientific Committee on Price History has established the following strata as sound for studies of historical prices as a group:

I. Grain and other crops
II. Grain products
III. Livestock, meat, and poultry
IV. Dairy products, fats, and so on
V. Fish
VI. Vegetables
VII. Fruit
VIII. Sugar, spices, and so on
IX. Miscellaneous foods
X. Drinks
XI. Light, fuel, and so on
XII. Textiles
XIII. Hides, skins, and so on
XIV. Building materials
XV. Metals
XVI. Chemicals and miscellaneous

These strata are formulated to assure breadth of coverage. An examination of the Beveridge data recorded in my computer memory shows that as early as 1600 commodities are found in Strata I, III, IX, XI, XII,

XIII, XIV, XV, and XVI. By 1660 there is representation in all strata except VI, vegetables, for which the first appearance is in 1671.

The sample actually used in this study is, of course, selected from the Beveridge collection. It is a judgmental sample, because probability sampling would be wholly inappropriate. The principal judgment was in deciding what *not* to use. Without reconstructing all the reasoning, consider two examples: prices from the Lord Chamberlain's Department were excluded *in toto*. A close reading of Beveridge showed that these were centered almost exclusively on the Monarch's immediate household, and they hardly could be representative of wholesale prices in general. I must say, the temptation was considerable. I was throwing out data that stretched all the way from 1556 to 1829.

I also excluded spices. These were too rare in those early centuries to be at all representative for my purpose. Other exclusions were made on similar bases.

Full disclosure is part of the creed of the statistician, but publishers have their space limitations. With deference to the latter the composition of the final sample of commodity prices is detailed for only the one year 1700. The commodities are purposely listed in alphabetical order so that readers readily can ascertain if their candidates are included. Also, the reader can define subgroups (e.g., building materials) of particular interest to him or her and readily determine their proportionate representation in the sample. The digits following some of the commodities indicate the number of separate price series; otherwise only one price series is included for each commodity named.

Commodity Series

1700

Ale	Busquits 3	Cheese 4
Bacon	Bread 3	Chickens
Bark	Bricks 4	Cloth 2
Barley 3	Broadcloth	Coal 5
Bavins 2	Butter 4	Cod
Bean	Candles 6	Cream
Beef 7	Canvas	Diaper (cloth)
Beer 1	Cement	Ducks
Billets 2	Charcoal 2	Eggs

Commodity Series

1700

Faggots	Lime 4	Sand
Flounder	Linen	Solder
Flour 2	Malt 4	Straw
Geese	Milk	Sugar 4
Glue	Mutton 5	Tallow
Gravel	Nails	Tar 2
Hair	Oatmeals 4	Thrums
Hay	Oats 2	Tile pins
Hemp	Peas 2	Tiles (plain) 4
Hops	Pitch 2	Tiles (ridge)
Lamb	Pork 3	Train oil
Lard	Pullets	Turkey hens
Laths 2	Rice 2	Veal
Lead 4	Salmon	Whiting
Leatherbacks	Salt 3	Whole deals

The sample starts with a modest dozen of commodities in 1560, but expands to 24 price series as early as 1568.[1]

The index number used is of the average-of-ratio type. The specific form of average employed is the geometric means so that the algebraic formulation used is:

$$\sqrt[N]{\pi \frac{P_1}{P_0}}$$

In this formula P_0 represents, for each commodity, the price in the selected base year; P_1 denotes the commodity's price in any selected "given" year; π is simply the operational symbol for multiplication; and N represents the number of commodities in the sample for the "given" year for which the index is, in fact, computed.

A full discussion and justification for the use of the geometric mean type of price-index number is given in *The Golden Constant*, to which the reader interested in technical details is referred. But the general reader of the present volume should be told that this form of price index

[1] These are bricks (2), candles (2), charcoal, cheese, cloth, lead, lime (2), pewter, pitch, rabbits, solder, straw, tallow, tar, thrums, tile pins, tiles (plain) (3), tiles (ridge), train oil.

has three outstanding merits. The first two of these are told in the words of Professor Wesley C. Mitchell in his classic *The Making and Use of Index Numbers* (modestly published as Bulletin No. 656 of the U.S. Bureau of Labor Statistics in 1938):

> For the geometric mean two great merits are claimed. First, unlike the arithmetic mean, it is not in danger of distortion from the asymmetrical distribution of price fluctuations. . . . If, for example, one commodity rose tenfold in price and another commodity fell to one-tenth of the old price, the arithmetic mean would show an average rise of 505 percent $(1000 + 10 \div 2)$, while the geometric mean would show no change in the average since $\sqrt{1000 \times 10} = 10$.
>
> The second merit claimed for geometric means is that they can be shifted from one base period to another without producing results that seem to be inconsistent.

The second merit cited by Mitchell—the ability to compare with mathematical soundness index numbers at any two dates neither of which is the base—is of utmost importance in long historical researches of price such as the one we are engaged in here.

The third merit of the simple geometric index number comes into significance when, as here, there are no data by which appropriate weights can be assigned to the various commodities in their contemporaneous market places of centuries ago. To the nonstatistician this must seem a grievous, if not fatal, fault. Actually, as the practitioner of index number construction knows, the lack of weights—more properly, the use of uniform (simple) weights—is not that serious in most practice if the simple geometric index is used.

This was discovered by Irving Fisher by 1922 (*The Making of Index Numbers*) and was probably known to Wesley C. Mitchell even earlier. Fisher writes (pp. 444–445):

> The third point which strikes us in making these comparisons is how *small* is the difference made by using the careful discriminating cross weighting instead of the erratic simple weighting. This is astonishing when we consider that the two sets of weights themselves differ enormously. In the simple weighting all 36 commodities are equally important while in the cross weighting the highest weight (that for lumber was 118 times as great as the lowest (that for skins)); in 1915 the highest was 134 times the lowest; in 1916, it was 100 times; in 1917, 130 times; and in 1918, 261 times. Yet in spite of these enormous variations (and in spite of the fact that there are

> only 36 commodities in the list), these *unbiased* simple and cross weighted forms usually agree within five and ten percent. In fact, out of 60 comparisons between the simple and cross weighted index numbers, there are only 13 differences that exceed five percent and only five over ten percent.

Fisher goes on to state:

> Professor Wesley C. Mitchell cites many actual examples of the effect of weighting as compared to simple numbers. In general, the differences are less even than those here found. . . . Ordinarily the difference between the simple and the best weighted index number of the Aldrich Senate Report was less than three percent.

In historical researches all errors are unwelcome, but a numerical error of the order of 3 percent is among the least of our worries. So much for the technical aspects and advantages of the particular type of price index constructed for this study.

There is a broader issue also at stake. In the General Introduction to his work Lord Beveridge aptly states that "whether the period chosen be short or long, price-history is a study not of isolated facts but of relations: comparison is its essence. This makes it necessary to make as sure as we can in each case that, in comparing prices at different times, we are comparing like with like." Much of the text of his first volume is given to explaining how this comparability was sought for and preserved.

I would only point out that when we go so far back in price history as I do here we are like the archaeologist. We nurse together the evidence that has survived along with whatever test of its validity is available to us. From this partial record we try to reconstruct what the whole must have been like. Statistics, like archaeology, is an inexact science when practiced on numbers that are remote and fragmentary. When we examine the prehistoric paintings of the horses in the caves at Lascaux, we should not complain about the pigment that was used.

The foregoing discussion relates to a wholesale price index number (1560 to 1790) especially constructed for this study. No such series existed for those years. The nearest approach is to be found in E. H. Phelps Brown and S. V. Hopkins, "Seven Centuries of the Prices of Consumables, Compared with Builders' Wage-Rates," *Economica*, 1956. This famous calculation was designed to approximate a cost-of-living index for workers' families and is, of course, confined to consumers' goods only. Six categories (encompassing seventeen commodities) are covered: (1) farinaceous, (2) meat, fish, (3) butter, cheese, (4) drink, (5) fuel, light, and (6)

textiles. My new index number is based on a much larger sample and one intended to be more representative of *wholesale* prices generally.

Starting in 1790 there are available well-recognized index numbers at the wholesale level, so that I was not forced to carry my index further toward the present. Rather, my index is chained to the Gayer-Rostow-Schwartz index from 1790–1850, which in turn is spliced to the Sauerbeck-*Statist* index for the interval 1850–1979. The complete series, 1560–1979, is expressed on the base 1930 = 100.0. This base was chosen because the Board of Trade once used 1930 as base 100.0 in representing prewar prices and because this was one of the last years preceding extraordinary gyrations in silver prices.

My original index was computed directly from the commodity price ratios presented in the Beveridge collection, which were individually on base average 1720–1744 = 100.0. Because I used the geometric-type index number that allowed any 2 nonbase years to be compared directly, it followed that I could shift the base by simple division to any other single year I chose without mathematical distortion. Thus the link-up with the Gayer-Rostow-Schwartz index was achieved in the overlap year of 1790 by the process of division. The latter index is also of the geometric type, so that the virtues of this form of index number extend homogeneously from 1560–1850 in the final analysis. The entire index number is given in Table 17.

Throughout this volume index numbers are stated to one decimal place. This is a convention for their easy identification as percentages and not because they are mathematically significant to one decimal.

The original Gayer-Rostow-Schwartz index number, including a description of the weighting system they used can be found in Appendix A of my *Golden Constant*. Also to be found there is the Sauerbeck-*Statist* series in its original form.

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