ANNUAL REPORT OF
THE DIRECTOR OF THE MINT

FOR THE FISCAL YEAR ENDED JUNE 30

1965

INCLUDING REPORT ON

THE PRODUCTION AND CONSUMPTION OF GOLD AND SILVER

FOR THE CALENDAR YEAR

1964

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Director of the Mint

LETTER OF TRANSMITTAL

DEPARTMENT OF THE TREASURY,
BUREAU OF THE MINT,
Washington, D.C., May 15, 1966

SIR: In compliance with the provisions of section 345 of the Revised Statutes of the United States, I have the honor to submit a report on the operations of the Mints, the Assay Offices, and the Bullion Depositories of the United States for the fiscal year ended June 30, 1965. This is the Ninety-third Annual Report of the Director of the Mint since the establishment in 1873 of the Bureau of the Mint in the Department of the Treasury. Annual reports of Mint activities, however, have been made since the first Mint was authorized in 1792. The annual report of this Bureau on United States production and consumption of gold and silver for the calendar year 1964 is also submitted.

Respectfully,

Eva Adams,
Director of the Mint.

Hon. HENRY H. FOWLER,
Secretary of the Treasury.

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THE COINAGE ACT OF 1965

Introduction.--A major piece of monetary legislation in 1965 was Public Law 89-81, known as the "Coinage Act of 1965". The most important feature of this Act is a change in the metallic content of the three denominations of United States subsidiary coins, the half dollar, the quarter dollar, and the dime. The following is a condensed review of developments preceding the enactment of Public Law 89-81, July 23, 1965. Additional details are included in the Exhibits Section of this Report.

Background.--From the establishment of the national coinage system in 1792, the traditional composition of United States silver coins has been an alloy of 90 percent silver (900 silver fineness) and 10 percent copper. In recent years the Mint has required exceptionally large amounts of silver bullion for the manufacture of coins. This coinage silver has come from the Treasury's substantial stocks of bullion, acquired principally under the Government's silver purchase program dating from the early 1930's. In recent years there also has been an expanding worldwide demand for silver for nonmonetary purposes, that is, for industrial, professional, and artistic uses. Eventually the market supply of silver from new production combined with that from secondary sources became insufficient to meet total nonmonetary requirements, and the Treasury has met this imbalance from the U.S. Government's stocks of silver bullion. For some time it has been apparent that the increasingly large drains on Treasury silver could not continue indefinitely.

Special studies.--In the national interest, the Treasury initiated comprehensive studies more than two years ago, concentrating on the two major problems. One problem concerned silver in general, and the feasibility of continuing the present high-content silver coinage. The other dealt with coinage materials other than the alloy of 90 percent silver and 10 percent copper.

Of exceptional significance was the survey, in depth, of the silver demand and supply situation on both a national and a world level. The studies confirmed that the rising use of silver for commercial purposes and coinage, accompanied by only a very moderate expansion in new production, had created an immense and widening gap between free world production and consumption. In 1964, for example, world consumption of silver by industry and the arts, and its use in coinage, taken separately, were greater than new production. As previously mentioned, the deficit in the supply, for a number of years, had been met from the bullion stocks of the U.S. Treasury. In addition to the widening gap between production and consumption, the studies indicated that there is no dependable or likely prospect that new, economically workable sources of silver could appreciably close this gap in the foreseeable

future. It is noted that silver is produced chiefly as a byproduct in the mining of copper, lead, and zinc. At the present time, approximately two-thirds of domestic silver is recovered as a byproduct of these base metal ores.

With this outlook on silver, the studies concentrated on the evaluation of coinage metals other than silver of 900 fineness. A set of specific criteria was established for judging the possible alternatives.

Since the primary function of a coinage system is to provide an adequate medium of exchange, the particular needs of the economy and the convenience of the public were placed ahead of all other considerations. With respect to public acceptability, importance was attached to maintaining some continuity with the traditional coinage, especially with regard to the physical characteristics of color, weight, size, and general attractiveness of the coins. Coins now serve in a dual capacity in the United States, as technical merchandising instruments as well as in the traditional hand-to-hand means of exchange. As merchandising instruments they are used to operate machines dispensing a variety of goods and services.

A partial list of service machines operated by coins includes pay telephones, music boxes, parking meters, toll booths, laundry and dry cleaning facilities, and coin changers. Automatic vending machines to dispense candy, cigarettes, soft drinks, and the like have expanded in recent years to accommodate numerous other items. A rapidly growing application is the vending of hot and cold meals and refreshment services in industrial plants, offices, hospitals, schools, and other institutions.

From the practical standpoint of adequate performance of coins in their dual capacity, it was most desirable for a new coinage system to provide for a high degree of side-by-side circulation of new and old coins.

During the two-year period under review, the staff of the Bureau of the Mint participated actively in all phases of the Treasury's comprehensive studies. The Mint's technical program was greatly expanded through intensified metallurgical research and laboratory experiments. The latest scientific developments and improved methods of metal processing in the industrial field were surveyed. And, in the latter part of 1964, the Mint commissioned a private metallurgical research organization, the Battelle Memorial Institute, to make an independent and parallel study of materials suitable for use in United States coins. Collectively, these studies represent the most exhaustive investigation of the coinage field ever undertaken in the United States.

The Mint's long and varied experience in manufacturing domestic and foreign coins in many metals and alloys proved to be an invaluable point of reference during the entire period.

The metallurgical institute, in order to obtain a balanced perspective of the problem, considered a broad spectrum of metals, alloys, and nonmetallic materials that might be used for coinage. Each type of material was examined and evaluated on the basis of the established criteria, such as the availability and cost of raw materials, coinability, counterfeiting potential, acceptability in coin-operated mechanisms, and other technical factors. The range of metallic elements makes an impressive list, totaling thirty two

in number and including the "newer" as well as the traditional coinage metals. Twenty of the metals were eliminated in a preliminary screening based on the application of the criteria and minimum standards of metallurgical and technical acceptability. The remaining twelve were given further consideration either as minor alloying elements or in essentially an unalloyed form. In addition, another type of material, called a "composite", was tested. When certain desirable properties cannot be realized with a homogeneous material, they can often be met in composite systems. One such composite is a "clad" or "multilayer material" of two or more metals specially engineered to reproduce all of the necessary requirements. Nonmetallic materials, plastics and ceramics, were rejected from consideration based on present technology.

A variety of representative materials, in the form of rolled strip, were selected for actual coinage testing in the Philadelphia Mint. They included the following: Homogeneous silver alloys ranging in fineness from 200 to 500; nickel-silver (65% copper, 18% nickel, 17% zinc); cupronickel (75% copper and 25% nickel); cupronickel and nickel-silver clad on copper; silver-copper clad on copper or on low content silver-copper; columbium; zirconium; Monel; stainless steels; and a 95% nickel-5% silicon alloy containing a magnetic core. The behavior and adaptability of the various metals to Mint processes and Mint equipment were observed during the blanking, upsetting, and coining stages of manufacturing. The most promising of the materials were subjected to full-scale production runs. Ease and certainty of high levels of quality production were important criteria from the standpoint of Mint operations. Trial coins were given extensive wear, corrosion, and other tests.

At the conclusion of the studies, there was unanimous agreement that the present silver coins of 900 fineness are unequaled. The superiority of silver as a coinage metal has long been recognized since the white color, corrosion resistance, high density, low electrical resistivity, and the absence of magnetism are unique to the silver-copper alloy system. No other element or alloy contains this particular combination of properties. However, because of the lack of silver with which to maintain the 90 percent silver coinage, the fundamental determination of the studies was that the United States could not, over a period of time, continue the large-scale consumption of silver required in the subsidiary coinage. To do so could result in a severe and chronic national coin shortage in the not distant future.

The coinage materials selected as possible alternatives met the required set of criteria in varying degrees. In the final analysis, only the multilayer composite type of coin proved to be entirely compatible with the high silver content subsidiary coins. The rejectors or sensors in automatic vending and service machines were specifically designed to accommodate the sizes, weights, and alloy of present silver coins; and to change the many millions of mechanisms to accept coins with different electrical properties would interrupt service for one to three years, thus imposing a great deal of inconvenience and hardship upon the public. Since the

composite type of coin satisfied the other criteria it therefore was recommended.

As background for the recommended legislation, the Treasury Department released the Treasury Staff Study of Silver and Coinage, which summarizes the two-year comprehensive investigation into all aspects and possibilities of the silver and coinage problems. The entire Study is presented in Exhibit 5 in this Report. The Treasury as a supplement to its findings also released the final report of the Battelle Memorial Institute, A Study of Alloys Suitable for Use as United States Coinage, containing the summary of their extensive study. On June 3, 1965, President Lyndon B. Johnson transmitted his recommendations with respect to silver and the coinage in a Message to the Congress which was accompanied by a draft of legislation, "A Bill To Provide for the Coinage of the United States." Exhibit 2 contains the text of the Presidential Message and the proposed legislation.

The documents, H.R. 8746 superseded by H.R. 8926 and S. 2080, were referred to the Congressional Committees on Banking and Currency. Public hearings were held by the House Committee on June 4, 7, and 8, and by the Senate Committee on June 9, 1965. The Committees heard statements and testimony by Secretary of the Treasury Fowler, other Treasury officials, various Members of Congress, and other interested persons from outside the government. Secretary Fowler's statements in support of the President's recommendations are given in Exhibits 3 and 4.

After due consideration by both Houses of Congress the legislation with amendments, passed the House and Senate on June 14, and 15, 1965, respectively. During a special White House ceremony, President Johnson signed the Coinage Act of 1965 into Public Law 89-81 on July 23, 1965. The remarks of the President during this historic occasion and the details of the Coinage Law are given in Exhibits 6 and 7 in this Report.

The provisions of Public Law 89-81 are reviewed briefly in part. The three denominations of composite or clad coins will consist of two distinct types of multilayer material, each composed of three layers of metal. The weight of the cladding will be not less than 30 percent of the gross weight of the coin.

Silver is completely eliminated from the dime and the quarter dollar. The two outer layers of these denominations will be composed of a cupronickel alloy of 75 percent copper and 25 percent nickel, metallurgically bonded to a center core or inner layer of pure copper. The obverse and reverse sides will be white in appearance, and the copper core will give the coins a distinctive copper-colored edge. The clad dime will weigh 2.268 grams, compared with 2.5 grams for the silver dime. The clad quarter will weigh 5.67 grams, compared with 6.25 grams for the silver quarter.

The half dollar clad coin containing silver will preserve a link with the 173-year-old tradition of silver coins. It will have an overall silver content of 40 percent, or a fineness of 400, and will be almost indistinguishable from the present half dollar. This denomination will be faced with an alloy of 80 percent silver and 20 percent copper, metallurgically bonded to a center core containing approximately 21 percent silver and 79 percent copper.

The gross weight of the clad half dollar will be 11.5 grams, of which 4.6 grams will be silver. The 900 silver half dollar weighs 12.5 grams, of which 11.25 grams are silver.

Each denomination of clad coin will retain the same size (diameter and thickness) and the same designs as the ones presently minted, thus continuing further the valued ties with the past. As previously indicated, they will operate satisfactorily as technical merchandising instruments alongside the 90 percent silver subsidiary coins. No Mint marks will appear on the clad coins for a period of five years. The dates on the new coins will correspond to the year of coinage or issue, with certain exceptions needed for the prevention or alleviation of a coin shortage.

The new clad coins will be legal tender for all debts, public and private, public charges, taxes, duties, and dues. Also, they will have the same purchasing power as all other United States currencies and coins.

The Secretary of the Treasury is given special procurement authority, for a period not to exceed five years, so that the Mint can produce rapidly an adequate supply of the new coins. During this time he may enter into such contracts that are deemed appropriate and in the national interest to acquire metallic strip, essential equipment, and other materials, manufacturing facilities, patents and patent rights, and technical assistance. The Secretary delegated this authority to the Director of the Mint on July 26, 1965 (see Exhibit 8).

Of exceptional importance to the Mint is the provision for the San Francisco Assay Office to perform full-scale coinage operations, to continue until the Secretary of the Treasury may determine that the Philadelphia and Denver Mints are adequate to produce ample supplies of coins. Also, San Francisco will again refine gold and silver bullion. Refining had been discontinued in 1957 (see also Exhibit 16).

The coinage legislation of 1965 leaves three denominations of coins unchanged: The bronze one-cent and the cupronickel five-cent pieces, and the standard silver dollar of 900 fineness. However, the Act stipulates that no silver dollars are to be manufactured during the five-year period dating from the enactment of this legislation. Other miscellaneous provisions of the law concern the coinage metal fund, wastage, etc. Also, the President is authorized to establish a "Joint Commission on the Coinage" to review from time to time the progress made under the Coinage Act of 1965.

CHRONOLOGY OF EVENTS JULY - DECEMBER 1965

July 23, 1965.--President Johnson approves the "Coinage Act of 1965" (Public Law 89-81).

August 23, 1965.--Philadelphia Mint starts production of the new clad quarters, authorized by the Coinage Act of 1965. These are the first coins to bear the date "1965".

September 1, 1965.--Reactivation of minting operations at the San Francisco Assay Office, authorized by the Coinage Act of 1965, begins with the striking of one cent coins.

September 17, 1965.--Groundbreaking ceremonies for a new Mint building are held in Philadelphia.

November 1, 1965.--The new clad quarters are released for circulation throughout the United States.

December 6, 1965.--Philadelphia Mint starts production of the new clad dimes, authorized by the Coinage Act of 1965. The coins bear the date "1965".

December 29, 1965.--The first minor coins bearing the date "1965" are struck. Minor coins are the cupronickel 5-cent and bronze 1-cent denominations.

December 30, 1965.--Denver Mint starts production of the new clad silver half dollars, authorized by the Coinage Act of 1965. The coins bear the date "1965".

SPECIAL CONGRESSIONAL HEARINGS

Of particular interest was the nationwide inquiry relative to the prevalent shortage of coins in circulation, made by the Legal and Monetary Affairs Subcommittee of the Committee on Government Operations, House of Representatives. Public hearings were held in two sessions--the first on June 30, July 1 and 2, 1964, and the second on February 16 and 17, 1965. In response to the Committee's request, information was furnished by various Members of Congress, Government officials, commercial bankers, representatives of business concerns dealing with large quantities of coins, trade associations, and other interested citizens. Treasury officials presenting comprehensive information on coinage production and distribution were Assistant Secretary Wallace and Mint Director, Eva Adams. The testimony of the Director of the Mint before the Committee on July 2, 1964, is recorded in the 1964 Annual Report (Exhibit 1, pages 129-194); that given in the second session on February 17, 1965, appears as Exhibit 1 in this Report.

REPORT ON OPERATIONS OF THE BUREAU OF THE MINT, FISCAL YEAR 1965

PRODUCTION AND DISTRIBUTION OF U.S. COINS

Production.--It is most rewarding for the United States Mint to report a new all-time coinage record for the fifth consecutive year. Thus the five-year period 1961-1965 marks the greatest continuing increase in production output in the 173-year history of the Mint. In addition, the fiscal year 1965 marks a full year of operation under the Mint's intensified coinage program announced by the Treasury in the latter part of June 1964. The program, referred to as the "Crash Program", was designed to overcome the national coin shortage which had become progressively more acute during the past several years.

The collective measures of the program produced the desired results. The Mints hired additional personnel and throughout the year operated 3 shifts on a 24-hour day, 7 days a week schedule.

Renovations of space in the Philadelphia and Denver Mints provided for more machinery and equipment. A vacant building adjacent to the Denver Mint was remodeled by the General Services Administration, and coinage presses were installed. At the San Francisco Assay Office, other Government agencies which occupied a part of the building were relocated, and mint machinery for the blanking, annealing, cleaning, and upsetting of bronze and cupronickel planchets was installed in the space. By the spring of 1965, San Francisco was supplying the Denver Mint with all of their one and five cent coin blanks. The annealing and cleaning of bronze planchets for the Philadelphia Mint was done by the Department of Defense in the Frankford Arsenal in Philadelphia. The purchase from private industry of bronze and cupronickel strip for the one and five cent denominations permitted the use of all of the Mint's melting, casting, and rolling facilities for the production of subsidiary silver coins. New coin and blanking presses and other equipment were purchased. Surplus machines which were acquired from the Department of Defense and the General Services Administration were converted to mint blanking and stamping operations. Old mint presses which had been on loan to museums were returned to the Mint for active use. The production of "proof" coins was suspended at the Philadelphia Mint at the end of December 1964; the proof coin presses were converted for high-speed production of regular coins, and proof coin employees were transferred to regular coinage operations.

At the beginning of fiscal 1965, 60 coinage presses were in operation. By the end of the year, 39 additional presses brought the total to 99. The results of the expanded operations under the Crash Program are evident by the progressively higher rate of production. With an output of 458 million coins in July 1964, the first month of the fiscal year, nearly 590 million were produced the following month, and a peak of over 738 million pieces was reached in April 1965. Consequently the 12-month record for fiscal 1965 totaled well over 7 billion pieces, compared with 4.3 billion pieces in 1964. A comparison of coinage production for the past five years is as follows:

U.S. coins manufactured during the 5-year period 1961-1965

Fiscal year	Number of coins manufactured [1]	1965 percentage increase	Total face value
1965.....	7,241,835,601	-	$495,954,566.73
1964.....	4,325,022,920	67	257,236,322.30
1963.....	3,641,621,768	99	161,698,512.03
1962.....	3,476,283,167	108	146,179,572.55
1961.....	3,071,050,188	136	93,592,938.00
Total.....	21,755,813,644		1,154,661,911.61

[1] Includes five denominations: Half dollars, quarter dollars, dimes, 5-cent pieces, and 1-cent pieces.

A measure intended to eliminate the incentive for keeping "1964" dated coins out of circulation for speculative purposes was provided for in Public Law 88-580, enacted September 3, 1964. Normally, the date inscription on United States coins coincides with the calendar year in which they are manufactured. The coins manufactured from January through June 1965, therefore, continued to be inscribed with the "1964" date. Public Law 88-580, titled "An Act To authorize the mint to inscribe the figure 1964 on all coins minted until adequate supplies of coins are available", appears on page 195, Exhibit 2, in the 1964 Annual Report.

Approximately 32,000 short tons of metals were consumed in the 1965 production. Five denominations of coins were made in three different combinations of metals; silver, copper, nickel, and zinc. The subsidiary coins, half dollars, quarter dollars, and dimes, were composed of silver of 900 fineness, alloyed with 100 parts of copper. The minor coins, 5-cent pieces and 1-cent pieces, were of cupronickel and bronze alloys, respectively; the cupronickel alloy was 75 percent copper and 25 percent nickel; the bronze alloy was 95 percent copper and 5 percent zinc. A comparison of the quantity of metals in the 1965 output with that of the preceding four years is given in the following table.

Metals consumed in the manufacture of U.S. coins 1961-1965

Weight unit: Short tons avoirdupois

Fiscal year	Silver	Copper	Nickel	Zinc [1]	Total
1965.....	9,422	19,676	2,174	637	31,909
1964.....	4,935	11,874	868	459	18,136
1963.....	2,870	10,345	562	439	14,216
1962.....	2,577	9,972	462	437	13,448
1961.....	1,450	9,048	290	422	11,210
Total.....	21,254	60,915	4,356	2,394	88,919

[1] Includes small quantity of tin in the 1-cent bronze alloy before enactment of Public Law 87-643, September 3, 1962 (31 U.S.C. 317).

Distribution.--The Mint releases coins for circulation through the facilities of the Federal Reserve System. The following list gives the location of the twelve Federal Reserve Banks and their twenty four branches which serve as central points for the distribution of coins to commercial banks throughout the country.

Federal Reserve District	Federal Reserve Bank	Branch Banks
1.	Boston, Massachusetts	--
2.	New York, New York	Buffalo, New York
3.	Philadelphia, Pennsylvania	--

Federal Reserve District	Federal Reserve Bank	Branch Banks
4.	Cleveland, Ohio	Cincinnati, Ohio
		Pittsburgh, Pennsylvania
5.*	Richmond, Virginia	Baltimore, Maryland
		Charlotte, North Carolina
6.	Atlanta, Georgia	Birmingham, Alabama
		Jacksonville, Florida
		Nashville, Tennessee
		New Orleans, Louisiana
7.	Chicago, Illinois	Detroit, Michigan
8.	St. Louis, Missouri	Little Rock, Arkansas
		Louisville, Kentucky
		Memphis, Tennessee
9.	Minneapolis, Minnesota	Helena, Montana
10.	Kansas City, Missouri	Denver, Colorado
		Oklahoma City, Oklahoma
		Omaha, Nebraska
11.	Dallas, Texas	El Paso, Texas
		Houston, Texas
		San Antonio, Texas
12.**	San Francisco, California	Los Angeles, California
		Portland, Oregon
		Salt Lake City, Utah
		Seattle, Washington

*The District of Columbia is served by the U.S. Treasury in Washington, D.C.
**Includes Alaska and Hawaii.

The Mints delivered to the Banks the entire output of 7.2 billion newly minted coins produced during the twelve months of fiscal 1965. The coins have a face value of more than $495 million. A summary of the shipments to each Federal Reserve District, according to denomination, is given in a table on page 10.

The Mint's shipments in fiscal 1965 were doubled those of 1963 (3.7 billion pieces), and were two thirds greater than in 1964 (4.3 billion pieces). Thus, in the last three years the Nation's stock of metallic currency was augmented by more than 15 billion new coins through the Mint's emergency program for alleviating the acute coin shortage. The Federal Reserve Banks are to be commended in their equitable distribution of coins to the commercial banks. Also, the American Bankers Association performed a most valuable public service by their "Calling All Coins" campaign which opened in October 1964, and by their sustained efforts in urging the public to keep all of their coins in active circulation. The cumulative actions served to ease the shortage as 1965 progressed. The one and five-cent denominations in particular were in good supply.

The percentage distribution of each denomination of coin delivered to the Federal Reserve Banks during the past three years is shown in a table on page 10.

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Shipments of United States coins for circulation by the Bureau of the Mint, fiscal year 1965[1]

Federal Reserve District	1 cent	5 cents	10 cents	25 cents	50 cents	Total
1.....	144,600,000	66,500,000	28,600,000	27,800,000	17,540,000	285,040,000
2.....	471,450,000	242,952,000	128,250,000	131,820,000	16,100,000	990,572,000
3.....	199,365,000	72,802,000	75,314,311	38,129,173	15,609,602	401,220,086
4.....	282,600,000	125,920,000	86,500,000	48,680,000	15,930,000	559,630,000
5.....	366,300,000	131,600,000	58,914,609	58,255,434	13,246,148	628,316,191
6.....	397,400,000	117,040,000	85,350,000	56,100,000	16,640,000	672,530,000
7.....	623,100,000	249,960,000	169,350,000	128,860,000	31,050,000	1,202,320,000
8.....	222,450,000	106,200,000	79,750,000	44,960,000	9,260,000	462,620,000
9.....	103,950,000	45,740,000	42,700,000	23,780,000	6,290,000	222,460,000
10.....	160,613,300	52,756,380	57,845,249	27,049,924	10,229,953	308,494,806
11.....	180,950,000	98,520,000	70,550,000	39,240,000	11,390,000	400,650,000
12.....	564,220,000	266,836,000	152,840,000	90,840,000	30,102,000	1,104,838,000
Total pieces..	3,716,998,300	1,576,826,380	1,035,964,169	715,514,531	193,387,703	7,238,691,083
Percent of total.	51%	22%	14%	10%	3%	100%

[1] Excludes proof coins sold directly by the Mint during a portion of the year.

Percentage distribution of Mint shipments, by denominations and fiscal years

	1963	1964	1965
Billions of coins shipped.....	3.6	4.3	7.2
Percentage distribution:			
1 cent.....	71	62	51
5 cents.....	11	15	22
10 cents.....	12	14	14
25 cents.....	4	6	10
50 cents.....	2	3	3
Total.....	100%	100%	100%

The stock of fractional coins in the United States, reflecting the 15.1 billion new coins placed in circulation, and adjusted for uncurrent (worn) and mutilated coins withdrawn from circulation, etc., showed a net increase of $881.9 million (face value) during the three fiscal years 1963-1965, as follows:

Stock of United States coins at end of fiscal years 1962-1965

Stock on June 30	Face value in millions of dollars		
	Minor coins	Subsidiary coins	Total
1962.....	$636.0	$1,710.8	$2,346.8
1963.....	681.8	1,824.9	2,506.7
1964.....	737.7	1,999.5	2,737.2
1965.....	853.4	2,375.3	3,228.7
Net increase.....	+217.4	+664.5	+881.9

ADDITIONAL MINT FACILITIES

The new Mint building in Philadelphia, authorized under the provisions of Public Law 88-102, approved August 20, 1963, is expected to be completed and to begin actual operations by July 1967. Production facilities will include melting, casting, rolling, and coining, plus the capability to produce the new clad strip for coins authorized by the Coinage Act of 1965. Many innovations in minting processes and equipment are planned for the new installation which will bring about more efficient operations as well as a greatly expanded capacity.

PRODUCTION OF FOREIGN COINS

The Act of January 29, 1874, which authorizes the United States Mints to manufacture foreign coins, contains a provision that such coinage should not interfere with the required coinage of the United States. During the year under review the United States Mint temporarily suspended the customary service of minting coins for other governments in order to utilize its entire capacity and facilities for the production of domestic coins.

GOLD AND SILVER TRANSACTIONS

Deposits.--The number of gold and silver bullion deposit transactions made at the Mints and Assay Offices during the fiscal year 1965 amounted to 8,199. This was an increase of 201 deposit transactions over the previous year. Total assay determinations in 1965 amounted to 256,019, of which 90,071 determinations were made on the gold and silver bullion deposits.

The gold content of the 8,199 bullion deposits received amounted to 5,949,941 fine ounces valued at $208,247,950, and the silver content, 4,355,010 fine ounces valued at $5,431,708, exclusive of transfers between Mint institutions. Included were receipts of newly mined bullion produced in mines of the United States, amounting to 711,586 ounces of gold, and 12,686 ounces of silver. Gold and silver bearing scrap materials received from domestic sources amounted to 543,116 ounces and 3,440,134 ounces, respectively. Uncurrent United States gold coins received and melted contained 53 fine ounces of gold. Uncurrent United States silver subsidiary coins returned from active circulation yielded 354,319 fine ounces of silver. Gold from foreign and other miscellaneous sources amounted to 4,695,186 ounces; and silver from various sources totaled 547,871 ounces, of which 324,809 ounces were lend-lease returns made by the Government of India.

Disposition.--The disposition of bullion at the Mints and Assay Offices, exclusive of intermint transfers, totaled 48,235,067 fine ounces of gold valued at $1,688,227,362, and 447,784,611 fine ounces of silver valued at $577,802,890. Withdrawals of gold included the following: Exchanged and sold for industrial, professional, and artistic uses, 91,037 and 4,055,057 ounces, respectively; exchanged and sold for monetary and other miscellaneous purposes, 816,352 ounces and 43,272,621 ounces.

The disposition of fine silver during fiscal 1965 included the following: Manufactured by the Philadelphia and Denver Mints into 1,946,639,115 United States half dollars, quarter dollars, and dimes, 274,457,699 ounces; exchanged for deposits of scrap silver from domestic sources, 3,189,765 ounces; exchanged for other miscellaneous deposits of silver, 128,797 ounces; sold in medals and other miscellaneous items, 4,908,517 ounces; and 165,099,833 fine ounces of silver bullion were issued at the New York and San Francisco Assay Offices through the redemption of silver certificate currency. This type of silver transaction was effected under the authority of section 2 of the Act of June 4, 1963 (Public Law 88-36) and the special instructions issued under this Act by the Secretary of the Treasury, dated July 22, 1963 and March 25, 1964.

Summary.--The stocks of gold and silver held by the Mints, Assay Offices, and Bullion Depositories at the beginning and close of the fiscal year 1965, and the receipts and disposition during the year, exclusive of interinstitution transfers, are summarized as follows:

Gold and silver bullion	Fine troy ounces	Short tons	Value
Holdings June 30, 1964 [a]:			
Gold	432,369,156	14,824	$15,132,920,449
Silver	1,378,511,867	47,263	1,774,839,037
	1,810,881,023	62,087	16,907,759,486
Received in fiscal 1965 [b]:			
Gold	5,949,941	204	208,247,950
Silver	4,355,010	149	5,431,708
	10,304,951	353	213,679,658
Disposition in fiscal 1965 [b]:			
Gold	48,235,067	1,654	1,688,227,362
Silver [c]	447,784,611	15,352	577,802,890
	496,019,678	17,006	2,266,030,252
Total receipts and disposition [b]:			
Gold	54,185,008	1,858	1,896,475,312
Silver [c]	452,139,621	15,501	583,234,598
	506,324,629	17,359	2,479,709,910
Holdings June 30, 1965 [d]:			
Gold	390,084,030	13,374	13,652,941,037
Silver	935,082,266	32,060	1,202,467,855
	1,325,166,296	45,434	$14,855,408,892

[a] Does not include Treasury holdings of 9,386,146 ounces (322 tons) of gold valued at $328,515,138 and 64,751,316 ounces (2,220 tons) of silver valued at $83,718,873 held outside of Mint institutions.

[b] Excludes interinstitution transfers.

[c] Includes 274,457,699 ounces (9,410 tons) manufactured into 1,946,639,115 subsidiary silver coins having a total face value of $379,884,110.55.

[d] Does not include Treasury holdings of 8,032,364 ounces (275 tons) of gold valued at $281,132,746 and 64,751,316 ounces (2,220 tons) of silver valued at $83,718,873 held outside of Mint institutions.

MINT REVENUES

The Bureau of the Mint deposited over $114 million into the general fund of the Treasury in fiscal 1965. This exceeded the previous year's revenues by more than $43 million. Seigniorage resulting from the manufacture of the 7,241,835,601 subsidiary and minor coins totaled $112,960,193, reflecting a gain of 64 percent over coinage seigniorage in 1964. Other 1965 deposits of over $1 million included handling charges on gold bullion, profit on the sale of silver bullion, other bullion charges, sales of equipment, scrap, salvage materials, increment resulting from reduction in the weight of the gold dollar, and miscellaneous fees.

Revenues deposited by Bureau of the Mint into the general fund of the Treasury	Fiscal year 1964	Fiscal year 1965
Seigniorage on subsidiary silver coinage	$20,956,984.70	$21,911,119.11
Seigniorage on minor coinage	47,788,252.66	91,049,073.55
Total coinage seigniorage	68,745,237.36	112,960,192.66
All other	2,096,470.12	1,309,763.66
Total revenues	70,841,707.48	114,269,956.32
Amount of increase in 1965	.....	$43,428,248.84
Percentage increase in 1965	.....	61.3%

SUMMARY OF FUNCTIONS, WORKLOAD, AND PERSONNEL

The principal functions of the Bureau of the Mint are the manufacture, distribution, and redemption of domestic coins; the receipt, processing, custody, disbursement, and movement of gold and silver bullion; the manufacture of medals of a national character, including special medals authorized by acts of Congress and medals for other U.S. Government agencies; the manufacture of foreign coins; the assays of ores for the public; and other technical services.

The Director of the Mint, with departmental headquarters in Washington, D.C., administers and supervises all activities of the Bureau. In the fiscal year 1965, the six field institutions in operation were the Philadelphia and Denver Mints; the New York and San Francisco Assay Offices; the Silver Bullion Depository in West Point, N.Y., which is an adjunct of the New York Assay Office; and the Gold Bullion Depository in Fort Knox, Ky. An electrolytic refinery for refining precious metals is located in New York. Each Mint and Assay Office performs a number of operations relating to the overall functions listed above.

During fiscal year 1965, the overall volume of Mint operations continued to expand. A table of selected items representing major activities compares the workload for fiscal years 1964 and 1965. The number of employees in the departmental and field offices of the Mint service is classified according to location and function in the table, Personnel of the Bureau of the Mint.

Volume of operations, Bureau of the Mint

Selected items	Fiscal year 1964	Fiscal year 1965
Coins manufactured, pieces:		
Domestic regular issue	4,307,341,770	7,231,406,086
Domestic proof coins	17,681,150	10,429,515
Foreign coins	80,000,000	.....
Total	4,405,022,920	7,241,835,601
Coins issued, pieces:		
1-cent pieces	2,678,257,373	3,717,236,160
5-cent pieces	629,746,773	1,577,964,240
Dimes	614,549,023	1,036,210,180
Quarter dollars	254,880,389	715,810,588
Half dollars	147,579,077	194,624,218
Silver dollars	18,326,563	.....
Total[1]	4,343,339,198	7,241,845,386
Domestic coinage dies used	23,430	41,935
Foreign coinage dies used	200	.....
Uncurrent U.S. coins received from circulation, pieces	13,112,542	7,159,580
Total assay determinations made	203,075	256,019
Medals and distinguishing devices issued	181,640	136,521
Visitors touring the Philadelphia and Denver Mints	206,764	237,391
Metal operated upon by the melting and refining divisions, ounces[2]:		
Gold	8,784,100	9,109,800
Silver, domestic coinage, etc	248,389,200	487,375,200
Cupronickel alloy	36,215,100	16,793,500
Bronze alloy	446,018,300	24,499,400
Gold bars manufactured, fine ounces	4,303,400	5,306,700
Silver bars manufactured, fine ounces	3,962,600	3,053,400
Monetary assets of the Bureau of the Mint on June 30	$16,911,388,880	$14,866,496,855

[1] Includes 17,670,865 and 10,439,300 pieces of proof coins sold by the Mint during fiscal years 1964 and 1965, respectively.
[2] Gold and silver, fine ounces; all other, gross ounces.

Personnel of the Bureau of the Mint, fiscal year 1965

Bureau of the Mint	Number of employees											
	General administration[1]	Coining	Melting and refining	Cash and deposits	Proof coin and medal sales	Guard force	Building and mechanical	Engraving	Assaying	Custodial force	Total June 30, 1965	Total June 30, 1964
Office of the Director	64	.....	....	....	....	....	....	....	....	....	64	52
Philadelphia Mint	39	[2] 294	44	19	28	32	88	66	5	30	645	562
San Francisco Assay Office	12	49	....	17	....	16	13	....	6	....	113	49
Denver Mint	33	230	40	20	....	29	60	....	8	10	430	312
New York Assay Office	20	.....	52	44	....	22	14	....	15	4	171	165
West Point Depository	....	.....	....	14	....	16	1	....	....	....	31	20
Fort Knox Depository	3	.....	....	....	....	25	....	....	....	3	31	30
Total, June 30, 1965	171	573	136	114	28	140	176	66	34	47	1,485	.....
Total, June 30, 1964	134	401	161	112	63	125	94	31	31	38	.....	1,190

[1] Includes executive direction, accounting, personnel, technical, etc.
[2] Includes proof coinage employees.

REPORT OF THE DIRECTOR OF THE MINT ON THE PRODUCTION AND CONSUMPTION OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1964

REPORT ON UNITED STATES PRODUCTION AND CONSUMPTION OF GOLD AND SILVER, CALENDAR YEAR 1964 [1]

Introduction

The Office of the Director of the Mint compiles annual statistics on domestic gold and silver production and the nonmonetary consumption of gold and silver in the United States. The basic information for production is obtained from two general sources--(1) the Government Mints and Assay Offices and (2) privately owned domestic refineries. Information for consumption is also obtained from the above-named sources and, in addition, from dealers who supply the trade.

The Mints and Assay Offices determine the State source of all newly mined unrefined material at the time deposits are received. The State source of material received by private refineries is determined from information submitted by them and by intervening mills, smelters, and other plants involved in the reduction processes. The amount of gold and silver produced represents the actual quantity of bullion recovered in refined form following reduction processes. It is noted that the Mints and Assay Offices receive gold and silver in refined form as well as unrefined.

Consumption data are based on the total amount of gold and silver issued by the Government, private refiners, and dealers during a calendar year--reduced by the total amount of secondary (scrap) gold and silver received from depositors by the same concerns during the same year. The resulting net figures represent the equivalent amount of gold and silver consumed in the year.

Because of increased interest shown in the end-use of gold and silver, the Mint's industrial consumption tables for 1964 introduce an additional section designating purposes for which the metals were used. The basic information was obtained from three general sources--(1) Documents relating to sales and exchanges made at Government Mints and Assay Offices; (2) a sampling of issues of domestic refiners and dealers who supply industry; and (3) available estimates of representative trade organizations. It is important to note that precise and complete information is extremely limited. With present rapid technological changes in the industrial field, the primary suppliers to a large extent are not in a position to identify the final use of the gold and silver which they have issued.

The disposition of gold is divided into four general categories--(1) jewelry and the arts, (2) dental use, (3) space and defense, and (4) other industrial usage. The disposition of silver is divided into

[1] Historical tables on UNITED STATES PRODUCTION AND CONSUMPTION OF GOLD AND SILVER for 1930 - 1963 are published in the 1964 Annual Report, pages 20-26.

eight general categories: (1) jewelry and silverware, (2) dental and medical, (3) photographic film, plates, and sensitized photographic paper, (4) mirrors, (5) batteries, (6) brazing alloys and solders, (7) electrical and electronic, and (8) other miscellaneous usage.

U.S. gold production

The refinery production, in 1964, of newly mined gold from mines located in the United States totaled 1,469,000 fine troy ounces with a value of $51,415,000. This was a slight increase over the 1963 production of 1,468,750 ounces valued at $51,406,250. The three leading States--South Dakota, Utah, and Arizona--accounted for nearly three-fourths of the U.S. total. South Dakota, ranking first, produced 42 percent, Utah, 20 percent, and Arizona, accounted for 11 percent. The gold output for each of the 15 producing States in 1964 is shown in Table A. Table B indicates the portion of this production which was deposited at the Government Mints and Assay Offices during the year.

U.S. silver production

The 1964 refinery production of newly mined silver from United States mines totaled 37,000,000 fine troy ounces, an increase of 2 million ounces, or 5.7 percent, over the 1963 output of 35,000,000 ounces. Three States--Idaho, Arizona, and Montana, accounted for more than three-fourths of the U.S. total. Idaho, in first place, produced 45 percent, Arizona, 16 percent, and Montana produced 15 percent of the total. The output of silver for each of the 23 producing States in 1964 is set forth in Table A. Table C shows the portion of this output which was deposited at the Government Mints and Assay Offices during the year.

Gold and silver issued for industrial, professional, and artistic use in the United States

The consumption of gold for nonmonetary purposes in 1964 amounted to 4,801,000 fine troy ounces valued at $168,035,000. This was a rise over the previous year of 1,881,000 fine ounces valued at $65,835,000 when the net issues amounted to 2,920,000 fine ounces of gold valued at $102,200,000. (Table D).

The industrial consumption of silver amounted to 120,500,000 fine ounces in 1964, compared with 110,000,000 fine ounces in 1963, an increase of approximately 9.5 percent. (Table E).

Price of silver

The New York quotation for refined silver of $1.293 per troy ounce of 999/1000 fineness, established on September 9, 1963, continued without interruption throughout the calendar year 1964. A historical summary showing the annual high, low, and average prices dating from 1874 is given in Table F.

Table G sets forth the monthly and annual high, low, and average spot price of silver in the London bullion market for the calendar year 1964. These prices, in pence per troy ounce of 999/1000 fineness, are also converted to United States money in terms of exchange rates for the pound sterling in New York. These are averages of daily rates certified to the Secretary of the Treasury by the Federal Reserve Bank of New York. The London price changes are attributed principally to fluctuations in the exchange rates between the dollar and the pound sterling.

TABLE A.--United States production of gold and silver, calendar year 1964
(Based on arrivals at the United States Mint and at private refineries)

State in which mined	Gold		Silver	
	Fine troy ounces	Value[1]	Fine troy ounces	Value[2]
Alaska	58,500	$2,047,500	7,300	$9,448
Arizona	157,000	5,495,000	6,000,000	7,765,740
California	71,770	2,511,950	179,550	232,390
Colorado	41,600	1,456,000	2,707,000	3,503,643
Idaho	5,500	192,500	16,628,000	21,521,454
Illinois	.....	.....	15,000	19,414
Kentucky	.....	.....	1,800	2,330
Michigan	.....	.....	306,550	396,765
Missouri	.....	.....	5,220	6,756
Montana	27,850	974,750	5,500,000	7,118,595
Nevada	92,500	3,237,500	125,100	161,916
New Mexico	7,000	245,000	250,000	323,572
New York	.....	.....	14,000	18,120
North Carolina	2	70	4,700	6,083
Oregon	1,000	35,000	30,400	39,346
South Dakota	619,650	21,687,750	131,700	170,458
Tennessee	122	4,270	90,900	117,651
Texas	.....	.....	950	1,230
Utah	290,000	10,150,000	4,600,000	5,953,734
Virginia	.....	.....	369	478
Washington	96,500	3,377,500	390,000	504,773
Wisconsin	.....	.....	11,460	14,833
Wyoming	6	210	1	1
Total	1,469,000	51,415,000	37,000,000	47,888,730

[1] Valued at $35 per fine troy ounce.
[2] Valued at price of silver in New York in 1964. The quotation, $1.293 per ounce 999/1000 fine throughout the year, is equivalent to $1.29429 per fine ounce.

TABLE B.--Newly mined domestic gold received by United States Mint institutions, in fine ounces (to thousandths of an ounce), calendar year 1964

Source	San Francisco	Denver	New York	Total ounces[1]	Value at $35 per ounce
Alaska	54,438.515	3,324.920	1.350	57,764.785	$2,021,768
Arizona	55.052	6.717	.....	61.769	2,162
California	8,076.623	50.844	.....	8,127.467	284,462
Colorado	.....	9,700.124	.....	9,700.124	339,504
Idaho	694.357	53.674	.....	748.031	26,181
Montana	1.584	316.017	.....	317.601	11,116
Nevada	1,733.363	20.816	.....	1,754.179	61,396
Oregon	316.393	34.431	.....	350.824	12,279
South Dakota	.....	2.517	.....	2.517	88
Wyoming	.....	6.207	.....	6.207	217
Subtotal	65,315.887	13,516.267	1.350	78,833.504	2,759,173
Private refineries	.....	[2] 619,293.032	[3] 277.253	619,570.285	21,684,960
Total	65,315.887	632,809.299	278.603	698,403.789	24,444,133

[1] No newly mined domestic gold was received by the Philadelphia Mint during calendar year 1964.
[2] Source: South Dakota.
[3] Source: Alaska.

TABLE C.--Newly mined domestic silver received by United States Mint institutions, in fine ounces (to hundredths of an ounce), calendar year 1964

Source	San Francisco	Denver	New York	Total ounces[1]	Value at $1.29429[2]
Alaska	6,749.37	291.73	0.17	7,041.27	$9,113
Arizona	49.11	.97	.....	50.08	65
California	1,290.53	8.69	.....	1,299.22	1,682
Colorado	.....	2,956.73	.....	2,956.73	3,827
Idaho	384.09	26.42	.....	410.51	531
Montana	.19	29.32	.....	29.51	38
Nevada	651.64	8.24	.....	659.88	854
Oregon	42.23	9.79	.....	52.02	67
South Dakota	.....	.06	.....	.06	([3])
Wyoming	.....	.57	.....	.57	([3])
Total	9,167.16	3,332.52	.17	12,499.85	16,178

[1] No newly mined domestic silver was received by the Philadelphia Mint during calendar year 1964.
[2] The New York quotation was $1.293 per troy ounce 999/1000 fine during 1964.
[3] Less than $1.

TABLE D.--Gold issued for industrial, professional, and artistic use in the United States, calendar year 1964

Item	Fine troy ounces	Value at $35 per ounce
Government-stamped bars issued by the United States Mint[1]	3,734,160	$130,695,600
Bullion in various forms issued by private refiners and dealers[2]	2,153,240	75,363,400
Total issues	5,887,400	206,059,000
Deduct:		
Returns of secondary materials (scrap) from domestic sources:		
(a) Received by the United States Mint	483,700	16,929,500
(b) Received by private refiners and dealers	602,700	21,094,500
Total returns	1,086,400	38,024,000
Net amount of gold issued	4,801,000	168,035,000

Disposition (use) of gold issued[3]	Fine troy ounces	Value at $35 per ounce
Jewelry and arts	3,043,350	$106,517,250
Dental	628,450	21,995,750
Space and defense	349,510	12,232,850
Other industry	779,690	27,289,150
	4,801,000	168,035,000

[1] Includes sales and exchanges for scrap.
[2] Excludes the equivalent amount of Government-stamped bars received from the Mint.
[3] Based on a sampling furnished by private refiners and dealers, trade organizations, and others.

TABLE E.--Silver issued for industrial, professional, and artistic use in the United States, calendar year 1964

Item	Fine troy ounces	Value at $1.29429 per ounce
Government-stamped bars issued by the United States Mint[1]	50,240,100	$65,025,259
Bullion in various forms issued by private refiners and dealers[2]	146,359,900	189,432,155
Total issues	196,600,000	254,457,414
Deduct:		
Returns of secondary materials (scrap) from domestic sources:		
(a) Received by the United States Mint[3]	3,475,350	4,498,111
(b) Received by private refiners and dealers	72,624,650	93,997,358
Total returns	76,100,000	98,495,469
Net amount of silver issued	120,500,000	155,961,945

Disposition (use) of silver issued[4]	Fine troy ounces	Value at $1.29429 per ounce
Jewelry and silverware	22,600,000	$29,250,954
Dental and medical	5,200,000	6,730,308
Photographic film, plates, and sensitized photographic paper	38,000,000	49,183,020
Mirrors	3,100,000	4,012,299
Batteries	7,000,000	9,060,030
Brazing alloys and solders	13,600,000	17,602,344
Electrical and electronic uses	29,000,000	37,534,410
Other miscellaneous	2,000,000	2,588,580
	120,500,000	155,961,945

[1] Includes exchanges for scrap and estimated amount of silver issued for domestic consumption in exchange for silver certificates.
[2] Excludes the equivalent amount of Government-stamped bars received from the Mint.
[3] Does not include scrap resulting from coinage operations.
[4] Based on a sampling furnished by private refiners and dealers, trade organizations, and others.

TABLE F.--Price of silver in New York, 1874-1965 inclusive[1]

Per troy ounce

Calendar year	High	Low	Average	Calendar year	High	Low	Average
1874.....	$1.29375	$1.25500	$1.27195	1920.....	$1.37875	$0.60375	$1.01940
1875.....	1.26125	1.21000	1.23883	1921.....	.73813	.53188	.63096
1876.....	1.26000	1.03500	1.14950	1922.....	.74188	.62875	.67934
1877.....	1.26000	1.16000	1.19408	1923.....	.69000	.62875	.65239
1878.....	1.20750	1.08500	1.15429	1924.....	.72375	.63000	.67111
1879.....	1.16750	1.06500	1.12088	1925.....	.73187	.66812	.69406
1880.....	1.15000	1.11250	1.13931	1926.....	.68937	.51812	.62428
1881.....	1.14500	1.11000	1.12823	1927.....	.60312	.54187	.56680
1882.....	1.15000	1.09000	1.13855	1928.....	.63937	.56812	.58488
1883.....	1.11750	1.09500	1.10874	1929.....	.57812	.46812	.53306
1884.....	1.13250	1.08000	1.11161				
1885.....	1.09500	1.02750	1.06428	1930.....	.46875	.30750	.38154
1886.....	1.03500	.92500	.99880	1931.....	.37250	.25750	.28701
1887.....	1.03500	.95000	.97899	1932.....	.31000	.24250	.27892
1888.....	.97750	.92000	.94300	1933.....	.45000	.24500	.34727
1889.....	.97250	.92500	.93634	1934.....	.55750	.41750	.47973
1890.....	1.20500	.95750	1.05329	1935.....	.81000	.49750	.64273
1891.....	1.07500	.94750	.99033	1936.....	.49750	.44750	.45087
1892.....	.95250	.83000	.87552	1937.....	.46750	.44750	.44883
1893.....	.85000	.65000	.78219	1938.....	.44750	.42750	.43225
1894.....	.70000	.59500	.64043	1939.....	.42750	.34750	.39082
1895.....	.69000	.60000	.66268	1940.....	.35625	.34750	.34773
1896.....	.70250	.65625	.68195	1941.....	.35125	.34750	.34783
1897.....	.66125	.52750	.60774	1942.....	.44750	.35125	.38333
1898.....	.62250	.55125	.59064	1943.....	.44750	.44750	.44750
1899.....	.64750	.58625	.60507	1944.....	.44750	.44750	.44750
1900.....	.65750	.59750	.62065	1945.....	.70750	.44750	.51928
1901.....	.64500	.54750	.59703	1946.....	.90125	.70750	.80151
1902.....	.56875	.47375	.52815	1947.....	.86250	.59750	.71820
1903.....	.62375	.47500	.54208	1948.....	.77500	.70000	.74361
1904.....	.62500	.53375	.57843	1949.....	.73250	.70000	.71930
1905.....	.66500	.55625	.61008	1950.....	.80000	.71750	.74169
1906.....	.72375	.63125	.67379	1951.....	.90160	.80000	.89368
1907.....	.71000	.52750	.65978	1952.....	.88000	.82750	.84941
1908.....	.58875	.48250	.53496	1953.....	.85250	.83250	.85188
1909.....	.54500	.50750	.52163	1954.....	.85250	.85250	.85250
1910.....	.57625	.50750	.54245	1955.....	.92000	.85250	.89099
1911.....	.57500	.52125	.54002	1956.....	.91625	.90000	.90826
1912.....	.65625	.55250	.62006	1957.....	.91375	.89625	.90820
1913.....	.65125	.58000	.61241	1958.....	.90375	.88625	.89044
1914.....	.60875	.49000	.56331	1959.....	.91625	.89875	.91202
1915.....	.58000	.47750	.51062	1960.....	.91375	.91375	.91375
1916.....	.79125	.57250	.67151	1961.....	1.04750	.91375	.92449
1917.....	1.16500	.73125	.84000	1962.....	1.22000	1.01250	1.08521
				1963.....	1.29300	1.21000	1.27912
1918.....	1.01937	.88937	.98445	1964[2].....	1.29300	1.29300	1.29300
1919.....	1.38250	1.01375	1.12087	1965[2].....	1.29300	1.29300	1.29300

[1] Prices are as follows:
1874-1917: Asked price per fine ounce (unrefined).
1918-1929: Mean of bid and asked prices per fine ounce (unrefined).
1930-1961: Official quotations per ounce 999/1000 fine (unrefined).
1962-1965: Official quotations per ounce 999/1000 fine (refined). Quotations for refined silver are one-fourth cent above prices for unrefined silver.

[2] The price of $1.293 per ounce has been effective continuously from September 9, 1963.

Historical Note: There was no open-market price of silver as such in the United States under the bimetallic monetary standard which existed from Apr. 2, 1792, until Feb. 12, 1873. The ratios of the silver dollar to the gold dollar in this period were:

Act of	Ratio of silver to gold
Apr. 2, 1792..	15 to 1
June 28, 1834.	16.002 to 1
Jan. 18, 1837.	15.988+ to 1

TABLE G.--Price of silver in the London bullion market, calendar year 1964[1]

Month	Price per ounce 999/1000 fine			New York exchange rate for pound sterling[2]	U.S. equivalent of London average price per ounce
	High	Low	Average		
	Pence	Pence	Pence	U.S. dollars	U.S. dollars
January	111.75	111.75	111.7500	2.7983	1.3030
February	111.875	111.75	111.7563	2.7969	1.3024
March	111.75	111.75	111.7500	2.7981	1.3029
April	111.75	111.75	111.7500	2.7990	1.3033
May	111.75	111.625	111.7062	2.7994	1.3030
June	111.75	111.625	111.7159	2.7942	1.3007
July	112	111.75	111.9130	2.7897	1.3009
August	112	112	112.0000	2.7866	1.3004
September	112.25	112	112.1136	2.7834	1.3002
October	112.25	112.25	112.2500	2.7835	1.3019
November	112.25	112.125	112.2142	2.7848	1.3021
December	112.125	112.125	112.1250	2.7906	1.3037
Year	112.25	111.625	111.9229	2.7921	1.3021

[1] As reported in the Annual Bullion Review 1964, Samuel Montagu & Co. Ltd., London.
[2] As reported in the Federal Reserve Bulletin, Board of Governors of the Federal Reserve System. Rates are based on average of daily noon buying rates in New York for cable transfers. There are 240 pence in one pound sterling.

Review of the gold and silver mining industry in the United States for calendar year 1964[1]

After declining for 3 consecutive years, mine production of gold in the United States rose slightly in 1964 to 1.46 million ounces valued at $51.0 million.[2]

The production gain was attributed chiefly to increased output of gold ore in South Dakota and increased output of gold-bearing base metal ores in Arizona and Montana which more than offset sharp declines in output from placer mines in Alaska and California.

South Dakota and Utah, the two leading gold-producing States, furnished 62 percent of the total domestic gold output. The Homestake mine in South Dakota contributed 42 percent of the U.S. gold output. Fifty-four percent of the total domestic output was recovered from gold ores, 37 percent was a byproduct of base metal ores, and 9 percent came from placers.

Domestic mine output of recoverable silver increased about 3 percent in 1964 to 36.3 million ounces valued at $47.0 million. Greater recovery of byproduct silver from base metal ores in Arizona, Colorado, Montana, and Utah more than offset declines in the output of silver ores in Idaho and decreased output of silver and silver-bearing copper ores in Nevada and Utah. Two-thirds of the total silver output was recovered as a byproduct of ores mined chiefly for copper, lead, zinc, and gold; virtually all of the remainder came from ores in which silver was the principal product. Idaho contributed 45 percent of the total domestic silver output. The four leading silver-producing States, Idaho, Arizona, Montana, and Utah, supplied 88 percent of the total output.

[1] Prepared by the Bureau of Mines, U.S. Department of the Interior, based on more detailed presentations in the chapters on Gold and Silver in Volume I, and the chapters on mineral production by States in Volume III, of the Minerals Yearbook 1964.

[2] The mine production figures in this section are based on a mine canvass of recoverable metal, and, owing principally to the time lag involved before this material reaches the Mints, Assay Offices, or private refineries where the Bureau of the Mint measures production, will not necessarily agree, on a yearly basis, with refinery production data of the Bureau of the Mint.

Alaska.--Output of gold again dropped sharply. The 1964 output was the smallest in 70 years except for the World War II year of 1944. The continuing drop in Alaska's gold production reflected the shutdown of dredging operations by United States Smelting Refining and Mining Co. in the Fairbanks district. Virtually all of Alaska's gold is recovered from placer deposits by bucketline dredges. Output of silver, recovered chiefly as a byproduct of gold mining, also dropped sharply.

Arizona.--A 10-percent increase in gold output during the year reflected the increased production of copper. Eighty-seven percent of the gold was recovered as a byproduct of refining copper ores, 12 percent from refining of other base metal ores, and the remaining 1 percent mainly from ores of gold and silver. Six mining operations, Copper Queen, New Cornelia, Morenci, Iron King, San Manuel, Magma, and Christmas furnished 84 percent of the total output.

Production of silver increased 8 percent. Seventy-seven percent of the silver was recovered from copper ores, 13 percent from lead-zinc ores; and the remainder from miscellaneous ores. Four silver-producing companies, Phelps Dodge, American Smelting and Refining Company, Shattuck Denn, and Magma, supplied 75 percent of the State's total silver production.

California.--Gold production declined 18 percent for the second consecutive year. Ninety-three percent of the total gold produced was recovered from placers and the remainder came from lode gold mines. One bucketline dredging operation (3 dredges), 1 dragline excavating and sluicing operation, 18 nonfloating washing plants, and 3 suction dredges recovered 97 percent of the placer gold. Output of silver was nearly 10 percent more than in 1963 due chiefly to increased output of tungsten ore yielding byproduct silver. Ninety-seven percent of the silver was produced by four lode mines.

Colorado.--Production of gold was up 25 percent. Forty-six lode mines supplied 97 percent of the total output; the remainder came chiefly from 19 placer mines including sand and gravel operations yielding gold as a byproduct. Nearly two-thirds of the State's total gold output came from four lode mines in San Miguel County. Idarado Mining Co. was the largest producer. Silver output, recovered from 57 lode and 15 placer mines, increased 14 percent. Nearly all the State's silver was recovered from ores mined chiefly for base metals. The Eagle mine of New Jersey Zinc Co., the largest producer, recovered silver as a byproduct of zinc and copper ores.

Idaho.--Output of gold was up slightly from the record low established in 1963. About 60 percent of the total output was a byproduct of base metal production, and 18 percent was from gold and silver ores. Production of silver declined slightly owing chiefly to losses resulting from a labor strike at the Sunshine mine. Four mines in Shoshone County, Sunshine, Galena, Lucky Friday, and Bunker Hill, accounted for about 85 percent of the State's total silver production. Sixty-two percent of the silver produced was recovered from silver ores; the remainder from lead, zinc, and other base metal ores.

Michigan.--Production of silver, recovered as a byproduct from copper ore at the White Pine mine, increased 3 percent. Only a minor part of silver contained in the ore was recovered in a silver concentrate. Most of the silver in the ore was not recovered but was marketed as a constituent of lake copper.

Montana.--Production of gold increased sharply over the record low of 1963 corresponding largely to the rise in copper output from which most of the gold was recovered as a byproduct. Slightly more than two-thirds of the total gold output was recovered by The Anaconda Company from Butte district mines, particularly the Berkeley pit. A 25-percent increase in silver output, like that of gold, resulted from the rise in the output of copper yielding byproduct silver. Of the total output of silver, 63 percent was recovered from copper ores and 25 percent from zinc ores of the Butte district.

Nevada.--An 8-percent falloff in gold output reflected lower production of gold-bearing copper ore by Kennecott Copper Corp. Eight lode gold mines yielded 70 percent of the total gold output; nearly all of the remainder was recovered as a byproduct from copper ore.

Recoverable silver output dropped 20 percent to an alltime low, owing chiefly to inactivity at the Copper Canyon mine, the closing of a tailings treatment plant in Esmeralda County, and to curtailed production at two Lincoln County mines--Bristol Silver and Tempiute. Over 81 percent of the total silver output was recovered as a byproduct at two major copper mines in Lyon and White Pine Counties, the Ward Group (Silver King) in White Pine County, and the Getchell gold mine, Humboldt County.

New Mexico.--Gold output declined 22 percent and output of silver was down 5 percent. About 86 percent of the State's gold output was recovered as a byproduct of copper ore. Of the total silver output, 43 percent was recovered as a byproduct from lead and lead-zinc ores, 43 percent from copper ores, and nearly all of the remainder was from gold and gold-silver ores.

South Dakota.--Gold production increased 7 percent and silver production, 14 percent. Nearly all of the gold and silver was produced at the Homestake mine at Lead. The total value of bullion recovered reached a record high of $21.7 million.

Utah.--A 1-percent gain in gold production was attributed to increased output of silver-bearing lead-zinc ore at the Mayflower mine which more than offset decreases at the Utah Copper, U.S. and Lark, and United Park City mines. Eighty-five percent of the total gold output was recovered as a byproduct of copper ores. Silver output dropped 5 percent reflecting lower output of copper and other base metals. Silver was recovered chiefly as a byproduct from refining base metals. The principal silver-producing mines were the same as those producing most of the gold. About 46 percent of the total silver output was recovered from copper ores.

Washington.--Output of gold decreased 5 percent, virtually all of which was produced by Knob Hill Mines, Inc., at the Knob Hill and Gold Dollar mines in Ferry County, and L-D Mines, Inc., at the Gold King mine in Chelan County. Silver output, which increased slightly, was primarily a byproduct of gold mining. The two gold producers contributed 90 percent of the total silver output.

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TABLE H. --Distribution of gold and silver production of the United States in troy ounces, for 1964, by sources of production

(Source: Bureau of Mines)

State	Gold				Silver			
	Dry ores	Placers	Copper ores[1]	Total[2]	Dry ores[3]	Lead ores[4]	Copper ores	Total[2]
Alaska	2,132	56,284	.....	58,416	7,012	.....	324	7,336
Arizona	973	10	152,693	153,676	26,120	844,444	4,917,186	5,810,510
California	4,887	65,938	63	71,028	17,478	85,974	25	171,621
Colorado	3,088	1,050	37,984	42,122	161,268	1,992,417	472,746	2,626,431
Idaho	2,174	104	3,399	5,677	10,208,775	6,268,645	6,075	16,483,495
Kentucky	.....	.....	.....	.....	.....	.....	.....	1,673
Michigan	.....	.....	.....	.....	.....	.....	349,195	349,195
Montana	7,648	292	21,175	29,115	637,993	1,339,899	3,312,067	5,289,959
Nevada	63,633	1,222	25,614	90,469	43,440	25,670	103,337	172,447
New Mexico	569	1	5,540	6,110	30,421	107,240	104,744	242,405
New York	.....	.....	.....	.....	.....	13,306	.....	13,306
Oregon	311	322	28	661	14,301	.....	71	14,372
Pennsylvania	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
South Dakota	616,910	3	.....	616,913	132,981	.....	.....	132,981
Tennessee	.....	.....	133	133	.....	90,539	.....	90,539
Utah	917	.....	286,757	287,674	144,977	2,286,286	2,116,401	4,551,960
Washington	92,665	.....	3	94,308	331,464	33,611	.....	375,603
Wyoming	.....	6	.....	6	.....	.....	28	28
Total	795,907	125,232	533,389	1,456,308	11,756,230	13,088,031	11,382,199	36,333,861

[1] Includes gold in lead, lead-copper, zinc, zinc-lead, zinc-copper, and zinc-lead-copper ores.
[2] Totals will not add across because of the inclusion of gold and silver from other ores.
[3] Includes a small quantity of silver from placer mines.
[4] Includes silver in lead, lead-copper, zinc, zinc-lead, zinc-copper, and zinc-lead-copper ores.
[5] Pennsylvania included with Washington.

ADDENDA TO ANNUAL REPORT OF THE DIRECTOR OF THE MINT FISCAL YEAR ENDED JUNE 30, 1965

NOTE

Some tables in the Addenda are compiled on both a U.S. Government fiscal year basis and a calendar year basis. A fiscal year extends for a 12-month period beginning July 1, thus should not be compared or combined with a calendar year.

TABLE 1.--United States coins manufactured, fiscal year 1965

Denomination	Number of pieces[1]				
	Philadelphia Mint			Denver Mint	Total coinage
	Regular issue	Proof coins	Total	Regular issue	
Half dollars	91,042,000	2,085,903	93,127,903	101,494,358	194,622,261
Quarter dollars	443,312,000	2,085,903	445,397,903	270,410,728	715,808,631
Dimes	474,620,000	2,085,903	476,705,903	559,502,320	1,036,208,223
5-cent pieces	624,544,000	2,085,903	626,629,903	951,332,380	1,577,962,283
1-cent pieces	1,595,940,000	2,085,903	1,598,025,903	2,119,208,300	3,717,234,203
Total	3,229,458,000	10,429,515	3,239,887,515	4,001,948,086	7,241,835,601

Denomination	Face value				
	Philadelphia Mint			Denver Mint	Total coinage
	Regular issue	Proof coins	Total	Regular issue	
Half dollars	$45,521,000.00	$1,042,951.50	$46,563,951.50	$50,747,179.00	$97,311,130.50
Quarter dollars	110,828,000.00	521,475.75	111,349,475.75	67,602,682.00	178,952,157.75
Dimes	47,462,000.00	208,590.30	47,670,590.30	55,950,232.00	103,620,822.30
5-cent pieces	31,227,200.00	104,295.15	31,331,495.15	47,566,619.00	78,898,114.15
1-cent pieces	15,959,400.00	20,859.03	15,980,259.03	21,192,083.00	37,172,342.03
Total	250,997,600.00	1,898,171.73	252,895,771.73	243,058,795.00	495,954,566.73

Denomination	Metallic content--short tons				
	Silver	Copper	Nickel	Zinc	Total tons
Half dollars	2,414	268	.....	.....	2,682
Quarter dollars	4,438	493	.....	.....	4,931
Dimes	2,570	286	.....	.....	2,856
5-cent pieces	.....	6,523	2,174	.....	8,697
1-cent pieces	.....	12,106	.....	637	12,743
Total	[2] 9,422	19,676	2,174	637	31,909

[1] All coins manufactured during fiscal year 1965 were dated 1964 (Public Law 88-580, September 3, 1964).
[2] Represents 274,457,698.61 fine troy ounces of silver.

Note: No foreign coins were manufactured by the United States Mints during the fiscal year 1965.

TABLE 2.--Number of coins manufactured by the Philadelphia and Denver Mints, by month, fiscal year 1965[1]

Month	Number of pieces produced by the Philadelphia Mint[2]					
	Half dollars	Quarter dollars	Dimes	5-cent pieces	1-cent pieces	Total pieces
July 1964.....	2,834,905	22,974,905	2,326,905	24,326,905	115,381,905	167,845,525
Aug. 1964.....	4,968,015	38,360,015	45,102,015	37,628,015	144,402,015	270,460,075
Sept. 1964.....	6,096,585	31,872,585	47,428,585	32,144,585	162,398,585	279,940,925
Oct. 1964.....	5,732,701	38,554,701	44,402,701	32,782,701	171,182,701	292,655,505
Nov. 1964.....	9,629,544	40,381,544	37,969,544	32,485,544	181,514,544	301,980,720
Dec. 1964.....	17,552,153	33,994,153	40,096,153	30,646,153	166,676,153	288,964,765
Jan. 1965.....	12,452,000	36,468,000	47,360,000	36,072,000	141,210,000	273,562,000
Feb. 1965.....	7,218,000	38,152,000	49,500,000	77,564,000	100,630,000	273,064,000
Mar. 1965.....	6,216,000	37,712,000	52,060,000	81,728,000	105,640,000	283,356,000
Apr. 1965.....	9,602,000	33,888,000	54,830,000	78,756,000	108,085,000	285,161,000
May 1965.....	6,118,000	55,324,000	31,120,000	84,040,000	106,440,000	283,042,000
June 1965.....	4,708,000	37,716,000	24,510,000	78,456,000	94,465,000	239,855,000
Total.....	93,127,903	445,397,903	476,705,903	626,629,903	1,598,025,903	3,239,887,515
Month	Number of pieces produced by the Denver Mint					
July 1964.....	7,114,000	3,728,000	39,030,000	24,168,000	217,750,000	291,790,000
Aug. 1964.....	8,234,000	6,840,000	36,940,000	35,512,000	233,430,000	320,956,000
Sept. 1964.....	10,946,000	6,396,000	52,070,000	33,164,000	210,375,000	312,951,000
Oct. 1964.....	11,494,000	9,904,000	56,590,000	46,364,000	190,650,000	315,002,000
Nov. 1964.....	11,358,000	10,672,000	56,790,000	78,000,000	151,000,000	307,820,000
Dec. 1964.....	16,134,000	10,224,000	43,060,000	69,156,000	152,550,000	291,124,000
Jan. 1965.....	10,810,000	23,248,000	46,890,000	108,360,000	135,375,000	324,683,000
Feb. 1965.....	5,054,000	24,748,000	44,110,000	104,680,000	143,825,000	322,417,000
Mar. 1965.....	5,406,000	28,472,000	74,350,000	112,880,000	161,650,000	382,758,000
Apr. 1965.....	5,476,000	41,548,000	59,110,000	115,800,000	231,600,000	453,534,000
May 1965.....	6,182,000	59,992,000	32,490,000	118,800,000	200,175,000	417,639,000
June 1965.....	3,286,358	44,638,728	18,072,320	104,448,380	90,828,300	261,274,086
Total.....	101,494,358	270,410,728	559,502,320	951,332,380	2,119,208,300	4,001,948,086
Month	Grand total coinage production, fiscal year 1965					
July 1964.....	9,948,905	26,702,905	41,356,905	48,494,905	333,131,905	459,635,525
Aug. 1964.....	13,202,015	45,200,015	82,042,015	73,140,015	377,832,015	591,416,075
Sept. 1964.....	17,042,585	38,268,585	99,498,585	65,308,585	372,773,585	592,891,925
Oct. 1964.....	17,226,701	48,458,701	100,992,701	79,146,701	361,832,701	607,657,505
Nov. 1964.....	20,987,544	51,053,544	94,759,544	110,485,544	332,514,544	609,800,720
Dec. 1964.....	33,686,153	44,218,153	83,156,153	99,802,153	319,226,153	580,088,765
Jan. 1965.....	23,262,000	59,716,000	94,250,000	144,432,000	276,585,000	598,245,000
Feb. 1965.....	12,272,000	62,900,000	93,610,000	182,244,000	244,455,000	595,481,000
Mar. 1965.....	11,622,000	66,184,000	126,410,000	194,608,000	267,290,000	666,114,000
Apr. 1965.....	15,078,000	75,436,000	113,940,000	194,556,000	339,685,000	738,695,000
May 1965.....	12,300,000	115,316,000	63,610,000	202,840,000	306,615,000	700,681,000
June 1965.....	7,994,358	82,354,728	42,582,320	182,904,380	185,293,300	501,129,086
Total.....	194,622,261	715,808,631	1,036,208,223	1,577,962,283	3,717,234,203	7,241,835,601

[1] All coins manufactured during fiscal year 1965 were dated 1964 (Public Law 88-580, September 3, 1964).
[2] Includes 2,085,903 sets of proof coins manufactured from July through December 1964. None were produced from January through June 1965.

TABLE 3.--Shipments of United States coins for circulation by the Bureau of the Mint, fiscal year 1965[1]

Federal Reserve District (Banks and branches)	Number of pieces shipped by the Mints					
	1 cent	5 cents	10 cents	25 cents	50 cents	Total
1. Boston	144,600,000	66,500,000	28,600,000	27,800,000	17,540,000	285,040,000
2. New York	412,900,000	212,152,000	108,950,000	119,960,000	10,290,000	864,252,000
Buffalo	58,550,000	30,800,000	19,300,000	11,860,000	5,810,000	126,320,000
3. Philadelphia	199,365,000	72,802,000	75,314,311	38,129,173	15,609,602	401,220,086
4. Cleveland	109,800,000	47,860,000	31,650,000	17,520,000	8,050,000	214,880,000
Cincinnati	94,050,000	37,240,000	22,950,000	12,660,000	3,130,000	170,030,000
Pittsburgh	78,750,000	40,820,000	31,900,000	18,500,000	4,750,000	174,720,000
5. Richmond	131,400,000	49,620,000	29,900,000	20,300,000	5,750,000	236,970,000
Baltimore	59,250,000	56,300,000	12,750,000	13,940,000	1,490,000	143,730,000
Charlotte	68,550,000	16,120,000	8,000,000	6,600,000	3,400,000	102,670,000
6. Atlanta	79,600,000	22,000,000	18,150,000	9,320,000	4,160,000	133,230,000
Birmingham	43,900,000	5,000,000	8,100,000	3,500,000	2,480,000	62,980,000
Jacksonville	154,950,000	39,380,000	37,500,000	20,460,000	5,590,000	257,880,000
Nashville	35,850,000	.....	.....	2,400,000	2,420,000	40,670,000
New Orleans	83,100,000	50,660,000	21,600,000	20,420,000	1,990,000	177,770,000
7. Chicago	474,150,000	183,640,000	133,250,000	95,000,000	26,850,000	912,890,000
Detroit	148,950,000	66,320,000	36,100,000	33,860,000	4,200,000	289,430,000
8. St. Louis	99,450,000	35,340,000	41,250,000	17,900,000	4,820,000	198,760,000
Little Rock	24,600,000	3,500,000	4,750,000	2,200,000	1,260,000	36,310,000
Louisville	47,850,000	35,800,000	3,000,000	12,200,000	1,600,000	100,450,000
Memphis	50,550,000	31,560,000	30,750,000	12,660,000	1,580,000	127,100,000
9. Minneapolis	87,850,000	38,560,000	32,750,000	16,960,000	4,960,000	181,080,000
Helena	16,100,000	7,180,000	9,950,000	6,820,000	1,330,000	41,380,000
10. Kansas City	60,300,000	22,060,000	21,700,000	11,040,000	3,020,000	118,120,000
Denver	47,363,300	11,736,380	14,695,249	6,549,924	3,169,953	83,514,806
Oklahoma City	30,200,000	9,460,000	10,200,000	3,940,000	2,080,000	55,880,000
Omaha	22,750,000	9,500,000	11,250,000	5,520,000	1,960,000	50,980,000
11. Dallas	79,800,000	34,740,000	32,250,000	14,100,000	4,850,000	165,740,000
El Paso	22,200,000	9,560,000	18,450,000	8,600,000	1,520,000	60,330,000
Houston	53,250,000	40,600,000	16,350,000	12,640,000	3,940,000	126,780,000
San Antonio	25,700,000	13,620,000	3,500,000	3,900,000	1,080,000	47,800,000
12. San Francisco	199,675,000	90,680,000	54,150,000	22,260,000	11,162,000	377,927,000
Los Angeles	243,600,000	140,156,000	67,500,000	50,200,000	12,450,000	513,906,000
Portland	38,545,000	12,920,000	14,540,000	9,260,000	2,020,000	77,285,000
Salt Lake City	31,850,000	7,080,000	4,750,000	3,620,000	1,830,000	49,130,000
Seattle	50,550,000	16,000,000	11,900,000	5,500,000	2,640,000	86,590,000
Treasurer of the United States, Washington, D.C.	107,100,000	9,560,000	8,264,609	17,415,434	2,606,148	144,946,191
Subtotal	3,716,998,300	1,576,826,380	1,035,964,169	715,514,531	193,387,703	7,238,691,083
Proof coin sales	2,087,860	2,087,860	2,087,860	2,087,860	2,087,860	10,439,300
Intermint shipments, etc	(-) 1,850,000	(-) 950,000	(-) 1,841,849	(-) 1,791,803	(-) 851,345	[2] (-) 7,284,997
Total pieces	3,717,236,160	1,577,964,240	1,036,210,180	715,810,588	194,624,218	7,241,845,386
Total face value	$37,172,361.60	$78,898,212.00	$103,621,018.00	$178,952,647.00	$97,312,109.00	$495,956,347.60
Weight in short tons	12,745	8,697	2,855	4,931	2,682	31,910

[1] Includes proof coins which are sold only in sets. A set contains one coin of each denomination currently minted (1¢, 5¢, 10¢, 25¢, and 50¢). There were no shipments of standard silver dollars during the fiscal year.

[2] Returned to inventory.

TABLE 4.--Summary of uncurrent United States silver and minor coins withdrawn from circulation, fiscal year 1965[1]

Federal Reserve District (Banks and branches)	Number of pieces received by Mints					
	1 cent[2]	5 cents	10 cents	25 cents	50 cents	Total
1. Boston	65,000	12,000	40,000	16,000	4,000	137,000
2. New York	80,000	24,000	180,000	28,000	6,000	318,000
Buffalo	50,000	10,000	15,000	6,000	2,000	83,000
3. Philadelphia	130,000	20,000	60,000	20,000	6,000	236,000
4. Cleveland	65,000	12,000	50,000	20,000	4,000	151,000
Cincinnati	.....	.....	.....	.....	.....	.....
Pittsburgh	.....	.....	.....	.....	.....	.....
5. Richmond	83,000	21,000	60,000	41,200	11,800	217,000
Baltimore	49,000	15,000	18,500	9,600	1,200	93,300
Charlotte	47,000	14,000	16,000	5,200	2,000	84,200
6. Atlanta	87,500	16,000	100,000	22,000	8,000	233,500
Birmingham	68,500	13,200	20,000	26,200	1,800	129,700
Jacksonville	480,000	83,000	128,000	79,400	24,200	794,600
Nashville	.....	.....	.....	.....	.....	.....
New Orleans	112,000	26,000	31,000	15,200	4,400	188,600
7. Chicago	390,000	52,000	230,000	96,000	14,000	782,000
Detroit	60,000	6,000	70,000	14,000	2,000	152,000
8. St. Louis	75,000	16,000	50,000	24,000	6,000	171,000
Little Rock	.....	.....	.....	.....	.....	.....
Louisville	.....	.....	.....	.....	.....	.....
Memphis	.....	.....	.....	.....	.....	.....
9. Minneapolis	145,000	24,000	.....	28,000	7,000	204,000
Helena	.....	.....	.....	.....	.....	.....
10. Kansas City	50,000	16,000	30,000	20,000	2,000	118,000
Denver	40,000	8,000	40,000	36,000	2,000	126,000
Oklahoma City	40,000	8,000	20,000	4,000	.....	72,000
Omaha	21,000	7,000	17,000	3,200	1,400	49,600
11. Dallas	65,000	8,000	21,000	3,600	1,200	98,800
El Paso	15,000	3,000	5,000	600	500	24,100
Houston	15,000	12,000	10,000	12,000	.....	49,000
San Antonio	55,000	16,000	35,000	12,000	4,000	122,000
12. San Francisco	115,000	36,000	90,000	96,000	14,000	351,000
Los Angeles	300,000	84,000	260,000	84,000	10,000	738,000
Portland	.....	.....	.....	.....	.....	.....
Salt Lake City	50,000	16,000	40,000	12,000	.....	118,000
Seattle	55,000	16,000	50,000	16,000	6,000	143,000
Treasurer of the United States, Washington, D.C.	53,500	30,000	68,000	37,000	8,800	197,300
Subtotal	2,861,500	624,200	1,754,500	787,200	154,300	6,181,700
From other sources	456,469	123,519	313,552	65,488	18,852	977,880
Total pieces	3,317,969	747,719	2,068,052	852,688	173,152	7,159,580
Total face value	$33,179.69	$37,385.95	$206,805.20	$213,172.00	$86,576.00	$577,118.84
Weight in short tons[3]	11	4	6	6	2	29

[1] When coins in circulation become too worn for further use they are withdrawn by the Federal Reserve Banks and branches and the Treasurer of the United States. Such coins, termed "uncurrent", are exchanged at face value and shipped to the Philadelphia and Denver Mints. A few uncurrent coins are also received from other sources. The Mints melt and recoin uncurrent coins, as provided by law. No silver dollars were melted during fiscal year 1965.

[2] See Table 25 in this Report for a summary of uncurrent zinc-coated steel cents received by the Mints from fiscal year 1945 through 1965. See Table 26 for a summary of uncurrent copper-silver-manganese five cent pieces received by the Mints from fiscal year 1948 through 1965.

[3] Computed at standard weight, actual recoveries are smaller due to abrasion.

TABLE 5.--Stock of United States coins[1]
(Specified dates)

End of month	Standard silver dollars	Subsidiary silver coins (50¢, 25¢, and 10¢)	Minor coins (5¢ and 1¢)	Total
June 1959	$488,046,100	$1,496,953,100	$526,922,200	$2,511,921,400
December 1959	487,835,700	1,516,543,600	546,049,700	2,550,429,000
June 1960	487,773,300	1,552,105,600	559,148,200	2,599,027,100
December 1960	487,668,100	1,578,617,500	580,046,600	2,646,332,200
June 1961	487,589,300	1,608,670,200	594,059,800	2,690,319,300
December 1961	487,439,800	1,654,132,300	620,175,700	2,761,747,800
June 1962	487,355,300	1,710,760,400	636,034,000	2,834,149,700
December 1962	486,534,400	1,759,400,800	662,952,700	2,908,887,900
June 1963	486,017,400	1,824,877,900	681,787,300	2,992,682,600
December 1963	484,786,700	1,890,920,000	708,759,600	3,084,466,300
June 1964	484,722,100	1,999,475,000	737,664,800	3,221,861,900
December 1964	484,722,100	2,165,950,300	782,200,100	3,432,872,500
June 1965	484,719,600	2,375,327,100	853,388,400	3,713,435,100

[1] Estimates of the Bureau of the Mint, reflecting coins manufactured; uncurrent coins withdrawn from circulation, returned to the Mints, and melted; certain exports and imports; general disappearance; etc. Includes coins held in the Treasury as well as those outside the Treasury (in banks and in circulation). Further denomination breakdown and breakdown according to number of pieces are not available.

TABLE 5A.--Location of United States coins at close of specified fiscal and calendar years[1]

End of month	Standard silver dollars	Subsidiary silver coins	Minor coins	Total
	Held in the Treasury			
June 1959	$194,411,064	$20,459,473	$2,165,846	$217,036,383
December 1959	182,296,259	3,156,730	2,255,886	187,708,875
June 1960	174,314,287	6,931,620	3,041,090	184,286,997
December 1960	161,210,975	2,633,633	1,104,937	164,949,545
June 1961	149,172,946	4,740,467	1,487,719	155,401,132
December 1961	130,137,226	3,582,616	1,021,190	134,741,032
June 1962	115,487,279	4,475,000	962,607	120,924,886
December 1962	94,007,144	3,383,780	1,173,099	98,564,023
June 1963	65,760,615	3,854,311	609,982	70,224,908
December 1963	28,466,127	3,681,585	1,131,472	33,279,184
June 1964	2,943,295	3,921,528	208,079	7,072,902
December 1964	2,958,425	4,743,064	3,003,882	10,705,371
June 1965	2,971,079	2,055,900	4,753,364	9,780,343
	Held in Federal Reserve Banks			
June 1959	$8,143,867	$61,010,933	$10,880,729	$80,035,529
December 1959	7,932,174	45,029,242	5,550,500	58,511,916
June 1960	8,376,508	61,141,453	6,740,358	76,258,319
December 1960	7,131,361	42,501,041	4,931,379	54,563,781
June 1961	9,745,018	55,794,560	7,337,735	72,877,313
December 1961	11,041,402	28,465,611	5,484,339	44,991,352
June 1962	12,278,324	42,800,256	5,648,181	60,726,761
December 1962	7,766,334	16,936,418	4,121,221	28,823,973
June 1963	8,768,069	31,099,420	4,886,330	44,753,819
December 1963	4,526,049	15,393,981	1,443,975	21,364,005
June 1964	57,866	8,415,822	1,407,763	9,881,451
December 1964	52,718	14,380,251	2,931,043	17,364,012
June 1965	50,987	17,891,128	24,050,251	41,992,366
	In circulation[2]			
June 1959	$285,491,169	$1,415,482,694	$513,875,625	$2,214,849,488
December 1959	297,607,267	1,468,357,628	538,243,314	2,304,208,209
June 1960	305,082,505	1,484,032,527	549,366,752	2,338,481,784
December 1960	319,325,764	1,533,482,826	574,010,284	2,426,818,874
June 1961	328,671,336	1,548,135,173	585,234,346	2,462,040,855
December 1961	346,261,172	1,622,084,073	613,670,171	2,582,015,416
June 1962	359,589,697	1,663,485,144	629,423,212	2,652,498,053
December 1962	384,760,922	1,739,080,602	657,658,380	2,781,499,904
June 1963	411,488,716	1,789,924,169	676,290,988	2,877,703,873
December 1963	451,794,524	1,871,844,434	706,184,153	3,029,823,111
June 1964	481,720,939	1,987,137,650	736,048,958	3,204,907,547
December 1964	481,710,957	2,146,826,985	776,265,175	3,404,803,117
June 1965	481,697,534	2,355,380,072	824,584,785	3,661,662,391

[1] As reported on the Treasury Circulation Statement of United States Money. The sum of coins held in the Treasury, in Federal Reserve Banks, and in circulation equals the stock of United States coins shown in the table above.

[2] Includes coins held by commercial banks and by the public.

TABLE 6.--Gold transactions of the Bureau of the Mint, fiscal year 1965, in fine ounces (to thousandths of an ounce)

(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office	Fort Knox Depository	Total
1. Gold held at beginning of fiscal year 1965[1]	59,482.096	9,382,902.168	72,465,035.246	22,581,501.513	327,880,235.011	432,369,156.034
2. Increases during the fiscal year 1965:						
(1) Deposits of newly mined bullion:						
(a) Unrefined	.....	70,111.865	14,987.673	.....	.....	85,099.538
(b) Refined	.....	.....	[2] 626,131.552	355.263	.....	[2] 626,486.815
	.....	70,111.865	[2] 641,119.225	355.263	.....	[2] 711,586.353
(2) U.S. gold coins received and melted	.637	1.139	4.626	46.581	.....	52.983
(3) Deposits of scrap gold from domestic sources[3]	14,264.730	85,994.767	108,023.435	334,833.316	.....	543,116.248
(4) Transfers from other Mint institutions	.....	25.000	.....	43,560,540.141	.....	43,560,565.141
(5) Other[4]	70.229	658,246.594	548.278	4,036,320.489	.....	4,695,185.590
Total increases	14,335.596	814,379.365	[2] 749,695.564	47,932,095.790	.....	[2] 49,510,506.315
3. Decreases during the fiscal year 1965:						
(1) Gold bars issued for domestic industrial, professional, and artistic use:						
(a) Sold	15,141.522	333,832.582	.....	3,706,082.689	.....	4,055,056.793
(b) Exchanged for scrap gold deposits from domestic sources	6,735.998	41.035	452.766	83,807.513	.....	91,037.312
	21,877.520	333,873.617	452.766	3,789,890.202	.....	4,146,094.105
(2) Gold bars exchanged for gold deposits other than domestic scrap	.....	370,885.055	.....	445,466.670	.....	816,351.725
(3) Transfers to other Mint institutions	14,689.641	7.607	4,289,617.603	25.000	39,256,225.290	43,560,565.141
(4) Other[5]	451.391	.....	45.138	43,272,125.189	.....	43,272,621.718
Total decreases	37,018.552	704,766.279	4,290,115.507	47,507,507.061	39,256,225.290	91,795,632.689
4. Gold held at close of fiscal year 1965[6]	36,799.140	9,492,515.254	68,924,615.303	23,006,090.242	288,624,009.721	390,084,029.660

[1] Does not include 9,385,696 fine ounces valued at $328,499,362.28 held by the Treasury in other depositories.
[2] Reflects adjustment for advance payments.
[3] Includes old jewelry, dental scrap, etc.
[4] Includes deposits from foreign sources, operative recoveries, settlement surplus, and miscellaneous items not otherwise classified.
[5] Includes miscellaneous items such as sale of sweeps, operative losses, and withdrawals in connection with operation of the U.S. Exchange Stabilization Fund and the special custody account of the Treasurer of the United States.
[6] Does not include 8,032,054 fine ounces valued at $281,121,891.94 held by the Treasury in other depositories.

TABLE 7.--Gold transactions of the Bureau of the Mint, fiscal year 1965, value at $35 per fine ounce

(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office	Fort Knox Depository	Total
1. Gold held at beginning of fiscal year 1965[1]	$2,081,873.33	$328,401,576.01	$2,536,276,233.69	$790,352,543.21	$11,475,808,223.26	$15,132,920,449.50
2. Increases during the fiscal year 1965:						
(1) Deposits of newly mined bullion:						
(a) Unrefined	.....	2,453,915.19	524,568.51	.....	.....	2,978,483.70
(b) Refined	.....	.....	[2] 21,914,604.30	12,434.21	.....	[2] 21,927,038.51
	.....	2,453,915.19	[2] 22,439,172.81	12,434.21	.....	[2] 24,905,522.21
(2) U.S. gold coins received and melted	22.37	39.86	161.91	1,630.38	.....	1,854.52
(3) Deposits of scrap gold from domestic sources[3]	499,265.51	3,009,816.96	3,780,820.27	11,719,174.94	.....	19,009,077.68
(4) Transfers from other Mint institutions	.....	875.00	.....	1,524,618,904.87	.....	1,524,619,779.87
(5) Other[4]	2,458.03	23,038,630.77	19,189.74	141,271,217.44	.....	164,331,495.98
Total increases	501,745.91	28,503,277.78	[2] 26,239,344.73	1,677,623,361.84	.....	[2] 1,732,867,730.26
3. Decreases during the fiscal year 1965:						
(1) Gold bars issued for domestic industrial, professional, and artistic use:						
(a) Sold	529,953.35	11,684,139.46	.....	129,712,893.13	.....	141,926,985.94
(b) Exchanged for scrap gold deposits from domestic sources	235,759.90	1,436.22	15,846.81	2,933,262.90	.....	3,186,305.83
	765,713.25	11,685,575.68	15,846.81	132,646,156.03	.....	145,113,291.77
(2) Gold bars exchanged for gold deposits other than domestic scrap	.....	12,980,976.90	.....	15,591,333.45	.....	28,572,310.35
(3) Transfers to other Mint institutions	514,137.44	266.25	150,136,616.11	875.00	1,373,967,885.07	1,524,619,779.87
(4) Other[5]	15,798.74	.....	1,579.83	1,514,524,381.70	.....	1,514,541,760.27
Total decreases	1,295,649.43	24,666,818.83	150,154,042.75	1,662,762,746.18	1,373,967,885.07	3,212,847,142.26
4. Gold held at close of fiscal year 1965[6]	1,287,969.81	332,238,034.96	2,412,361,535.67	805,213,158.87	10,101,840,338.19	13,652,941,037.50

See Table 6 for footnotes.

TABLE 8.--Silver bullion transactions of the Bureau of the Mint, fiscal year 1965, in fine ounces (to hundredths of an ounce)

(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Depository	Total
1. Silver bullion held at beginning of fiscal year 1965:					
(1) At $1.29+ as security for silver certificates	117,063,128.53	397,440,201.07	18,500,210.74	830,613,812.12	1,363,617,352.46
(2) At $1.29+ for coinage or sale	443,197.13	.....	561,503.55	85,947.46	1,090,648.14
(3) At cost value	936,578.98	6,130,269.24	3,370,099.06	3,262,373.32	13,699,320.60
(4) At recoinage value	104,545.89	.....	.....	.....	104,545.89
Total holdings[1]	118,547,450.53	403,570,470.31	22,431,813.35	833,962,132.90	1,378,511,867.09
2. Increases during the fiscal year 1965:					
(1) Deposits of newly mined domestic silver (all unrefined)	.....	8,783.55	3,902.59	.....	12,686.14
(2) Deposits of scrap from domestic sources[2]	150,758.40	258,078.46	26,529.19	3,004,767.76	3,440,133.81
(3) Recoinage bullion from uncurrent U.S. silver dollars	.....	.....	.....	.....	.....
(4) Recoinage bullion from uncurrent U.S. silver subsidiary coins	189,268.93	.....	165,050.13	.....	354,319.06
(5) Transfers from other Mint institutions[3]	64,870,808.34	724.65	143,282,388.17	1,150,955.94	209,304,877.10
(6) Other[4]	27,300.22	128,986.46	64,882.05	[5] 326,701.76	[5] 547,870.49
Total increases	65,238,135.89	396,573.12	143,542,752.13	4,482,425.46	213,659,886.60
3. Decreases during the fiscal year 1965:					
(1) Processed into U.S. silver subsidiary coins[6]	148,266,349.40	.....	126,191,349.21	.....	274,457,698.61
(2) Silver bars, etc. exchanged for silver or silver certificates:					
(a) For deposits of scrap silver from domestic sources	123,330.71	212,632.19	.....	2,853,802.46	3,189,765.36
(b) For other silver deposits	.....	128,486.35	.....	310.51	128,796.86
(c) For silver certificates[7]	.....	677,387.94	.....	164,422,445.20	165,099,833.14
	123,330.71	1,018,506.48	.....	167,276,558.17	168,418,395.36
(3) Silver sold for industrial use, medals, etc	8,291.40	.....	.....	4,652,288.62	4,660,580.02
(4) Transfers to other Mint institutions[3]	6,012,081.25	99,271,100.68	18,036,287.64	85,985,407.53	209,304,877.10
(5) Other[8]	197,653.92	.....	34,894.65	15,388.25	247,936.82
Total decreases	154,607,706.68	100,289,607.16	144,262,531.50	257,929,642.57	657,089,487.91
4. Silver bullion held at close of fiscal year 1965:					
(1) At $1.29+ as security for silver certificates	27,090,268.16	297,492,438.66	15,746,315.85	575,188,496.65	915,517,519.32
(2) At $1.29+ for coinage or sale	1,962,371.15	.....	2,535,204.47	3,175,859.07	7,673,434.69
(3) At cost value	125,240.43	6,184,997.61	3,430,513.66	2,150,560.07	11,891,311.77
(4) At recoinage value	.....	.....	.....	.....	.....
Total holdings[1]	29,177,879.74	303,677,436.27	21,712,033.98	580,514,915.79	935,082,265.78

[1] Does not include 64,751,316.12 fine ounces of Treasury silver valued at $83,718,873.72 held by other U.S. Government agencies.
[2] Includes old jewelry and various other forms of scrap purchased as "bullion ordinary" and also exchanged for bars.
[3] Includes physical and book transfers.
[4] Includes mutilated coins purchased as bullion, operative recoveries, settlement surplus, silver in certain gold deposits, and miscellaneous items not otherwise classified.
[5] Includes lend-lease silver returns by Government of India in December 1964 amounting to 324,809.08 ounces valued at $230,975.35.
[6] The number of silver coins manufactured totaled 1,946,639,115 pieces with face value of $379,884,110.55 (See Table 1 for details).
[7] Issued in accordance with Instructions of Secretary of the Treasury, July 22, 1963, pursuant to Public Law 88-36 of June 4, 1963.
[8] Includes sale of sweeps, operative wastage, etc.

TABLE 9.--Silver bullion transactions of the Bureau of the Mint, fiscal year 1965, value

(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Depository	Total
1. Silver bullion held at beginning of fiscal year 1965:					
(1) At $1.29+ as security for silver certificates	$151,354,347.54	$513,862,038.76	$23,919,464.31	$1,073,924,798.36	$1,763,060,648.97
(2) At $1.29+ for coinage or sale	573,022.54	.....	725,984.40	111,123.96	1,410,130.90
(3) At cost value	686,643.28	4,412,757.06	2,419,231.73	2,705,266.42	10,223,898.49
(4) At recoinage value	144,358.53	.....	.....	.....	144,358.53
Total holdings[1]	152,758,371.89	518,274,795.82	27,064,680.44	1,076,741,188.74	1,774,839,036.89
2. Increases during the fiscal year 1965:					
(1) Deposits of newly mined domestic silver (all unrefined)	.....	11,330.80	5,034.33	.....	16,365.13
(2) Deposits of scrap from domestic sources[2]	194,475.69	332,921.41	34,222.72	3,876,146.83	4,437,766.65
(3) Recoinage bullion from uncurrent U.S. silver dollars	.....	.....	.....	.....	.....
(4) Recoinage bullion from uncurrent U.S. silver subsidiary coins	261,647.12	.....	228,166.75	.....	489,813.87
(5) Transfers from other Mint institutions[3]	83,873,368.21	936.92	185,253,996.63	1,130,223.06	270,258,524.82
(6) Other[4]	35,217.19	166,339.49	53,660.06	[5] 232,545.11	[5] 487,761.85
Total increases	84,364,708.21	511,528.62	185,575,080.49	5,238,915.00	275,690,232.32
3. Decreases during the fiscal year 1965:					
(1) Processed into U.S. silver subsidiary coins[6]	191,724,030.04	.....	163,171,260.38	.....	354,895,290.42
(2) Silver bars, etc. exchanged for silver or silver certificates:					
(a) For deposits of scrap silver from domestic sources	159,096.55	274,295.57	.....	3,681,404.79	4,114,796.91
(b) For other silver deposits	.....	165,747.42	.....	223.12	165,970.54
(c) For silver certificates[7]	.....	876,602.00	.....	212,587,218.00	213,463,820.00
	159,096.55	1,316,644.99	.....	216,268,845.91	217,744,587.45
(3) Silver sold for industrial use, medals, etc	10,720.21	.....	.....	4,964,269.36	4,974,989.57
(4) Transfers to other Mint institutions[3]	7,415,317.22	128,350,513.15	23,319,642.44	111,173,052.01	270,258,524.82
(5) Other[8]	150,148.97	.....	25,284.44	12,588.91	188,022.32
Total decreases	199,459,312.99	129,667,158.14	186,516,187.26	332,418,756.19	848,061,414.58
4. Silver bullion held at close of fiscal year 1965:					
(1) At $1.29+ as security for silver certificates	35,025,800.77	384,635,861.82	20,358,872.91	743,677,303.80	1,183,697,839.30
(2) At $1.29+ for coinage or sale	2,537,207.12	.....	3,277,840.15	4,106,161.19	9,921,208.46
(3) At cost value	100,759.22	4,483,304.48	2,486,860.61	1,777,882.56	8,848,806.87
(4) At recoinage value	.....	.....	.....	.....	.....
Total holdings[1]	37,663,767.11	389,119,166.30	26,123,573.67	749,561,347.55	1,202,467,854.63

See Table 8 for footnotes.

TABLE 10.--Miscellaneous operating data, Bureau of the Mint, fiscal year 1965

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office	Total
1. Gold and silver bullion deposit transactions, number	611	2,383	1,151	4,054	8,199
2. Gold and silver deposit assay determinations, number	4,481	21,596	11,865	52,129	90,071
3. Total assay determinations, number (includes line 2 above)	65,514	23,842	97,976	68,687	256,019
4. Refinery production:					
Gold refined by electrolytic process, fine ounces	.....	.....	.....	1,539,411.023	1,539,411.023
Gold refined by "fire" process, fine ounces	.....	.....	.....	2,439,601.348	2,439,601.348
Silver refined by electrolytic process, fine ounces[1]	.....	.....	.....	1,571,019.33	1,571,019.33
Silver refined by "fire" process, fine ounces	.....	.....	.....	466,738.65	466,738.65
5. Metal operated upon by the melting and refining division:					
Gold, fine ounces	15,354.043	309,675.262	680,965.568	8,103,838.672	9,109,833.545
Silver, fine ounces	229,359,010.68	426,769.63	253,133,502.94	4,455,893.96	487,375,177.21
Cupronickel alloy, gross ounces	605,476.71	.....	16,188,000.00	.....	16,793,476.71
Bronze alloy, gross ounces	3,508,192.40	.....	20,991,203.91	.....	24,499,396.31
6. Metal operated upon by the coining division:					
Gold, fine ounces (medals)	1,018.154	.....	.....	.....	1,018.154
Silver, fine ounces	233,131,707.27	.....	254,440,724.83	.....	487,572,432.10
Cupronickel alloy, gross ounces	195,004,076.32	.....	224,095,840.71	.....	419,099,917.03
Bronze alloy, gross ounces	235,072,317.52	.....	368,535,423.73	.....	603,607,741.25
7. Gold issue bars (400 troy ounces) manufactured:					
Number of bars	.....	.....	1,424	1,820	3,244
Fine ounces contained	.....	.....	588,982.355	735,988.554	1,324,970.909
8. Gold commercial bars (miscellaneous sizes) manufactured:					
Number of bars	.....	3,419	.....	35,882	39,301
Fine ounces contained	.....	262,779.885	.....	3,719,046.621	3,981,826.506
9. Silver issue bars (1,000 troy ounces) manufactured:					
Number of bars	.....	.....	.....	2,572	2,572
Fine ounces contained	.....	.....	.....	2,600,044.04	2,600,044.04
10. Silver commercial bars (miscellaneous sizes) manufactured:					
Number of bars	.....	3,135	.....	199	3,334
Fine ounces contained	.....	411,640.44	.....	41,795.62	453,436.06
11. Sweeps material sold:					
Quantity, net avoirdupois pounds	47,434	.....	66,776	77,487	191,697
Gold content, fine ounces	131.788	.....	95.228	1,606.916	1,833.932
Silver content, fine ounces	82,908.59	.....	34,966.87	15,388.25	133,263.71
12. Operating gains and losses (-):					
Gold bullion, fine ounces:					
Melting and refining	4.368	325.742	464.774	21.267	816.151
Coining (medals)	7.225	.....	.....	.....	7.225
Silver bullion, fine ounces:					
Melting and refining	41,976.19	(-) 54.76	120,178.46	7,053.21	169,153.10
Coining	(-) 107,974.35	.....	(-) 39,058.34	.....	(-) 147,032.69
Cupronickel alloy, gross ounces:					
Melting and refining	(-) 27,697.14	.....	(-) 350,364.40	.....	(-) 378,061.54
Coining	55,143.99	.....	(-) 275,029.09	.....	(-) 219,885.10

TABLE 10.--Miscellaneous operating data, Bureau of the Mint, fiscal year 1965--Continued

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office	Total
12. Operating gains and losses (-)--Continued:					
Bronze alloy, gross ounces:					
Melting and refining	253,598.02	.....	70,916.60	.....	324,514.62
Coining	(-)106,276.77	.....	(-)525,981.74	.....	(-)632,258.51
13. Silver bars in storage at West Point Depository, fine ounces:					
Held at beginning of fiscal year	.....	.....	.....	792,209,780.78	792,209,780.78
Net withdrawals during year	.....	.....	.....	307,411,387.27	307,411,387.27
Held at end of fiscal year	.....	.....	.....	484,798,393.51	484,798,393.51
14. Unrefined gold held on June 30, 1965, fine ounces	5,499.574	5,115,390.995	12,832,610.056	9,132,669.365	27,086,169.990
15. Unrefined silver held on June 30, 1965, fine ounces	243,109.68	6,957,950.76	8,150,885.60	18,061,576.86	33,413,522.90
16. Medals, etc.:					
List medals sold, number	39,246	.....	.....	.....	39,246
Special medals and distinguishing devices delivered, number	97,275	.....	.....	.....	97,275
17. Visitors touring the Mints, number	88,382	.....	149,009	.....	237,391

[1] In fiscal 1964 the silver electrolytically refined, amounting to 3,109,329 ounces, included 1,559,329 ounces refined for another U.S. Government agency. The amount of Mint silver refined was therefore 1,550,000 ounces.

TABLE 11.--Detail of revenues deposited into the general fund of the Treasury by the Bureau of the Mint, fiscal year 1965

Item	Office of the Director	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Bullion Depository	Total
GENERAL ACCOUNT RECEIPTS						
Seigniorage on subsidiary silver coinage	.....	$12,762,885.44	.....	$9,148,233.67	.....	$21,911,119.11
Seigniorage on minor coinage	.....	37,088,024.98	.....	53,961,048.57	.....	91,049,073.55
Seigniorage on silver bullion, difference between cost value and monetary value	.....	.....	.....	.....	.....	.....
Profit on sale of silver bullion	.....	.....	.....	.....	$192,206.74	192,206.74
Handling charges on gold bullion	.....	2,016.68	$42,914.47	65,770.67	346,108.08	456,809.90
Other bullion charges	.....	20,750.86	135,469.73	103,098.23	273,519.06	532,837.88
Commission on telephone pay stations	.....	707.88	.....	128.31	.....	836.19
Business concessions, not otherwise classified	.....	.....	.....	69.48	.....	69.48
Forfeitures of unclaimed money and property	.....	.....	.....	.....	4.10	4.10
Fines, penalties, and forfeitures, not otherwise classified	.....	.....	1,441.50	.....	7,020.45	8,461.95
Gifts to the United States, not otherwise classified	.....	.....	.....	.....	1.48	1.48
Sales of miscellaneous products and by-products	$673.49	70.25	.....	.....	.....	743.74
Fees and other charges for accounting and auditing services	.....	35.26	.....	18.08	.....	53.34
Charges for testing, inspection and grading services, not otherwise classified	.....	767.00	.....	224.50	2,876.50	3,868.00
Fees and other charges for miscellaneous services	24.70	100.00	.....	.....	.....	124.70
Net proceeds from surplus property in the United States	.....	.....	42,236.78	.....	.....	42,236.78
Proceeds from sale of equipment and other personal property, not otherwise classified	.....	7,081.88	.....	212.50	.....	7,294.38
Sale of scrap and salvage materials	.....	32,983.97	.....	27,007.86	2,137.13	62,128.96
Recoveries for Government property lost or damaged, not otherwise classified	.....	.....	.....	3.56	.....	3.56
Refunds of erroneous payments	.....	.....	16.93	.....	.....	16.93
Miscellaneous recoveries and refunds, not otherwise classified	191.63	688.43	.....	1.00	27.52	908.58
Total general account receipts	889.82	49,916,112.63	222,079.41	63,305,816.43	823,901.06	114,268,799.35
SPECIAL ACCOUNT RECEIPTS						
Increment resulting from reduction in the weight of the gold dollar	.....	2.20	322.71	142.62	667.45	1,134.98
TRUST ACCOUNT RECEIPTS						
Unclaimed moneys of individuals whose whereabouts are unknown	.....	21.99	.....	.....	.....	21.99
Total receipts	889.82	49,916,136.82	222,402.12	63,305,959.05	824,568.51	114,269,956.32

TABLE 12.--Analysis of monetary assets and liabilities of the Bureau of the Mint on June 30, 1965

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Depository	Fort Knox Depository	Total
ASSETS						
Gold bullion	$1,287,969.81	$332,238,034.96	$2,412,361,535.67	$805,213,158.87	$10,101,840,338.19	$13,652,941,037.50
Silver bullion	37,663,767.11	389,119,166.30	26,123,573.67	749,561,347.55	.....	1,202,467,854.63
Silver coin	39,480.65	14,804.70	34,898.80	.....	.....	89,184.15
Minor coin	.....	1,025.45	3,536.26	.....	.....	4,561.71
Unclassified cash	2,731.57	306.37	3,245.16	9,385.36	.....	15,668.46
Minor coinage metal	5,460,847.63	.....	5,517,700.73	.....	.....	10,978,548.36
Reimbursable losses on melted coin	.....	.....	.....	.....	.....	.....
Total assets	44,454,796.77	721,373,337.78	2,444,044,490.29	1,554,783,891.78	10,101,840,338.19	14,866,496,854.81
LIABILITIES						
Bullion fund	38,993,477.76	721,373,337.78	2,438,523,253.30	1,554,783,891.78	10,101,840,338.19	14,855,514,298.81
Minor coinage metal fund	1,473,542.23	.....	1,112,318.97	.....	.....	2,585,861.20
Undeposited receipts	471.38	.....	.....	.....	.....	471.38
Accounts payable	3,987,305.40	.....	4,408,918.02	.....	.....	8,396,223.42
Total liabilities	44,454,796.77	721,373,337.78	2,444,044,490.29	1,554,783,891.78	10,101,840,338.19	14,866,496,854.81

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TABLE 13.--United States coins manufactured, calendar year 1964

Denomination	Number of pieces[1]				
	Philadelphia Mint			Denver Mint	Total coinage
	Regular issue	Proof coins	Total	Regular issue	
Half dollars	87,448,004	3,950,762	91,398,766	114,411,608	205,810,374
Quarter dollars	258,132,000	3,950,762	262,082,762	123,801,308	385,884,070
Dimes	238,770,000	3,950,762	242,720,762	572,154,430	814,875,192
5-cent pieces	340,964,000	3,950,762	344,914,762	455,821,840	800,736,602
1-cent pieces	1,519,165,000	3,950,762	1,523,115,762	1,865,163,400	3,388,279,162
Total	2,444,479,004	19,753,810	2,464,232,814	3,131,352,586	5,595,585,400

Denomination	Face value				
	Philadelphia Mint			Denver Mint	Total coinage
	Regular issue	Proof coins	Total	Regular issue	
Half dollars	$43,724,002.00	$1,975,381.00	$45,699,383.00	$57,205,804.00	$102,905,187.00
Quarter dollars	64,533,000.00	987,690.50	65,520,690.50	30,950,327.00	96,471,017.50
Dimes	23,877,000.00	395,076.20	24,272,076.20	57,215,443.00	81,487,519.20
5-cent pieces	17,048,200.00	197,538.10	17,245,738.10	22,791,092.00	40,036,830.10
1-cent pieces	15,191,650.00	39,507.62	15,231,157.62	18,651,634.00	33,882,791.62
Total	164,373,852.00	3,595,193.42	167,969,045.42	186,814,300.00	354,783,345.42

Denomination	Metallic content--short tons				
	Silver	Copper	Nickel	Zinc	Total tons
Half dollars	2,552	284	.....	.....	2,836
Quarter dollars	2,393	265	.....	.....	2,658
Dimes	2,021	225	.....	.....	2,246
5-cent pieces	.....	3,310	1,103	.....	4,413
1-cent pieces	.....	11,035	.....	581	11,616
Total	[2] 6,966	15,119	1,103	581	23,769

[1] All coins manufactured during calendar year 1964 were dated 1964.
[2] Represents 202,991,685.47 fine troy ounces of silver.

Note: No foreign coins were manufactured by the United States Mints during the calendar year 1964.

TABLE 14.--Specifications of coins manufactured during calendar year 1964 and fiscal year 1965

Denomination	Standard weight		Composition (Percent)	Diameter in inches	Thickness in inches
	Grams	Grains			
Half dollar[1]	12.5	192.9	90 silver, 10 copper.....	1.205	0.086
Quarter dollar[1]	6.25	96.45	....do.....	.955	.067
Dime[1]	2.5	38.58	....do.....	.705	.053
5-cent piece[2]	5	77.16	75 copper, 25 nickel.....	.835	.078
1-cent piece[2]	3.11	48	95 copper, 5 zinc.....	.750	.062

[1] Authorized by the Act of February 12, 1873 (Rev. Stat. 3513).
[2] Authorized by the Act of February 12, 1873 (Rev. Stat. 3515).

TABLE 15.--Shipments of United States coins for circulation by the Bureau of the Mint, calendar year 1964[1]

Federal Reserve District (Banks and branches)	Number of pieces shipped by the Mints						
	1 cent	5 cents	10 cents	25 cents	50 cents	$1.00	Total
1. Boston	158,700,000	21,240,000	27,500,000	12,200,000	18,940,000	.....	238,580,000
2. New York	370,950,000	82,632,000	78,050,000	60,760,000	9,130,000	.....	601,522,000
Buffalo	61,500,000	14,080,000	14,800,000	6,760,000	5,860,000	.....	103,000,000
3. Philadelphia	163,970,000	38,514,000	56,415,725	20,854,285	15,798,139	.....	295,552,149
4. Cleveland	82,250,000	18,600,000	25,750,000	8,720,000	8,400,000	.....	143,720,000
Cincinnati	86,200,000	16,340,000	17,700,000	6,360,000	3,230,000	.....	129,830,000
Pittsburgh	64,050,000	17,140,000	26,400,000	11,400,000	4,800,000	.....	123,790,000
5. Richmond	100,985,000	25,216,000	25,400,000	10,802,500	5,502,500	.....	167,906,000
Baltimore	69,250,000	37,860,000	9,450,000	8,720,000	1,740,000	.....	127,020,000
Charlotte	64,150,000	10,100,000	2,750,000	1,600,000	3,600,000	.....	82,200,000
6. Atlanta	74,650,000	12,492,000	15,000,000	4,140,000	4,100,000	.....	110,382,000
Birmingham	47,800,000	5,500,000	3,150,000	900,000	2,520,000	.....	59,870,000
Jacksonville	135,845,000	29,600,000	25,250,000	9,960,000	5,420,000	.....	206,075,000
Nashville	43,050,000	.....	.....	1,200,000	2,380,000	.....	46,630,000
New Orleans	91,800,000	25,660,000	14,250,000	11,620,000	1,970,000	.....	145,300,000
7. Chicago	374,100,000	80,628,000	84,250,000	46,300,000	27,200,000	.....	612,478,000
Detroit	113,950,000	26,440,000	31,500,000	18,200,000	4,500,000	.....	194,590,000
8. St. Louis	110,395,000	26,220,000	33,000,000	9,400,000	4,880,000	.....	183,895,000
Little Rock	23,350,000	2,500,000	4,750,000	800,000	1,450,000	.....	32,850,000
Louisville	48,245,000	26,660,000	500,000	11,200,000	1,520,000	.....	88,125,000
Memphis	49,000,000	27,208,000	25,250,000	9,160,000	2,100,000	.....	112,718,000
9. Minneapolis	78,050,000	23,280,000	25,000,000	9,760,000	5,170,000	.....	141,260,000
Helena	12,300,000	5,400,000	11,950,000	3,900,000	1,400,000	.....	34,950,000
10. Kansas City	53,100,000	13,556,000	16,950,000	5,940,000	3,160,000	.....	92,706,000
Denver	50,043,400	10,913,840	13,935,618	4,987,713	3,444,603	.....	83,325,174
Oklahoma City	34,300,000	8,800,000	9,500,000	1,700,000	2,410,000	.....	56,710,000
Omaha	24,800,000	8,160,000	8,050,000	3,440,000	2,140,000	.....	46,590,000
11. Dallas	68,200,000	19,020,000	28,000,000	7,800,000	5,310,000	.....	128,330,000
El Paso	20,300,000	4,600,000	20,200,000	4,600,000	1,620,000	.....	51,320,000
Houston	52,450,000	19,080,000	10,850,000	7,000,000	4,040,000	.....	93,420,000
San Antonio	28,200,000	9,300,000	4,000,000	2,200,000	1,180,000	.....	44,880,000
12. San Francisco	168,506,692	37,478,706	40,606,668	10,290,716	11,346,535	.....	268,229,317
Los Angeles	247,950,000	52,396,000	58,750,000	26,600,000	12,500,000	.....	398,196,000
Portland	41,250,000	10,280,000	16,750,000	4,900,000	2,200,000	.....	75,380,000
Salt Lake City	24,400,000	6,200,000	4,000,000	1,520,000	1,980,000	.....	38,100,000
Seattle	51,600,000	15,440,000	13,500,000	2,500,000	3,000,000	.....	86,040,000
Treasurer of the United States, Washington, D. C.	94,050,000	5,000,000	4,757,266	10,707,319	2,933,164	2,019,000	119,466,749
Subtotal	3,383,690,092	793,534,546	807,915,277	378,902,533	198,874,941	2,019,000	5,564,936,389
Proof coin sales	3,746,472	3,746,472	3,746,472	3,746,472	3,746,472	.....	18,732,360
Intermint shipments, etc	638,308	3,251,294	3,009,153	3,030,775	2,984,671	.....	12,914,201
Total pieces	3,388,074,872	800,532,312	814,670,902	385,679,780	205,606,084	2,019,000	5,596,582,950
Total face value	$33,880,748.72	$40,026,615.60	$81,467,090.20	$96,419,945.00	$102,803,042.00	$2,019,000.00	$356,616,441.52
Weight in short tons	11,616	4,412	2,245	2,657	2,833	60	23,823

[1] Includes proof coins which are sold only in sets. A set contains one coin of each denomination currently minted (1¢, 5¢, 10¢, 25¢, and 50¢).

TABLE 16.--Gold transactions of the Bureau of the Mint, calendar year 1964, in fine ounces (to thousandths of an ounce)
(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office	Fort Knox Depository	Total
1. Gold held at beginning of calendar year 1964[1]	77,017.150	9,190,796.837	72,117,073.253	23,583,774.993	327,880,235.011	432,848,897.244
2. Increases during the calendar year 1964:						
(1) Deposits of newly mined bullion:						
(a) Unrefined	.....	65,315.887	13,516.267	1.350	.....	78,833.504
(b) Refined	.....	.....	[2] 619,293.032	277.253	.....	[2] 619,570.285
	.....	65,315.887	[2] 632,809.299	278.603	.....	[2] 698,403.789
(2) U.S. gold coins received and melted	2.861	1.139	1.701	39.064	.....	44.765
(3) Deposits of scrap gold from domestic sources[3]	13,777.484	80,266.737	93,308.560	295,792.983	.....	483,145.764
(4) Transfers from other Mint institutions	.....	25.000	.....	4,306,754.820	.....	4,306,779.820
(5) Other[4]	71.053	941,685.130	453.790	848,899.501	.....	1,791,109.474
Total increases	13,851.398	1,087,293.893	[2] 726,573.350	5,451,764.971	.....	[2] 7,279,483.612
3. Decreases during the calendar year 1964:						
(1) Gold bars issued for domestic industrial, professional, and artistic use:						
(a) Sold	18,184.819	295,518.881	75.023	3,351,476.263	.....	3,665,254.986
(b) Exchanged for scrap gold deposits from domestic sources	6,503.041	.....	38.396	62,363.545	.....	68,904.982
	24,687.860	295,518.881	113.419	3,413,839.808	.....	3,734,159.968
(2) Gold bars exchanged for gold deposits other than domestic scrap	.....	369,807.300	.....	223,287.069	.....	593,094.369
(3) Transfers to other Mint institutions	17,155.852	.....	4,289,598.968	25.000	.....	4,306,779.820
(4) Other[5]	242.794	.....	23.302	2,430,251.107	.....	2,430,517.203
Total decreases	42,086.506	665,326.181	4,289,735.689	6,067,402.984	.....	11,064,551.360
4. Gold held at close of calendar year 1964[6]	48,782.042	9,612,764.549	68,553,910.914	22,968,136.980	327,880,235.011	429,063,829.496

[1] Does not include 10,380,005 fine ounces valued at $363,300,168.17 held by the Treasury in other depositories.
[2] Reflects adjustment for advance payments.
[3] Includes old jewelry, dental scrap, etc.
[4] Includes deposits from foreign sources, operative recoveries, settlement surplus, and miscellaneous items not otherwise classified.
[5] Includes miscellaneous items such as sale of sweeps, operative losses, and withdrawals in connection with operation of the U.S. Stabilization Fund and the special gold custody account of the Treasurer of the United States.
[6] Does not include 10,585,241 fine ounces valued at $370,483,431.94 held by the Treasury in other depositories.

TABLE 17.--Gold transactions of the Bureau of the Mint, calendar year 1964, value at $35 per fine ounce
(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office	Fort Knox Depository	Total
1. Gold held at beginning of calendar year 1964[1]	$2,695,600.06	$321,677,888.57	$2,524,097,563.88	$825,432,109.64	$11,475,808,223.26	$15,149,711,385.41
2. Increases during the calendar year 1964:						
(1) Deposits of newly mined bullion:						
(a) Unrefined	.....	2,286,056.06	473,069.36	47.25	.....	2,759,172.67
(b) Refined	.....	.....	[2] 21,675,256.12	9,703.86	.....	[2] 21,684,959.98
	.....	2,286,056.06	[2] 22,148,325.48	9,751.11	.....	[2] 24,444,132.65
(2) U.S. gold coins received and melted	100.24	39.86	59.54	1,367.28	.....	1,566.92
(3) Deposits of scrap gold from domestic sources[3]	482,211.96	2,809,336.01	3,265,799.68	10,352,763.61	.....	16,910,111.26
(4) Transfers from other Mint institutions	.....	875.00	.....	150,736,418.70	.....	150,737,293.70
(5) Other[4]	2,486.87	32,958,979.52	15,882.65	29,711,482.85	.....	62,688,831.89
Total increases	484,799.07	38,055,286.45	[2] 25,430,067.35	190,811,783.55	.....	[2] 254,781,936.42
3. Decreases during the calendar year 1964:						
(1) Gold bars issued for domestic industrial, professional, and artistic use:						
(a) Sold	636,468.70	10,343,159.55	2,625.81	117,301,668.36	.....	128,283,922.42
(b) Exchanged for scrap gold deposits from domestic sources	227,606.39	.....	1,343.87	2,182,723.97	.....	2,411,674.23
	864,075.09	10,343,159.55	3,969.68	119,484,392.33	.....	130,695,596.65
(2) Gold bars exchanged for gold deposits other than domestic scrap	.....	12,943,255.50	.....	7,815,047.41	.....	20,758,302.91
(3) Transfers to other Mint institutions	600,454.82	.....	150,135,963.88	875.00	.....	150,737,293.70
(4) Other[5]	8,497.84	.....	815.56	85,058,788.80	.....	85,068,102.20
Total decreases	1,473,027.75	23,286,415.05	150,140,749.12	212,359,103.54	.....	387,259,295.46
4. Gold held at close of calendar year 1964[6]	1,707,371.38	336,446,759.97	2,399,386,882.11	803,884,789.65	11,475,808,223.26	15,017,234,026.37

See Table 16 for footnotes.

TABLE 18.--Silver bullion transactions of the Bureau of the Mint, calendar year 1964, in fine ounces (to hundredths of an ounce)

(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Depository	Total
1. Silver bullion held at beginning of calendar year 1964:					
(1) At $1.29+ as security for silver certificates	142,336,569.40	424,313,481.03	12,828,136.36	888,309,077.92	1,467,787,264.71
(2) At $1.29+ for coinage or sale	.....	.....	.....	544,343.66	544,343.66
(3) At cost value	2,023,796.84	6,461,931.84	10,391,530.85	4,536,523.61	23,413,783.14
Total holdings[1]	144,360,366.24	430,775,412.87	23,219,667.21	893,389,945.19	1,491,745,391.51
2. Increases during the calendar year 1964:					
(1) Deposits of newly mined domestic silver (all unrefined)	.....	9,167.16	3,332.52	.17	12,499.85
(2) Deposits of scrap from domestic sources[2]	134,857.59	200,164.97	22,125.56	3,118,198.93	3,475,347.05
(3) Recoinage bullion from uncurrent U.S. silver dollars	12,413.11	.....	30,294.89	.....	42,708.00
(4) Recoinage bullion from uncurrent U.S. silver subsidiary coins	175,414.99	.....	280,622.45	.....	456,037.44
(5) Transfers from other Mint institutions[3]	17,357,297.34	352,375.38	123,658,235.52	3,596,587.28	145,623,868.48
(6) Other[4]	32,202.14	125,846.15	71,424.22	[5] 326,490.96	555,963.47
Total increases	17,712,185.17	687,553.66	124,066,035.16	7,041,277.34	150,166,424.29
3. Decreases during the calendar year 1964:					
(1) Processed into U.S. silver subsidiary coins[6]	97,678,895.80	.....	105,312,789.67	.....	202,991,685.47
(2) Silver bars, etc. exchanged for silver or silver certificates:					
(a) For deposits of scrap silver from domestic sources	111,269.37	159,959.65	.....	2,968,888.63	3,240,117.65
(b) For other silver deposits	.....	125,738.58	.....	310.51	126,049.09
(c) For silver certificates[7]	.....	220,256.06	.....	141,182,368.43	141,402,624.49
	111,269.37	505,954.29	.....	144,151,567.57	144,768,791.23
(3) Silver sold for industrial use, medals, etc	27,692.56	.....	.....	8,696,816.97	8,724,509.53
(4) Transfers to other Mint institutions[3]	3,821,062.66	70,446,865.70	16,509,655.75	55,342,155.60	145,623,868.48
(5) Other[8]	129,543.21	.....	68,304.40	11,433.91	209,281.52
Total decreases	101,768,463.60	70,952,819.99	121,890,749.82	208,201,974.05	502,318,136.23
4. Silver bullion held at close of calendar year 1964:					
(1) At $1.29+ as security for silver certificates	59,156,603.88	354,350,385.38	20,676,716.13	690,705,063.60	[9] 1,125,384,640.22
(2) At $1.29+ for coinage or sale	888,052.69	.....	1,272,465.96	175,859.07	2,336,377.72
(3) At cost value	259,431.24	6,159,761.16	3,445,770.46	2,007,698.77	11,872,661.63
Total holdings[1]	60,304,087.81	360,510,146.54	25,394,952.55	692,888,621.44	[9] 1,139,593,679.57

[1] Does not include 64,751,316.12 fine ounces of Treasury silver valued at $83,718,873.72 held by other U.S. Government agencies during the calendar year 1964.
[2] Includes old jewelry and various other forms of scrap purchased as "bullion ordinary" and also exchanged for bars.
[3] Includes physical and book transfers with adjustments for items in transit in total column (Item 2 (5) Total includes 659,372.96 ounces valued at $852,522.61 not in detail. Item 3 (4) Total column excludes 495,871.23 ounces valued at $641,126.43 in detail; and New York excludes 659,372.96 ounces valued at $852,522.61).
[4] Includes mutilated coins purchased as bullion, operative recoveries, settlement surplus, silver in certain gold deposits, and miscellaneous items not otherwise classified.
[5] Includes lend-lease silver returns by Government of India in December 1964 amounting to 324,809.08 ounces valued at $230,975.35.
[6] The number of silver coins manufactured totaled 1,406,569,636 pieces with face value of $280,863,723.70 (See Table 13 for details).
[7] Issued in accordance with Instructions of Secretary of the Treasury, July 22, 1963, pursuant to Public Law 88-36 of June 4, 1963.
[8] Includes sale of sweeps, operative wastage, etc.
[9] Includes 495,871.23 ounces valued at $641,126.43 not in detail.

TABLE 19.--Silver bullion transactions of the Bureau of the Mint, calendar year 1964, value

(On quantity basis)

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Depository	Total
1. Silver bullion held at beginning of calendar year 1964:					
(1) At $1.29+ as security for silver certificates	$184,031,119.52	$548,607,327.88	$16,585,873.24	$1,148,520,786.23	$1,897,745,106.87
(2) At $1.29+ for coinage or sale	.....	.....	.....	703,797.85	703,797.85
(3) At cost value	1,459,049.61	4,705,233.65	7,422,494.74	3,728,140.54	17,314,918.54
Total holdings[1]	185,490,169.13	553,312,561.53	24,008,367.98	1,152,952,724.62	1,915,763,823.26
2. Increases during the calendar year 1964:					
(1) Deposits of newly mined domestic silver (all unrefined)	.....	11,825.61	4,298.92	.22	16,124.75
(2) Deposits of scrap from domestic sources[2]	173,963.57	258,212.99	28,541.94	4,022,473.23	4,483,191.73
(3) Recoinage bullion from uncurrent U.S. silver dollars	16,049.25	.....	39,169.16	.....	55,218.41
(4) Recoinage bullion from uncurrent U.S. silver subsidiary coins	242,495.28	.....	387,934.95	.....	630,430.23
(5) Transfers from other Mint institutions[3]	22,305,359.95	455,596.45	159,881,354.92	4,249,075.63	187,743,909.56
(6) Other[4]	41,540.68	162,288.52	62,099.43	[5] 232,378.14	498,306.77
Total increases	22,779,408.73	887,923.57	160,403,399.32	8,503,927.22	193,427,181.45
3. Decreases during the calendar year 1964:					
(1) Processed into U.S. silver subsidiary coins[6]	125,633,438.57	.....	132,151,426.18	.....	257,784,864.75
(2) Silver bars, etc. exchanged for silver or silver certificates:					
(a) For deposits of scrap silver from domestic sources	143,537.46	206,347.99	.....	3,829,866.09	4,179,751.54
(b) For other silver deposits	.....	162,202.82	.....	223.12	162,425.94
(c) For silver certificates[7]	.....	284,966.00	.....	182,539,120.00	182,824,086.00
	143,537.46	653,516.81	.....	186,369,209.21	187,166,263.48
(3) Silver sold for industrial use, medals, etc	27,269.82	.....	.....	9,495,274.81	9,522,544.63
(4) Transfers to other Mint institutions[3]	4,539,306.43	90,946,417.98	21,345,817.53	71,553,494.05	187,743,909.56
(5) Other[8]	94,945.77	.....	48,973.10	9,429.65	153,348.52
Total decreases	130,438,498.05	91,599,934.79	153,546,216.81	267,427,407.72	642,370,930.94
4. Silver bullion held at close of calendar year 1964:					
(1) At $1.29+ as security for silver certificates	76,485,305.62	458,149,801.66	26,733,531.91	893,032,467.55	[9] 1,455,042,233.17
(2) At $1.29+ for coinage or sale	1,148,189.31	.....	1,645,208.54	227,373.31	3,020,771.16
(3) At cost value	197,584.88	4,450,748.65	2,486,810.04	1,621,925.87	8,757,069.44
Total holdings[1]	77,831,079.81	462,600,550.31	30,865,550.49	894,881,766.73	[9] 1,466,820,073.77

See Table 18 for footnotes.

TABLE 20. --Analysis of monetary assets and liabilities of the Bureau of the Mint on December 31, 1964

Item	Philadelphia Mint	San Francisco Assay Office	Denver Mint	New York Assay Office and West Point Depository	Fort Knox Depository	Total
ASSETS						
Gold bullion	$1,707,371.38	$336,446,759.97	$2,399,386,882.11	$803,884,789.65	$11,475,808,223.26	$15,017,234,026.37
Silver bullion	[1] 78,471,079.81	462,600,550.31	[2] 32,416,596.95	[3] 893,331,846.70	.....	1,466,820,073.77
Silver coin	163,235.18	1,972,944.00	34,949.15	.....	.....	2,171,128.33
Minor coin	19,536.65	174,187.72	11,526.29	.....	.....	205,250.66
Unclassified cash	21,760.11	399.74	2,943.55	8,034.63	.....	33,138.03
Minor coinage metal	1,680,954.98	.....	[4] 1,585,468.91	.....	.....	3,266,423.89
Reimbursable losses on melted coin	.....	.....	5,008.79	.....	.....	5,008.79
Total assets	[1] 82,063,938.11	801,194,841.74	[5] 2,433,443,375.75	[3] 1,697,224,670.98	11,475,808,223.26	16,489,735,049.84
LIABILITIES						
Bullion fund	[1] 79,671,525.48	801,194,841.74	[2] 2,430,896,566.52	[3] 1,697,224,670.98	11,475,808,223.26	16,484,795,827.98
Minor coinage metal fund	765,313.08	.....	[4] 1,420,927.88	.....	.....	2,186,240.96
Undeposited receipts	691,921.00	.....	949,814.03	.....	.....	1,641,735.03
Accounts payable	935,178.55	.....	176,067.32	.....	.....	1,111,245.87
Total liabilities	[1] 82,063,938.11	801,194,841.74	[5] 2,433,443,375.75	[3] 1,697,224,670.98	11,475,808,223.26	16,489,735,049.84

[1] Includes in-transit item valued at $640,000.00.
[2] Includes in-transit item valued at $1,551,046.06.
[3] Excludes $1,549,920.03 for which credit has not been taken.
[4] Includes in-transit item valued at $101,492.56.
[5] See footnotes 2 and 4.

TABLE 21.--Total number of Benjamin Franklin-Liberty Bell design half dollars manufactured by the United States Mints[1]

Calendar year	Number of pieces			
	Philadelphia Mint[2]	Denver Mint	San Francisco Mint	Total
1948	3,006,814	4,028,600	.....	7,035,414
1949	5,614,000	4,120,600	3,744,000	13,478,600
1950	7,793,509	8,031,600	.....	15,825,109
1951	16,859,602	9,475,200	13,696,000	40,030,802
1952	21,274,073	25,395,600	5,526,000	52,195,673
1953	2,796,920	20,900,400	4,148,000	27,845,320
1954	13,421,503	25,445,580	4,993,400	43,860,483
1955	2,876,381	.....	.....	2,876,381
1956	4,701,384	.....	.....	4,701,384
1957	6,361,952	19,966,850	.....	26,328,802
1958	4,917,652	23,962,412	.....	28,880,064
1959	7,349,291	13,053,750	.....	20,403,041
1960	7,715,602	18,215,812	.....	25,931,414
1961	11,318,244	20,276,442	.....	31,594,686
1962	12,932,019	35,473,281	.....	48,405,300
1963	25,239,645	67,069,292	.....	92,308,937
Total	154,178,591	295,415,419	32,107,400	481,701,410

[1] The obverse and reverse of the coin were designed by the late John R. Sinnock, Chief Sculptor and Engraver of the Mint. The coin was first minted and issued in April 1948 and coined through December 31, 1963.
[2] Includes proof coins 1950-1963.

TABLE 22.--Number of John F. Kennedy design half dollars manufactured by United States Mints, February 1964 - June 1965[1]

Month	Philadelphia Mint[2]	Denver Mint	Total
February 1964	7,184,000	10,088,000	17,272,000
March 1964	13,355,372	14,740,004	28,095,376
April 1964	5,316,748	8,298,000	13,614,748
May 1964	9,298,463	8,750,000	18,048,463
June 1964	9,430,280	7,255,604	16,685,884
July 1964	2,834,905	7,114,000	9,948,905
August 1964	4,968,015	8,234,000	13,202,015
September 1964	6,096,585	10,946,000	17,042,585
October 1964	5,732,701	11,494,000	17,226,701
November 1964	9,629,544	11,358,000	20,987,544
December 1964	17,552,153	16,134,000	33,686,153
Total calendar year 1964	91,398,766	114,411,608	205,810,374
January 1965	12,452,000	10,810,000	23,262,000
February 1965	7,218,000	5,054,000	12,272,000
March 1965	6,216,000	5,406,000	11,622,000
April 1965	9,602,000	5,476,000	15,078,000
May 1965	6,118,000	6,182,000	12,300,000
June 1965	4,708,000	3,286,358	7,994,358
Total	137,712,766	150,625,966	288,338,732

[1] The Kennedy half dollar, authorized by Public Law 88-256 approved Dec. 30, 1963, was first coined at the Philadelphia and Denver Mints on February 11, 1964. Public distribution of the coin began on March 24, 1964.
[2] Includes proof coins manufactured during 1964.

TABLE 23.--Bullion value of the silver dollar and commercial ratio of silver to gold

Calendar year	Bullion value of the silver dollar[1]	Commercial ratio of silver to gold[2]
1950	$0.57422	47.14
1951	.69189	39.12
1952	.65762	41.16
1953	.65953	41.04
1954	.66001	41.01
1955	.68981	39.24
1956	.70319	38.50
1957	.70314	38.50
1958	.68939	39.27
1959	.70609	38.34
1960	.70743	38.27
1961	.71575	37.82
1962	.84019	32.22
1963	.99031	27.34
1964	1.00105	27.04

[1] Based on fine silver content of the standard silver dollar (371.25 grains or 0.7734375 fine ounce) and commercial price of silver per fine ounce.
[2] Based on commercial price of silver per fine ounce and the monetary value of gold ($35 per fine ounce).

TABLE 24.--Monetary value of gold in the United States since establishment of the monetary system under the Constitution in 1792

Legislative reference	Number of grains of standard gold in one dollar	Fineness (thousandths)	Number of grains of pure gold in one dollar	Value of one fine troy ounce of gold (480 grains)
Act of Apr. 2, 1792	27	916 2/3	24.75	$19.39393939
Act of June 28, 1834	25.8	899.225	23.2	$20.68965517
Act of Jan. 18, 1837	25.8	900	23.22	$20.67183462
Act of Feb. 12, 1873	25.8	900	23.22	$20.67183462
Act of Mar. 14, 1900	25.8	900	23.22	$20.67183462
Proclamation of Jan. 31, 1934, issued pursuant to act of May 12, 1933, and Gold Reserve Act of Jan. 30, 1934	15 5/21 (15.23809524)	900	13.71428572	$35.00

TABLE 25.--Summary of uncurrent zinc-coated steel one-cent coins withdrawn from circulation, by fiscal year[1]

Face value

Fiscal year	Withdrawn by Mint--			Total
	Philadelphia	San Francisco[2]	Denver	
1945	$6,902.81	.....	.....	$6,902.81
1946	7,145.90	.....	.....	7,145.90
1947	13,795.10	.....	.....	13,795.10
1948	43,317.89	$8,686.02	.....	52,003.91
1949	80,705.90	8,613.33	$68,446.36	157,765.59
1950	156,558.91	72,063.98	62,651.50	291,274.39
1951	127,513.79	44,985.54	79,426.40	251,925.73
1952	66,762.23	8,005.12	67,963.13	142,730.48
1953	52,924.15	11,618.90	41,375.65	105,918.70
1954	43,537.53	12,924.99	.....	56,462.52
1955	68,745.24	10,065.74	58,340.13	137,151.11
1956	50,048.66	.....	52,562.98	102,611.64
1957	29,752.38	.....	35,684.79	65,437.17
1958	34,956.91	.....	33,085.33	68,042.24
1959	28,912.21	.....	34,434.40	63,346.61
1960	27,811.77	.....	21,448.47	49,260.24
1961	9,054.69	.....	15,993.62	25,048.31
1962	7,441.41	.....	11,779.45	19,220.86
1963	3,769.03	.....	5,539.13	9,308.16
1964	3,531.48	.....	.....	3,531.48
1965	1,440.33	.....	.....	1,440.33
Total 1945-65	864,628.32	176,963.62	588,731.34	1,630,323.28

[1] Zinc-coated steel 1-cent coins were manufactured during the calendar year 1943. The total coinage and issue amounted to 1,093,838,670 pieces with face value of $10,938,386.70. The amount outstanding of June 30, 1965 amounts to 930,806,342 pieces with face value of $9,308,063.42.
[2] Uncurrent coins were not received at San Francisco after the fiscal year 1955.

TABLE 26.--Five-cent copper-silver-manganese coins: Silver bullion allocated for manufacture into coins; coins produced and issued, by Mint; and uncurrent coins withdrawn from monetary use, by Mint

NOTE.--All U. S. 5-cent coins manufactured from Oct. 1, 1942 through Dec. 31, 1945 inclusive, were composed of an alloy of 56% copper, 35% silver, and 9% manganese, with standard weight of an individual coin, 77.16 grains. Thus the silver content is 27.006 grains or 0.0562625 fine troy ounce in the 0.16075 troy ounce of alloy per coin. Measurements of a coin are 0.835 inch for the diameter and 0.078 inch for the thickness.[1]

Fiscal year	Silver bullion allocated from Silver Purchase Act silver		Silver bullion manufactured into 5-cent coins			
	Fine ounces	Cost value	Fine ounces	Cost value	Face value	Number of pieces produced
1943.....	29,994,258.28	$13,997,209.83	17,138,954.71	$7,998,085.96	$15,304,230.00	306,084,600
1944.....	15,000,000.00	6,999,587.97	14,151,572.32	6,604,003.13	12,681,500.00	253,630,000
1945.....	1,000,000.00	466,666.66	8,728,872.41	4,073,372.95	7,781,355.00	155,627,100
1946.....	2,705,289.90	1,262,448.62	8,680,148.74	4,050,451.04	7,729,100.00	154,582,000
Total..	48,699,548.18	22,725,913.08	48,699,548.18	22,725,913.08	43,496,185.00	869,923,700

Fiscal year	Coins produced and issued for circulation, by Mint[2]					
	Philadelphia	Denver	San Francisco	Total pieces	Total face value	Standard gross weight--Troy ounces[3]
1943.....	216,594,600	.....	89,490,000	306,084,600	$15,304,230.00	49,203,099
1944.....	161,678,000	30,442,000	61,510,000	253,630,000	12,681,500.00	40,771,023
1945.....	108,748,100	29,519,000	17,360,000	155,627,100	7,781,355.00	25,017,056
1946.....	80,603,000	24,800,000	49,179,000	154,582,000	7,729,100.00	24,849,057
Total..	567,623,700	84,761,000	217,539,000	869,923,700	43,496,185.00	139,840,235

Fiscal year	Uncurrent coins withdrawn from monetary use, by Mint[4]					
	Philadelphia	Denver	San Francisco[5]	Total pieces	Total face value	Silver content --Fine ounces
1948.....	690,392	153,201	332,023	1,175,616	$58,780.80	65,812.63
1949-52....	.....	.....	.....	.....	.....	.....
1953.....	1,879,987	588,353	734,521	3,202,861	160,143.05	179,300.64
1954.....	.....	.....	.....	.....	.....	.....
1955.....	500,930	272,234	255,822	1,028,986	51,449.30	57,604.08
1956.....	229,171	273,540	.....	502,711	25,135.55	28,142.46
1957.....	170,363	519,863	.....	690,226	34,511.30	38,639.82
1958.....	192,286	418,815	.....	611,101	30,555.05	34,210.29
1959.....	159,873	197,179	.....	357,052	17,852.60	19,988.27
1960.....	230,153	415,952	.....	646,105	32,305.25	36,169.86
1961.....	145,074	535,841	.....	680,915	34,045.75	38,118.57
1962.....	121,157	753,984	.....	875,141	43,757.05	48,991.62
1963.....	140,092	549,524	.....	689,616	34,480.80	38,605.67
1964.....	81,122	348,596	.....	429,718	21,485.90	24,056.21
1965.....	57,105	49,764	.....	106,869	5,343.45	5,982.68
Total..	4,597,705	5,076,846	1,322,366	10,996,917	549,845.85	615,622.80

[1] The design on the 5-cent copper-silver-manganese is the same as that appearing on all cupronickel 5-cent coins made since Oct. 1938. On the obverse is a portrait likeness of Thomas Jefferson and on the reverse, a likeness of Monticello, his historic Virginia home. The designer was Felix Schlag.

[2] The position of the Mint mark on the 5-cent copper-silver-manganese is in the field above the dome of Monticello, on coins made at the three Mints. For the first and only time to date a Mint mark appears on a coin struck at Philadelphia (letter P). All other coins made at Philadelphia are distinguished by the absence of a Mint mark. On the 5-cent cupronickel coin the Mint mark appears at the right of Monticello (D for Denver and S for San Francisco).

[3] Represents computed gross weight. The legal weight tolerance (above or below) on individual pieces is 3 grains.

[4] Represents coins unfit for further circulation which were returned to the Mints, melted, and cast into bar form.

[5] Uncurrent coins were not received at San Francisco after the fiscal year 1955.

TABLE 27.--Summary of silver receipts, issues, and balances, fiscal years 1934 through 1965[1]

Opening balances and receipts	Fine ounces	Value
Balances June 30, 1933:		
Silver bullion ordinary	13,831,051.05	$6,588,389.06
Recoinage silver	13,925,846.32	19,251,049.27
	27,756,897.37	25,839,438.33
Receipts (July 1, 1933 - June 30, 1965):		
Silver purchase act silver (Act of 6/19/34, 48 Stat. 1178)	2,048,490,530.48	1,027,637,216.75
Nationalized silver (Executive Order 6814, 8/9/34)	113,032,915.78	56,528,353.08
Foreign debt silver (Title III, Act of 5/12/33, 48 Stat. 31, 53)	22,734,824.35	11,367,412.18
Newly-mined domestic silver:		
Executive proclamation silver (E.P. 2067 of 12/21/33 and amendments)	301,226,723.50	216,588,371.53
Act of July 6, 1939 (53 Stat. 998)	206,287,208.67	146,693,123.94
Act of July 31, 1946 (60 Stat. 750)	376,686,164.80	340,919,995.60
	884,200,096.97	704,201,491.07
Silver bullion ordinary	400,988,097.36	284,906,292.14
Recoinage bullion from uncurrent subsidiary silver coins	62,569,407.27	93,302,502.03
Recoinage bullion from uncurrent silver dollars	45,936,330.61	61,818,618.00
Seigniorage accruing from revaluation of silver	.....	1,172,867,644.88
Total receipts	3,577,952,202.82	3,412,629,530.13
Total silver available fiscal years 1934 through 1965	3,605,709,100.19	3,438,468,968.46

Issues and closing balances	Fine ounces	Value
Issues (July 1, 1933 - June 30, 1965):		
Silver processed into United States coins	1,651,796,149.78	$1,470,476,928.68
Silver lend-leased to foreign governments	410,814,344.19	191,713,360.44
Silver sold:		
Under Green Act (Act of 7/12/43, 57 Stat. 520)	167,380,240.92	78,110,778.17
Under Act of July 31, 1946 (60 Stat. 750)	138,971,143.85	103,749,218.68
Other	22,894,591.09	22,572,484.29
	329,245,975.86	204,432,481.14
Wasted in operations	776,236.67	448,105.37
Melting losses - uncurrent coin	.....	9,501,911.48
Silver used for redemption of silver certificates	213,242,811.79	275,709,453.00
Total issues	2,605,875,518.29	2,152,282,240.11
Balances as of June 30, 1965:		
Silver bullion securing certificates:		
Bureau of the Mint	915,517,519.32	1,183,697,839.30
Other federal agencies	64,751,316.12	83,718,873.72
	980,268,835.44	1,267,416,713.02
Silver bullion for coinage or sale at $1.29+	7,673,434.69	9,921,208.46
Silver bullion ordinary	11,891,311.77	8,848,806.87
Total balances	999,833,581.90	1,286,186,728.35
Total issues and balances	3,605,709,100.19	3,438,468,968.46

[1] See pages 215-253 of the Annual Report of the Director of the Mint Fiscal Year Ended June 30, 1964 for a detailed summary by year, fiscal years 1934 through 1964.

TABLE 28.--Summary of foreign coinage by United States Mints, by country, through Dec. 31, 1964

Country	Number of pieces produced	Country	Number of pieces produced
Argentina	64,058,334	Hawaii[1]	1,950,000
Australia	168,000,000	Honduras	106,529,500
Belgian Congo	25,000,000	Indo-China	135,270,000
Belgium	25,000,000	Korea	295,000,000
Bolivia	30,000,000	Liberia	20,452,500
China	39,720,096	Mexico	91,076,840
Colombia	133,461,872	Netherlands	562,500,000
Costa Rica	70,438,820	Neth. E. Indies	1,716,368,000
Cuba	496,559,888	Nicaragua	26,080,000
Curacao	12,000,000	Panama (Republic)	20,624,880
Dominican Republic	53,920,207	Peru	136,045,669
Ecuador	214,451,060	Philippines	1,512,983,332
El Salvador	161,695,351	Poland	6,000,000
Ethiopia	375,433,730	Saudi Arabia	124,712,574
Fiji	4,800,000	Siam (Thailand)	20,000,000
France	50,000,000	Surinam (Neth. Guiana)	21,195,000
Greenland	100,000	Syria	7,350,000
Guatemala	7,835,000	Venezuela	306,762,944
Haiti	44,500,000	Total (37 countries)	7,087,875,597

[1] Coined prior to annexation to the United States. United States coins used thereafter. Hawaii became the fiftieth State of the Union on August 21, 1959.

TABLE 29.--Summary of foreign coinage by United States Mints, by calendar year, through Dec. 31, 1964

Calendar year	Number of pieces produced	Calendar year	Number of pieces produced
July 1, 1875-Dec. 31, 1905	155,896,973	1936	32,350,000
1906	10,204,504	1937	26,800,000
1907	45,253,047	1938	48,579,644
1908	29,645,359	1939	15,725,000
1909	11,298,981	1940	33,170,000
1910	7,153,818	1941	208,603,500
1911	7,794,406	1942	307,737,000
1912	6,244,348	1943	186,682,000
1913	7,309,258	1944	788,498,000
1914	17,335,005	1945	1,802,376,008
1915	55,485,190	1946	504,528,000
1916	37,441,328	1947	277,376,094
1917	25,208,497	1948	21,950,000
1918	60,102,000	1949	156,687,944
1919	100,269,195	1950	2,000,000
1920	99,002,334	1951	25,450,000
1921	55,094,352	1952	45,857,000
1922	7,863,030	1953	193,673,000
1923	4,369,000	1954	19,015,000
1924	12,663,196	1955	67,550,000
1925	13,461,000	1956	38,793,500
1926	14,987,000	1957	59,264,000
1927	3,650,000	1958	152,575,000
1928	16,701,000	1959	129,647,000
1929	34,980,000	1960	238,400,000
1930	3,300,120	1961	148,500,000
1931	4,498,020	1962	256,485,000
1932	9,756,096	1963	293,515,000
1933	15,240,000	1964	.....
1934	24,280,000		
1935	109,600,850	Total	7,087,875,597

Note:--For a detailed record of foreign coinage production by United States Mints for other countries from 1876 through 1962, see pages 63-89 in the 1963 Annual Report. For annual data for the calendar year 1963 see page 48, Table 14, in the 1964 Annual Report.

TABLE 30.--Introduction

The Act of Congress approved April 2, 1792, provided for coinage of gold, silver, and copper, and established the first United States Mint in the Nation's Capital, then the city of Philadelphia. Subsequent legislation set up branch Mints in various parts of the country. Headquarters were moved from Philadelphia to Washington, D. C. when the Act of Congress approved February 12, 1873, established the several Mints and Assay Offices as a Bureau of the Treasury Department.

The annual coinage data represent coins of both regular and commemorative designs including those reserved for assay purpose. In addition, regular designs include uncirculated and proof coins as well as those issued for general circulation. Proof coins have been minted only at the Philadelphia Mint.

Location of Mints	Acts establishing the Mints	Distinguishing Mint marks[1]	Period covered in coinage data
Philadelphia, Pennsylvania	April 2, 1792	None, except letter P on copper-silver-manganese 5 cents.	1793-1964.
Denver, Colorado	April 21, 1862	D	1906-1964.
San Francisco, California[2]	July 3, 1852	S	1854-Mar.31, 1955.
New Orleans, Louisiana	March 3, 1835	O	1838-1861, 1879-1909.
Carson City, Nevada	March 3, 1863	CC	1870-1893.
Charlotte, North Carolina	March 3, 1835	C	1838-1861.
Dahlonega, Georgia	do	D	1838-1861.

[1] See also p. 183. [2] See also pp. 5, 183, and 192.

Directors of the United States Mint since April 2, 1792

	Director of the Mint	Appointment by President	Date of Senate confirmation	Term of service[1] From	Term of service[1] To
1.	David Rittenhouse	George Washington..	Apr. 14, 1792	Apr. 1792	June 1795.
2.	Henry William de Saussure	.....do.....	([2])	July 1795	Oct. 1795.
3.	Elias Boudinot	.....do.....	Dec. 15, 1795	Oct. 1795	July 1805.
4.	Robert Patterson	Thomas Jefferson...	Dec. 23, 1805	Jan. 1806	July 1824.
5.	Samuel Moore	James Monroe.....	Jan. 3, 1825	July 1824	1835.
6.	Robert Maskell Patterson[3]	Andrew Jackson.....	Jan. 5, 1835	May 1835	July 1851.
7.	George N. Eckert	Millard Fillmore...	Aug. 30, 1852	July 1851	Apr. 1853.
8.	Thomas M. Pettit	Franklin Pierce....	Mar. 31, 1853	Apr. 1853	June 1853.[4]
9.	James Ross Snowden	.....do.....	Feb. 4, 1854	June 1853	1861.
10.	James Pollock	Abraham Lincoln....	July 15, 1861	Spring 1861	Fall 1866.
11.	Henry Richard Linderman	Andrew Johnson.....	Apr. 2, 1867	Apr. 1867	May 1869.
12.	James Pollock[5]	Ulysses S. Grant...	Apr. 20, 1869	Spring 1869	Spring 1873.
13.	Henry Richard Linderman[5]	.....do.....	Dec. 8, 1873	Apr. 1873	Dec. 1878.
14.	Horatio C. Burchard	Rutherford B. Hayes	Feb. 19, 1879	Feb. 1879	1885.
15.	James P. Kimball	Grover Cleveland...	May 6, 1886	Dec. 1885	1889.
16.	Edward O. Leech	Benjamin Harrison..	Dec. 19, 1889	Oct. 1889	1893.
17.	Robert E. Preston	Grover Cleveland...	Jan. 12, 1894	Nov. 1893	Feb. 1898.
18.	George E. Roberts	William McKinley...	Jan. 26, 1898	Feb. 1898	July 1907.
19.	Frank A. Leach	Theodore Roosevelt.	Feb. 12, 1908	Sept. 1907	Nov. 1909.
20.	A. Piatt Andrew	William H. Taft....	Aug. 5, 1909	Nov. 1909	June 1910.[6]
21.	George E. Roberts[5]	.....do.....	Dec. 14, 1910	July 1910	Nov. 1914.
22.	Robert W. Woolley	Woodrow Wilson.....	Mar. 3, (legislative day of Feb. 19), 1915	Mar. 1915	July 1916.
23.	F.J.H. von Engelken	.....do.....	Aug. 17, (legislative day of Aug. 16), 1916	Sept. 1916	Feb. 1917.
24.	Raymond T. Baker	.....do.....	Mar. 15, 1917	Mar. 1917	Mar. 1922.
25.	F.E. Scobey	Warren G. Harding..	Mar. 7, 1922	Mar. 1922	Sept. 1923.
26.	Robert J. Grant	Calvin Coolidge....	Dec. 18, 1923	Nov. 1923	May 1933.
27.	Nellie Tayloe Ross	Franklin D. Roosevelt	Apr. 28 (legislative day of Apr. 17), 1933.	May 1933	Apr. 1953.
28.	William H. Brett	Dwight D. Eisenhower	July 1, 1954	July 1954	Jan. 1961.
29.	Eva Adams	John F. Kennedy....	Sept. 23, 1961	Oct. 1961	

[1] Beginning date of service preceding date of confirmation indicates appointment made, in most instances, while the Senate was in recess.
[2] The Senate was in recess during entire term of service.
[3] Son of the fourth Director.
[4] Deceased.
[5] Former Director (see above).
[6] Became Assistant Secretary of the Treasury on June 8, 1910.

I.--United States coinage by Mint, class, denomination, and number of pieces, from organization through Dec. 31, 1964--Includes regular issues, proof and commemorative coins

Class and denomination	Philadelphia 1793-1964	Denver 1906-64	San Francisco 1854-March 1955	New Orleans 1838-61, 1879-1909	Carson City 1870-93	Charlotte 1838-61	Dahlonega 1838-61	Total 1793-1964
Gold:								
50 dollars	.....	.....	3,019	.....	.....	.....	.....	3,019
Double eagles	71,180,127	13,108,000	88,134,526	818,775	864,178	.....	.....	174,105,606
Eagles	34,554,932	5,909,280	14,558,406	2,361,089	299,778	.....	.....	57,683,485
Half eagles	41,969,621	5,292,660	28,028,008	923,725	709,617	881,027	1,107,211	78,911,869
3 dollars	452,572	.....	62,100	24,000	.....	.....	1,120	539,792
Quarter eagles	16,965,555	1,081,680	754,519	1,209,263	.....	217,966	197,850	20,426,833
Dollars	18,573,821	.....	115,266	1,004,000	.....	109,138	72,529	19,874,754
Total gold	183,696,628	25,391,620	131,655,844	6,340,852	1,873,573	1,208,131	1,378,710	351,545,358
Silver:								
Dollars	423,758,122	47,406,100	183,504,073	187,111,529	13,881,329	.....	.....	855,661,153
Trade dollars	5,107,524	.....	26,647,000	.....	4,211,400	.....	.....	35,965,924
Half dollars	761,766,275	513,320,280	211,637,554	80,234,676	5,308,627	.....	.....	1,572,267,412
Quarter dollars	1,997,841,704	1,215,513,992	282,500,664	60,343,000	10,316,792	.....	.....	3,566,516,152
20 cents	56,710	.....	1,155,000	.....	143,290	.....	.....	1,355,000
Dimes	4,208,450,972	3,460,666,410	821,404,689	68,079,906	20,901,108	.....	.....	8,579,503,085
Half dimes	78,975,838	.....	2,382,000	16,246,550	.....	.....	.....	97,604,388
3 cents	42,016,240	.....	.....	720,000	.....	.....	.....	42,736,240
Total silver	7,517,973,385	5,236,906,782	1,529,230,980	412,735,661	54,762,546	.....	.....	14,751,609,354
Minor:								
5 cents	4,269,809,499	2,825,517,950	566,301,900	.....	.....	.....	.....	7,661,629,349
3 cents	31,378,316	.....	.....	.....	.....	.....	.....	31,378,316
2 cents	45,601,000	.....	.....	.....	.....	.....	.....	45,601,000
1 cent	20,886,605,279	19,076,769,300	2,757,165,004	.....	.....	.....	.....	42,720,539,583
Half cent	7,981,822	.....	.....	.....	.....	.....	.....	7,981,822
Total minor	25,241,375,916	21,902,287,250	3,323,466,904	.....	.....	.....	.....	50,467,130,070
Total coinage	32,943,045,929	27,164,585,652	4,984,353,728	419,076,513	56,636,119	1,208,131	1,378,710	65,570,284,782

I. --United States coinage by Mint, class, denomination, and face value, from organization through Dec. 31, 1964--Includes regular issues, proof and commemorative coins

Class and denomination	Philadelphia	Denver	San Francisco	New Orleans	Carson City	Charlotte	Dahlonega	Total
Gold:								
50 dollars	.....	.....	$150,950.00	.....	.....	.....	.....	$150,950.00
Double eagles	$1,423,602,540.00	$262,160,000.00	1,762,690,520.00	$16,375,500.00	$17,283,560.00	.....	.....	3,482,112,120.00
Eagles	345,549,320.00	59,092,800.00	145,584,060.00	23,610,890.00	2,997,780.00	.....	.....	576,834,850.00
Half eagles	209,848,105.00	26,463,300.00	140,140,040.00	4,618,625.00	3,548,085.00	$4,405,135.00	$5,536,055.00	394,559,345.00
3 dollars	1,357,716.00	.....	186,300.00	72,000.00	.....	.....	3,360.00	1,619,376.00
Quarter eagles	42,413,887.50	2,704,200.00	1,886,297.50	3,023,157.50	.....	544,915.00	494,625.00	51,067,082.50
Dollars	18,573,821.00	.....	115,266.00	1,004,000.00	.....	109,138.00	72,529.00	19,874,754.00
Total gold	2,041,345,389.50	350,420,300.00	2,050,753,433.50	48,704,172.50	23,829,425.00	5,059,188.00	6,106,569.00	4,526,218,477.50
Silver:								
Dollars	423,758,122.00	47,406,100.00	183,504,073.00	187,111,529.00	13,881,329.00	.....	.....	855,661,153.00
Trade dollars	5,107,524.00	.....	26,647,000.00	.....	4,211,400.00	.....	.....	35,965,924.00
Half dollars	380,883,137.50	256,660,140.00	105,818,777.00	40,117,338.00	2,654,313.50	.....	.....	786,133,706.00
Quarter dollars	499,460,426.00	303,878,498.00	70,625,166.00	15,085,750.00	2,579,198.00	.....	.....	891,629,038.00
20 cents	11,342.00	.....	231,000.00	.....	28,658.00	.....	.....	271,000.00
Dimes	420,845,097.20	346,066,641.00	82,140,468.90	6,807,990.60	2,090,110.80	.....	.....	857,950,308.50
Half dimes	3,948,791.90	.....	119,100.00	812,327.50	.....	.....	.....	4,880,219.40
3 cents	1,260,487.20	.....	.....	21,600.00	.....	.....	.....	1,282,087.20
Total silver	1,735,274,927.80	954,011,379.00	469,085,584.90	249,956,535.10	25,445,009.30	.....	.....	3,433,773,436.10
Minor:								
5 cents	213,490,474.95	141,275,897.50	28,315,095.00	.....	.....	.....	.....	383,081,467.45
3 cents	941,349.48	.....	.....	.....	.....	.....	.....	941,349.48
2 cents	912,020.00	.....	.....	.....	.....	.....	.....	912,020.00
1 cent	208,866,052.79	190,767,693.00	27,571,650.04	.....	.....	.....	.....	427,205,395.83
Half cent	39,909.11	.....	.....	.....	.....	.....	.....	39,909.11
Total minor	424,249,806.33	332,043,590.50	55,886,745.04	.....	.....	.....	.....	812,180,141.87
Total coinage	4,200,870,123.63	1,636,475,269.50	2,575,725,763.44	298,660,707.60	49,274,434.30	5,059,188.00	6,106,569.00	8,772,172,055.47

II. --Authority for United States coinage, with class, denomination, standard weight, fineness, and total coined

GOLD COINAGE[1]

Denomination	Authorizing act	Standard weight	Standard fineness	Total coined to 1933 (May 1)	
		Grains	*Thousandths*	*Pieces*	*Face value*
50 dollars commemorative, Panama-Pacific International Exposition:					
Octagonal	Jan. 16, 1915	1,290	900	1,509	$75,450.00
Round	....do.....	1,290	900	1,510	75,500.00
Double eagle ($20)	Mar. 3, 1849	516	900	174,105,606	3,482,112,120.00
Do	Feb. 12, 1873	516	900		
Eagle ($10)	Apr. 2, 1792	270	916 2/3	57,683,485	576,834,850.00
Do	June 28, 1834	258	899.225		
Do	Jan. 18, 1837	258	900		
Do	Feb. 12, 1873	258	900		
Half eagle ($5)	Apr. 2, 1792	135	916 2/3	78,911,869	394,559,345.00
Do	June 28, 1834	129	899.225		
Do	Jan. 18, 1837	129	900		
Do	Feb. 12, 1873	129	900		
Quarter eagle ($2.50)[2]	Apr. 2, 1792	67.5	916 2/3	20,216,590	50,541,475.00
Do.[2]	June 28, 1834	64.5	899.225		
Do.[2]	Jan. 18, 1837	64.5	900		
Do.[2]	Feb. 12, 1873	64.5	900		
Quarter eagle ($2.50), commemorative:					
Panama-Pacific International Exposition	Jan. 16, 1915	64.5	900	10,017	25,042.50
Sesquicentennial Exhibition	Mar. 3, 1925	64.5	900	200,226	500,565.00
1 dollars[3]	Feb. 21, 1853 / Feb. 12, 1873	77.4	900	539,792	1,619,376.00
1 dollar[3]	Mar. 3, 1849 / Feb. 12, 1873	25.8	900	19,499,337	19,499,337.00
1 dollar, commemorative:					
Louisiana Purchase Exposition	June 28, 1902	25.8	900	250,258	250,258.00
Lewis and Clark Exposition	Apr. 13, 1904	25.8	900	60,069	60,069.00
Panama-Pacific International Exposition	Jan. 16, 1915	25.8	900	25,034	25,034.00
McKinley memorial	Feb. 23, 1916	25.8	900	30,040	30,040.00
Grant memorial	Feb. 2, 1922	25.8	900	10,016	10,016.00
Total gold	.....	.....	.....	351,545,358	4,526,218,477.50

[1] Sec. 5 of the Gold Reserve Act of Jan. 30, 1934 provides in part as follows: "No gold shall hereafter be coined, and no gold coin shall hereafter be paid out or delivered by the United States * * *. All gold coin of the United States shall be withdrawn from circulation, and, together with all other gold owned by the United States, shall be formed into bars of such weights and degrees of fineness as the Secretary of the Treasury may direct."

[2] Discontinued by act of Apr. 11, 1930.

[3] Discontinued by act of Sept. 26, 1890.

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II.--Authority for United States coinage, with class, denomination, standard weight, fineness, and total coined--Continued

SILVER COINAGE

Denomination	Authorizing act	Standard weight	Standard fineness	Total coined to Dec. 31, 1964	
		Grains	*Thousandths*	*Pieces*	*Face value*
Dollar [1] [2]	Apr. 2, 1792	416	892.44		
Do. [1] [2]	Jan. 18, 1837	412 1/2	900		
Do. [2]	Feb. 28, 1878	412 1/2	900	855,611,127	[2] $855,611,127.00
Do. [2]	July 14, 1890	412 1/2	900		
Do. [2]	Mar. 3, 1891	412 1/2	900		
Do. [2]	Apr. 23, 1918	412 1/2	900		
Trade dollar [3] [4]	Feb. 12, 1873	420	900	35,965,924	35,965,924.00
Dollar, commemorative: Lafayette	Mar. 3, 1899	412 1/2	900	50,026	50,026.00
Half dollar	Apr. 2, 1792	208	892.44		
Do	Jan. 18, 1837	206 1/4	900	1,554,693,396	777,346,698.00
Do	Feb. 21, 1853	192	900		
Do	Feb. 12, 1873	[5] 192.9	900		
Half dollar, commemorative:					
Columbian Exposition	Aug. 5, 1892	192.9	900	5,002,105	2,501,052.50
Panama-Pacific International Exposition	Jan. 16, 1915	192.9	900	60,030	30,015.00
Illinois Centennial	June 1, 1918	192.9	900	100,058	50,029.00
Maine Centennial	May 10, 1920	192.9	900	50,028	25,014.00
Landing of Pilgrims, Tercentennial	May 12, 1920	192.9	900	300,165	150,082.50
Alabama Centennial	May 10, 1920	192.9	900	70,044	35,022.00
Missouri Centennial	Mar. 4, 1921	192.9	900	50,028	25,014.00
Grant	Feb. 2, 1922	192.9	900	100,061	50,030.50
Monroe Doctrine Centennial	Jan. 24, 1923	192.9	900	274,077	137,038.50
Huguenot-Walloon	Feb. 26, 1923	192.9	900	142,080	71,040.00
Stone Mountain	Mar. 17, 1924	192.9	900	2,314,709	1,157,354.50
Battle Lexington-Concord	Jan. 14, 1925	192.9	900	162,099	81,049.50
California Diamond Jubilee	Feb. 24, 1925	192.9	900	150,200	75,100.00
Fort Vancouver	....do.....	192.9	900	50,028	25,014.00
Sesquicentennial Exhibition	Mar. 3, 1925	192.9	900	1,000,528	500,264.00
Battle of Bennington	Feb. 24, 1925	192.9	900	40,034	20,017.00
Oregon Trail	May 17, 1926	192.9	900	264,419	132,209.50
Hawaiian Discovery	Mar. 7, 1928	192.9	900	10,008	5,004.00
Texas Centennial	June 15, 1933	192.9	900	304,193	152,096.50
Daniel Boone Bicentennial	May 26, 1934	192.9	900	108,603	54,301.50
Maryland Tercentennial	May 9, 1934	192.9	900	25,015	12,507.50
Arkansas Centennial	May 14, 1934	192.9	900	120,166	60,083.00
Connecticut Tercentennial	June 21, 1934	192.9	900	25,018	12,509.00
City of Hudson, N. Y.	May 2, 1935	192.9	900	10,008	5,004.00
Providence, R. I., Tercentennial	....do.....	192.9	900	50,034	25,017.00
California-Pacific Exposition	May 3, 1935	192.9	900	430,224	215,112.00
Old Spanish Trail	June 5, 1935	192.9	900	10,008	5,004.00
Columbia, S. C., Sesquicentennial	Mar. 18, 1936	192.9	900	25,023	12,511.50
Cincinnati, Ohio, fiftieth anniversary as music center	Mar. 31, 1936	192.9	900	15,016	7,508.00
Long Island, N. Y., Tercentennial	Apr. 13, 1936	192.9	900	100,053	50,026.50
Great Lakes Exposition--Cleveland, Ohio, Centennial	May 5, 1936	192.9	900	50,030	25,015.00
New Rochelle, N. Y., two hundred and fiftieth anniversary	....do.....	192.9	900	25,015	12,507.50
Bridgeport, Conn., Centennial	May 15, 1936	192.9	900	25,015	12,507.50
Wisconsin Centennial	....do.....	192.9	900	25,015	12,507.50
Swedes' landing in Delaware, Tercentennial	....do.....	192.9	900	25,015	12,507.50
Lynchburg, Va., Sesquicentennial	May 28, 1936	192.9	900	20,013	10,006.50
Albany, N. Y., two hundred and fiftieth anniversary	June 16, 1936	192.9	900	25,013	12,506.50
Elgin, Ill. Centennial	....do.....	192.9	900	25,015	12,507.50
Battle of Gettysburg, seventy-fifth anniversary	....do.....	192.9	900	50,028	25,014.00
Roanoke Island, N. C., three-hundred and fiftieth anniversary	June 24, 1936	192.9	900	50,030	25,015.00
San Francisco-Oakland Bay Bridge	June 26, 1936	192.9	900	100,055	50,027.50
York County, Maine Tercentennial	....do.....	192.9	900	25,015	12,507.50
Battle of Antietam, seventy-fifth anniversary	June 24, 1937	192.9	900	50,028	25,014.00

II.--Authority for United States coinage, with class, denomination, standard weight, fineness, and total coined--Continued

SILVER COINAGE--Continued

Denomination	Authorizing act	Standard weight	Standard fineness	Total coined to Dec. 31, 1964	
		Grains	*Thousandths*	*Pieces*	*Face value*
Half dollar, commemorative--Continued					
Norfolk, Va., Tercentennial of land grant and bicentennial of city	June 28, 1937	192.9	900	25,013	$12,506.50
Iowa Centennial	Aug. 7, 1946	192.9	900	100,057	50,028.50
Booker T. Washington	....do.....	192.9	900	3,167,205	1,583,602.50
Booker T. Washington--George Washington Carver	Sept. 21, 1951 amending act of Aug 7, 1946	192.9	900	2,422,392	1,211,196.00
Quarter dollar	Apr. 2, 1792	104	892.4+		
Do	Jan. 18, 1837	103 1/8	900		
Do	Feb. 21, 1853	96	900	3,566,476,129	891,619,032.25
Do	Feb. 12, 1873	[6] 96.45	900		
Quarter dollar, commemorative:					
Columbian Exposition	Mar. 3, 1893	96.45	900	40,023	10,005.75
20 cents[7]	Mar. 3, 1875	[8] 77.16	900	1,355,000	271,000.00
Dime	Apr. 2, 1792	41.6	892.4+		
Do	Jan. 18, 1837	41 1/4	900		
Do	Feb. 21, 1853	38.4	900	8,579,503,085	857,950,308.50
Do	Feb. 12, 1873	[9] 38.58	900		
Half dime[10]	Apr. 2, 1792	20.8	892.4+		
Do.[10]	Jan. 18, 1837	20 5/8	900	97,604,388	4,880,219.40
Do.[10]	Feb. 21, 1853	19.2	900		
3 cents[10]	Mar. 3, 1851	12 3/8	750		
Do.[10]	Mar. 3, 1853	11.52	900	42,736,240	1,282,087.20
Total silver	.....	.....	.....	14,751,609,354	3,433,773,436.10

[1] Dollar of 1792 discontinued by act of Jan. 18, 1837; dollar 1837 discontinued by act of Feb. 12, 1873.

[2] Silver-dollar coinage:

Act Apr. 2, 1792:		
From 1792 to 1805	$1,439,517	
During 1836	1,000	
		$ 1,440,517
Act Jan. 18, 1837: From 1839 to Feb. 12, 1873		6,590,721
Act Feb. 28, 1878 (Bland-Allison Act)		378,166,793
Act July 14, 1890 (Sherman Act), to date of repeal of purchasing clause thereof Oct. 31, 1893		
	$36,087,285	
Act Nov. 1, 1893, to June 12, 1898	42,139,872	
Act June 13, 1898, war revenue bill	108,800,188	
		187,027,345
Act Mar. 3, 1887 and 1891, trade-dollar conversion		5,078,472
Act Apr. 23, 1918, Pittman Act replacement (represents equivalent number of dollars converted into bullion--259,121,554 for export to India and 11,111,168 for domestic subsidiary coin):		
Old design, since Feb. 21, 1921	$86,730,000	
Peace dollar, since Dec. 21, 1921	183,502,722	
		270,232,722
Act May 12, 1933 (sec. 43), Executive proclamation, Dec. 21, 1933		7,021,528
Act June 19, 1934 (sec. 7), Executive proclamation, Aug. 9, 1934		53,029
Total		855,611,127

[3] Coinage limited to export demand by joint resolution July 22, 1876. Redeemed $7,689,036 at face amount under act Mar. 3, 1887, converted into 5,078,472 standard dollars and $2,889,011 subsidiary silver coin.

[4] Discontinued by act of Mar. 3, 1887.

[5] 12 1/2 grams, or 192.9 grains.

[6] 6 1/4 grams, or 96.45 grains.

[7] Discontinued by act of May 2, 1878.

[8] 5 grams, or 77.16 grains.

[9] 2 1/2 grams, or 38.58 grains.

[10] Discontinued by act of Feb. 12, 1873.

II.--Authority for United States coinage, with class, denomination, standard weight, fineness, and total coined--Continued

MINOR COINAGE

Minor coinage was confined by law to the Mint at Philadelphia until the act of April 24, 1906. Minor coins were first manufactured at the Mint at Philadelphia in 1793, at San Francisco in 1908, and at Denver in 1911)

Denomination	Authorizing act	Standard weight	Standard composition [1]	Total coined to Dec. 31, 1964	
		Grains		*Pieces*	*Face value*
5 cents (nickel)	May 16, 1866	77.16	.....	6,791,705,649	$339,585,282.45
Do	Feb. 12, 1873				
5 cents (silver)	[2]	77.16	.....	869,923,700	43,496,185.00
3 cents (nickel)[3]	Mar. 3, 1865	30	.....	31,378,316	941,349.48
Do[3]	Feb. 12, 1873				
2 cents (bronze)[4]	Apr. 22, 1864	96	.....	45,601,000	912,020.00
Cent (copper)	Apr. 2, 1792	264	.....		
Do	Jan. 14, 1793	208	.....		
Do	[5] Jan. 26, 1796	168	.....	156,288,744	1,562,887.44
Do[6]	Jan. 18, 1837	168	.....		
Cent (nickel)[7]	Feb. 21, 1857	72	.....	200,772,000	2,007,720.00
Cent (bronze)	Apr. 22, 1864				
Do	Feb. 12, 1873	48	.....	36,166,904,169	361,669,041.69
Do*	Sept. 5, 1962				
Cent (zinc-steel)	[8]	41.5	.....	1,093,838,670	10,938,386.70
Do	[8]	42.5	.....		
Cent (copper-zinc)	[9]	48	.....	5,102,736,000	51,027,360.00
Half cent (copper)	Apr. 2, 1792	132	.....		
Do	Jan. 14, 1793	104	.....		
Do	[5] Jan. 25, 1796	84	.....	7,981,822	39,909.11
Do[6]	Jan. 18, 1837	84	.....		
Total minor	.....	.....	.....	50,467,130,070	812,180,141.87
Grand total gold, silver, and minor	.....	.....	.....	65,570,284,782	8,772,172,055.47

[1] Composition--percent:
5 and 3 cents (nickel)--copper, 75; nickel, 25.
5 cents (silver)--copper, 56; silver, 35; manganese, 9.
2 cents (bronze)--copper, 95; tin and zinc, 5.
1 cent (bronze)--copper, 95; tin and zinc, 5, and/or zinc, 5.
1 and 1/2 cent (copper)--pure copper.
1 cent (nickel)--copper, 88; nickel, 12.
1 cent (zinc-steel)--steel, with obverse and reverse sides covered with a coating of not to exceed 0.001 inch zinc.
1 cent (copper-zinc)--copper 95; zinc 5. (See footnote 9)

[2] 5 cents (silver) coined, under provisions of act of Mar. 27, 1942, as amended by act of Dec. 28, 1945 from Oct. 1, 1942, until expiration of authority Dec. 31, 1945.

[3] 3 cents (nickel) discontinued by act of Sept. 26, 1890.

[4] 2 cents (bronze) discontinued by act of Feb. 12, 1873.

[5] Proclamation of the President in conformity with act of Mar. 3, 1795.

[6] Copper cent and half cent discontinued by act of Feb. 21, 1857.

[7] Nickel cent discontinued by act of Apr. 22, 1864.

[8] Zinc-steel cent coined, by orders of Secretary of the Treasury dated Dec. 23, 1942, and May 15, 1943, pursuant to act of Dec. 18, 1942, during calendar year 1943.

[9] Copper-zinc cent coined, by order of Secretary of the Treasury of Dec. 16, 1943, pursuant to act of Dec. 18, 1942, from Jan. 1944 until expiration of authority Dec. 31, 1946.

* Tin was eliminated from the bronze alloy after Sept. 5, 1962 (31 U.S.C. 317). See Exhibits 3 and 4 in the 1962 Annual Report.

EXHIBITS

EXHIBIT 1

COIN SHORTAGE: STATEMENT OF MISS EVA ADAMS, DIRECTOR OF THE MINT, BEFORE THE LEGAL AND MONETARY AFFAIRS SUBCOMMITTEE OF THE HOUSE COMMITTEE ON GOVERNMENT OPERATIONS, FEBRUARY 17, 1965.

Mr. Chairman and Members of the Committee:

We are very happy to be with you again today as you continue your hearings on the coin shortage.[1] The Bureau of the Mint is sincerely grateful to all of you for the fine spirit of cooperation and understanding which you have shown during this and the previous hearing, and your constructive efforts to assist are appreciated more than you know.

Since our appearance before you last July 2nd, the Bureau of the Mint produced approximately 3,431,000,000 coins, through December. We have geared up to produce, in this first six months of 1965, 4,569,000,000 coins, totaling 8 billion coins in fiscal 1965, in contrast to 4,300,000,000 in 1964.

The good people of the Mints have been receiving and shipping about 4,900,000 pounds of metal and coins each week, which is 2,450 tons. This means the shipping and receiving of about 490 tons of material per day, Monday through Friday, in the three offices engaged in this gigantic operation. Of this, 47 truckloads of coin per week, each truck carrying 35,000 pounds, fan out from Denver and Philadelphia to scatter manufactured coins to the Federal Reserve Banks throughout the country. The San Francisco Assay Office has handled some 800,000 pounds of bronze and nickel strip coming in each week, and has shipped that amount out. 560,000 pounds of blanks have gone weekly to Denver for stamping, and 240,000 pounds of scrap is returned for remelting into strip.

These same good people in the Mints have done all of the required paperwork involved in these transactions. This means they have not only loaded and unloaded material and coins, but have negotiated the necessary shipping contracts, and kept voluminous records which must literally be accurate to the penny in each instance. Traffic in the crowded loading areas of our Mint institutions is unbelievable, but the work gets done. Fork-lift trucks, loaded with gondolas filled with tons of metal or coins, are quietly steered about the halls, up elevators, down ramps, and onto conveyors, all without fanfare.

About 20 million coins a day are finished, and poured into counting machines which work endlessly, filling canvas bags, made by Mint employees, each bag to be properly counted, marked, sealed, weighed and delivered for shipment. These workers in Denver, Philadelphia, and San Francisco, gentlemen, have performed miracles, as they are moving through those corridors just double the long-considered "maximum" amount of coin, with efficiency beyond the wildest hope of all of us who measured and worked to achieve this volume of production.

This increased coinage, you must remember, is in addition to the routine, usual work of all of our Mint institutions. Since we met here last summer, our New York Assay Office has been handling silver transactions at fantastic increases, while other operations have increased at West Point and Fort Knox, as well.

The Mint has not permitted any let-down in other duties prescribed by law. We have, as you all know, suspended our services to collectors. We are making no proof coins, taking no more orders for uncirculated sets, making no foreign coin, and we are continuing the 1964 date on the present coins pursuant to the law as passed by Congress last fall.

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[1] See Exhibit 1, page 129, in the 1964 Annual Report for a previous statement concerning the coin shortage.

Since we last met here with you, Mint officials have spent long hours and many days working out details for the new facility in Philadelphia, destined to be the most up-to-date Mint in the world. The ground is now being cleared, construction will start in September, and we hope to start turning out coins in the fall of 1967.

We have worked ceaselessly to find accurate techniques for estimating coin demand. We have explored every potential avenue to assure that the coin the federal government manufactures under the law of the land goes for the purpose for which it was intended, namely, for the conduct of the commerce of this country. We have not been entirely successful in prohibiting the activities of the speculators who hoard coin and offer it for sale at a premium, as we do not have police powers nor authority to declare such activities illegal. We have no way of finding out who is taking more than his share of new coin, as banks are reluctant to disclose their inventories, while businessmen feel a proper right to keep for their own use whatever change they might accumulate, as this, too, is not illegal.

We have many plans to survey various groups representing large segments of heavy users of coin, to ascertain their needs. We would like to make spot checks of areas where special conditions seem to exist. We have hoped to find means to curtail large-scale hoarding, or exporting, or melting down of coins, which we know exists. We have not carried out all of our projects, gentlemen, as we have limitations of time and of personnel. However, we stand proudly on what we have done, as the Bureau of the Mint, with the cooperation of Secretary Dillon, Assistant Secretary Wallace, and countless interested parties in and out of the Treasury Department, has at least made a dent in the coin shortage, and we believe we are on the road to solving this vexing problem. Furthermore, we have long-range plans which, with the necessary cooperation by our appropriating groups, will enable us to guarantee against future situations, such as the one with which we have been living for some time past.

How do we hope to do this? By being prepared, gentlemen, and never again letting the facilities of the Mint seem or be inadequate. We must not forget, however, that these 8 billion coins we will turn out this year, and our 9 or 10 billion next year, if that is enough, will be turned out with these very same facilities, even if not so economically as we all would wish.

Help from private industry in the way of providing strip has been invaluable, even if their problems have been so tremendous as to sometimes seem insurmountable, even to them. We have suffered along with private industry, as they have experienced strikes, or the threat of them, both in their own plants and with their vital shipping facilities. They have run short of material, such as zinc, even though we are supplying them copper and nickel from the Government stockpile. We have cooperated completely in all of their problems, but when shipments of strip are too thick or too thin because of the failure of their gauges, or when snows block the roads and no strip gets through for days, it becomes apparent that the Mints must be self-sufficient insofar as possible if they are to do the job assigned, in the years to come.

Right now we have set aside stockpiles of blanks to carry us through when our outside suppliers may be helpless in fulfilling their orders. In one instance, Denver went back to making nickel strip, on a temporary basis, until shipments of strip could be restored. I mention this, gentlemen, just to let you know of the magnitude of problems attendant to these operations, and emphasize the wisdom of the founding fathers who set up the Mints as places to manufacture the necessary coin of the realm literally from the ground up, self-sufficient and secure.

We went through Christmas, we are happy to report, without any crisis or a coin panic, even though retail sales this year amounted to $262 billion, or $29 billion more than in 1963. When our people were flying about inspecting machines which might be converted quickly into coining presses, it seemed futile, at times. However, it paid off, and the flow of coins into the money stream of the country undoubtedly contributed to the splendid business climate of this past year.

We have been greatly disappointed at the repeated delays which met our efforts to secure additional coinage presses. Even the conversion of the 16 Department of Defense presses seemed endless, and our delivery schedules were delayed even by months

from all suppliers. If you feel this should be a simple task, check with some of the manufacturers, as the making of coinage presses is a custom job, gentlemen, and not merely turning out more of a standard product. Our own technical people have constantly traveled from plant to plant, assisting in the completion of these vital presses. It was a great day when the two huge Department of Defense presses finally arrived and were set up in what had been an abandoned tramway building adjacent to the Denver Mint, hastily converted into housing for the huge presses, which needed special foundations solid enough to support their tonnage, with the resultant vibration and pressures.

All has not gone smoothly. For instance, we found one press which we hoped would do a good job. Actually, it took more Mint mechanics to keep it running, than we had! On the other hand, we borrowed two old Mint presses which had been placed in museums, and it is a great tribute to the workmanship of our own people to see those two old presses pounding out 1-cent and 10-cent pieces, two at a time, laboriously, methodically, but faithfully.

We have made progress, gentlemen, in this press area, too. For the first time in the history of the Mint, including Mints of other countries, many of our presses will be equipped with feeders to stamp out at least 4 coins at a time. We are continuing our efforts in this area, and because of the fine interest and cooperation of the House Appropriations Committee, and some splendid friends on the outside, we have hopes of a real breakthrough in the state-of-the-art of coining, which will completely solve the problem of presses.

The Bureau of the Mint has been seriously criticized, in some places, for many things. We do not claim to be perfect, but we have no shame for the record made by this Bureau. We have many feelings as to better ways for doing things, and with unlimited funds at our disposál, gentlemen, we would be beyond reproach in every area. However, we know we must operate efficiently and economically and yet give the service for which the Mint was intended.

The coin collectors of this country are a fine and honorable cross section of the land. They engage in a fascinating hobby, and one to be equally respected with that of the arts, philately, sports, or any others. Every country in the world provides their numismatists with proof sets, and/or uncirculated sets. It was with great reluctance that we discontinued this service, not only because of its historic, artistic and collecting value, but because of the basic advantage that it brought in substantial profit to the Government while serving a large and deserving segment of the public who also are taxpayers. However, our primary responsibility is to produce domestic coins for commerce, and we reluctantly bowed to this need. Hence we have taken no orders to make coin for foreign friendly countries since early 1963. We have suspended proof coins and uncirculated sets, even though we lost the advantages of these reimbursable activities, the profit to the Government, and incurred the disappointment - even anger - of the collectors.

The proof coins and other such operations did not interfere with the production of domestic coin. However, there were trained people working in those operations who could be taught to make regular coins. The proof coin operation took up some space. We are trying to convert some of these presses to regular coinage, although this may prove to be ill-advised, due to the cost and the fact that most of them were too old to be used in regular coinage when they were converted to proof coins. Nevertheless, we are picking up some production by suspension of these services, and this is our one goal, increased domestic coinage. We made many enemies by stopping our services to the hobby of coin collecting, but we hope they will bear with us.

One disgruntled individual recently commented that the Mint had increased production nearly 200% from 1959 to 1964, and he thought that should be enough. However, it was not, although it is significant that, while we were making 200% more coins than in 1959, the gross national product increased only 28%, and vending machine sales only 35%. Whatever the factor that caused the difference, the graphs and measures of the past have yielded to the facts of the present, and our crash program was the only answer. There were, believe me, many who doubted the need for increases in coinage, but now they seem to recognize its importance. Areas which have not felt any shortages

realize, finally, that they are lucky, and that other sections of the country have had problems. This has helped us materially in our many efforts, as you can imagine.

If I might make a comment which seems mischievous, it is interesting to note the comments of those whose hindsight is just as good as ours; but they forget that they were once hesitant to approve expenditures for extensions in our facilities, or otherwise cooperate when we sought ways to increase production. In this same category, we have the easy advice of those who say, "Why don't you find out what coins you will need in 1975, and be prepared to make them?" This we are ready and willing to do, but not yet able, as no one seems to have the right solution to the problem of accurate estimates of required coin production for the years ahead.

At a recent meeting with the Presidents of the Federal Reserve Banks, there was complete frankness on their parts that they could not possibly make a good estimate of their needs, even for one year ahead. They felt it absolutely impossible, with the changing patterns of flow-back of coins, the activities of speculators, the interest created by the coinage alloy study, and the general public interest in monetary matters generally. If anyone has found an invincible formula for accurately estimating the average needs, the Mint would welcome it; but until then, we are increasing our own efforts to find the answers. Increased interest of, and cooperation from, much of the banking industry already has helped, and between us, we may eventually find reliable patterns.

Some mention properly should be made of the great contribution to our program which was made by the utilization of our facilities in San Francisco last fall when the crisis was most acute. We had a goal of October 1, 1964, the beginning of the Christmas coin demand, for blanks to start rolling from San Francisco to Denver for the final stamping operation. This meant installation of equipment in the building in San Francisco. It meant the moving of some other Government offices using space there. It meant the knocking down of walls in a building actually constructed for Mint operations, so as to accommodate, once again, our special purpose type of operation. General Services Administration did a magnificent and speedy job, and on September 28, 1964, the first blanks poured out of converted Department of Defense blanking presses, and promptly went to Denver, thus freeing other machinery and space for production of silver blanks there. In San Francisco, we had the guards, the accountants, the vaults, the building, and the know-how. This still is, gentlemen, an additional ace-in-the-hole, as there is more space in our building there, for additional blanking and, if Congress wishes, perhaps on a temporary basis, for added coinage presses.

We have not neglected other aspects of our operation which might make increased production possible, if circumstances so indicate. Our study of the purchase of blanks from private industry still indicates such a tremendous increase in cost that it should be a last resort. In addition, blank annealing facilities do not exist in sufficient capacity in private industry. Those who have studied the problems of gearing up to do this work have indicated it would be impractical from an economical viewpoint. Additional studies are continuing to be made on this phase, as, while the Mint does not have a closed mind on this possibility, we feel very strongly at this point that the tremendous excess cost to the taxpayer could not be justified. Too, we feel we cannot logically and honestly make convincing explanations for resorting to such a costly expedient while there is any possibility of our doing this with our own facilities.

At this moment, gentlemen, we can tell you with pride and conviction that the coin situation is definitely improved. In fact, the serious shortage of the one-cent piece is practically over, from all available information. We have had troubles with the five-cent piece for quite some time. However, beginning this month, we plan to produce around 200,000,000 five-cent pieces every month. That number, believe me, should make many a phone call, buy many a candy bar, and, I trust, make this useful coin available wherever it may be needed.

By this same token, however, our records may not look so good, as the custom has always been to measure Mint production by the number of pieces produced. Seventy percent of our output, up until recently, was the one-cent piece, or the penny, as it is popularly called. Our studies and surveys clearly show a lower demand for this coin, and we have cut production of the one-cent piece to approximately 60% of our total for

the first half of fiscal year 1965, and down to about 40% in February 1965. These shiny pennies pour out like water from those dual machines, but the higher denominations are not so easy to produce. Nevertheless, it would be ridiculous for the Mint to try to keep up the production of numbers of coins, rather than the kinds that are needed. Therefore, we will probably increase production of the 10-cent and 25-cent pieces materially, up to as much as 45% over last year. While, in pieces, it may seem that we are falling off, believe me, the increased production of the coins that are in demand is the important thing. Even with this change, we hope to meet our estimates for the rest of this year, which total 8 billion in fiscal 1965, and at least 9 or 10 billion in 1966.

With this background, may we now look toward finding ways to assure a plentiful supply of coin for the commerce of this country. The Mint has some concrete ideas on this problem, gentlemen, and let us start by asking ourselves, "Is there a better way of financing Mint operations, so as to provide flexibility and availability?"

When a scarcity of coin develops, most people, most merchants, and most bankers wonder why the Mint doesn't immediately do something about putting out more coin. They become irritated at the seeming complacency of the Mint in plodding along at a predetermined production rate which isn't giving them the amount of coin they want.

Few of these people realize that it takes money to make money. We are not permitted by law to dip into the profit we make in producing coin--a profit which goes by the lofty title of "seigniorage" and which runs into the millions of dollars every year. It is Congress, itself, through the appropriation procedure, which provides the funds needed to produce coins.

Appropriation procedures are time-consuming, as is known to all who deal with them. Estimates of funds needed to operate must be prepared so far in advance, at least in the case of the Mint, that when the final decision is reached, the money made available may be entirely inadequate. In the past five years, Mint appropriation requests have been cut on an average of $700,000 a year. This would have produced a lot of coin.

I do not in any way criticize the Congress for lack of attention to the coinage problem, for we have received their wholehearted support when we have needed it. What I do think calls for examination, however, is the period of many, many months through which there is a constant hassle over funds to produce coins. Oftentimes, it is during these periods when coin crises develop.

As you gentlemen know, during the past several years there has been strict control over budgets, and the Mint and other agencies have been requested to hold their appropriation requirements to an absolute minimum. Budgetary ceilings have been established which cannot be exceeded in budget submissions. In addition, after Mint budget estimates are prepared they are subjected to critical examination by budget reviewing authorities in the Treasury Department, in the Bureau of the Budget, and in Congress. The Mint has not always been successful in convincing budget and appropriation authorities of our need.

An important related problem is the accumulation of substantial reserve inventories of coins in the Federal Reserve Banks and in the Mints. One of the weaknesses in the present system has been the tendency of budget-reviewing authorities to cut the Mint's appropriation each time an inventory was accumulated. If substantial inventories could be accumulated, and maintained, these inventories could be the "bumper" and absorb the shock of heavy demands when Mint production is geared to making such quantities of coin as are forecast on the basis of long-term needs, regardless of current demand. This would go a long way toward ironing out the "ups and downs" of coinage production.

The Mint recognizes the need for controls over the expenditure of public monies. It doesn't seek "back-door" financing, but it does seek a type of financing which will give it the production flexibility necessary to cope with expanded coin needs, as quickly as they develop, or even before they develop. If we can nip coin shortages in the bud when they start, we will end up in the long run by having to produce less coin than we need to after the shortage is in full bloom. We are now working with proper officials on a better financing plan which we hope will lead to legislation giving us the means of responding more quickly to the coin demand, and providing the additional stocks of coin needed.

IS THERE A BETTER WAY OF ESTIMATING THE COIN DEMAND?

When there is a coin shortage, we have found that the information and statistics available to us, from present sources, are inadequate to give us a measurement of the degree of the shortage and the amount of coin needed to overcome it.

When the Federal Reserve Banks and branches are able to meet all of the coin requests of their member banks, by reason of inventories in their vaults and current production schedules of the Mint, we can do a reasonably good job of estimating the coin demand by studying their net loss of coin every month in relation to the inventory they are carrying.

We have also had available to us, and have used as a forecasting aid, other information on factors we have considered to influence the coin demand.

The principal Government data of interest are Department of Commerce estimates of the gross national product and its components, and the present and projected population estimates; price indexes prepared by the Department of Labor; and Federal Reserve financial and business statistics. Other pertinent data include information on sales taxes, and current vending machines sales, and the industry's anticipated growth.

There are many other economic variables which are in themselves difficult to forecast with satisfactory accuracy. The Mint has evaluated many variables which have proven unrelated to the forecasting of coin demand.

Mr. Chairman, with your permission, I would like to include in the record a table relating coinage production with the traditional indicators of coin demand.

The observations one might make from this six-year table are that:

1. Coin production increased by approximately 174%.
2. Population increased by 8%.
3. The gross national product increased by 28%.
4. Vending machine sales increased by 47%.

Since these items are considered to be reliable indicators of economic growth, and therefore are considered a fair standard for measuring coin demand, it would appear that production increases have been more than adequate for normal increases in coinage demand. This did not prove to be so.

It has been said that the problem of accurately predicting coin needs is particularly difficult because of the very difficult nature of this problem, and as a result of substantial increases in coin demand during recent years, arrangements were made for a study of coinage problems by a private management engineering consulting firm. Arthur D. Little,

COINAGE PRODUCTION AND INDICATORS OF COIN DEMAND

Fiscal year	Coinage production		Population [1]		Gross national product [2]		Vending machine sales [3]	
	Pieces	Increase	Number	Increase	Amount	Increase	Amount	Increase
	Millions	Percent	Thousands	Percent	Billions	Percent	Millions	Percent
1959	1,571	-	177,830	-	$483	-	$2,380	-
1960	2,567	63.4	180,684	1.6	503	4.1	2,590	8.8
1961	3,059	19.2	183,756	1.7	519	3.2	2,740	5.8
1962	3,461	13.1	186,656	1.6	556	7.1	2,960	8.0
1963	3,627	4.8	189,375	1.5	584	5.0	3,220	8.8
1964	4,307	18.7	192,072	1.4	619	6.0	3,500	8.7
1965 (6 mos.)	3,431	-	193,500	-	NA	NA	NA	NA
1959-64	2,737	174.2	14,242	8.0	136	28.2	1,120	47.1

[1] Source: Bureau of the Census, Commerce Dept. Fiscal years 1959-64, June 30; 1965, Dec. 31, 1964.

[2] Source: Office of Business Economics, Commerce Dept. (Calendar year basis).

[3] Source: Vending trade publication (Calendar year basis).

Inc. of Cambridge, Massachusetts, was employed by the Bureau of the Budget to study coinage requirements over the next 25 years. This company was selected as being the best qualified consulting firm in the country for such a survey.

After a very careful analysis of coinage problems, the survey company issued a final report to the Director of the Bureau of the Budget on February 11, 1963. The forecast of domestic coins needed during the fiscal year 1965, as included in that report, amounted to 4.1 billion coins.

During the Hearings before your subcommittee on July 1, 1964, on the coin shortage, Chairman Martin of the Board of Governors, Federal Reserve System, presented an estimate which indicated that 6.8 billion coins would be needed in fiscal 1965. In commenting on these estimates, Mr. Martin made the following statement:

"Needs of this kind are extremely difficult to predict with accuracy--as a matter of fact, impossible to predict with accuracy, in my judgment--and these estimates could be substantially above or below the mark."

Mint production for fiscal year 1965 will be in excess of 8 billion coins.

It is apparent there has been a considerable range in estimated requirements for coin. I do not intend this as a reflection on the ability of the parties making the estimates, but it does demonstrate the difficulty of the problem.

Secretary Dillon has stated in his letter of February 10, 1965, to this subcommittee: "The Federal Reserve Bank Presidents have told us that it would be a mistake to furnish any estimate of coin needs for fiscal year 1966, at this time, because the figures would only be wild guesses, if not downright misleading. They express this view because of the uncertainty of what is going to happen to the silver content of our coins."

This subcommittee, of course, knows it is the plan of the Mint to produce coin day and night until the coin shortage is over. Sophisticated forecasts are not needed when we are producing to the limit of our capacity, as we are today, and will continue to do after the additional presses are placed on the production line. We must face the forecasting problem eventually, however, and for that reason I would like to touch on another subject, which bears upon the matter of recirculation of existing stocks of coins in the United States.

IS THERE A BETTER WAY OF FACILITATING THE RECIRCULATION OF COIN?

The total number of domestic coins produced by the Mint, since its establishment in 1792 through fiscal year 1964 amounts to 62 billion pieces. Of that amount, 48 billion coins, or 77% of the total coinage, have been made during the last 25 years. Since the average life of a coin is estimated to be from 25 to 30 years, this means that approximately 48 billion coins are available for circulation purposes under normal conditions.

Where is this coin? Obviously a large part of it, at least, is not coming back to the Federal Reserve Banks for recirculation.

Mr. Chairman, with your permission I would like to include in the record a table showing Federal Reserve coin receipts for the past several years, for the July to December period which represents the period of heaviest coin demand.

The steadily declining receipts of coin by the Federal Reserve Banks from member banks, at first glance, may appear to be an indication that coin has just disappeared. This isn't so. Except for the amounts of coin held off the market by speculators, the stock of circulated coin is still available for redistribution, but it is not reaching the Federal Reserve. An entirely new redistribution pattern has evolved since the coin shortage. Banks are not turning their excess coin in, to the extent they did.

To illustrate my point, I would like to read an excerpt from a bank visit report made by a Federal Reserve representative, as a result of a call he made on one of the member banks. For purposes of anonymity, I shall delete names. "Mr. X talked about the coin shortage and how it affected his bank. He said that sufficient coin was provided by vending machine operators that he was able to sell to many banks in his area. At one point in the conversation he jokingly remarked, 'If you know of any banks that need coin and your bank can't service them, let me know and I will see what we can do.'"

FEDERAL RESERVE RECEIPTS FROM MEMBER BANKS

JULY THROUGH DECEMBER (IN PIECES)

	Halves	Quarters	Dimes
1964	8,343,836	179,521,392	579,749,890
1963	101,417,066	812,660,244	1,541,079,210
1962	120,762,858	1,045,504,124	1,807,972,640

	Nickels	Cents	Total
1964	244,966,180	219,600,500	1,232,181,798
1963	684,656,020	795,387,600	3,935,200,140
1962	1,167,515,020	1,094,334,300	5,236,088,942

In his letter of February 10, Secretary Dillon has told you of the two-way deal that coin brokers have, picking up vending machine and other circulated money, selling it at a premium for new coin, and then selling the new coin at a premium to speculators.

The excess stocks of coin which are ordinarily deposited by member banks with the Federal Reserve Banks are the lifeblood of their coin operations. These are the coins which have ended up in vending machines, in telephone boxes, in parking meters, in laundromats, in toll bridge and road boxes, in newsstands, and Sunday School and church collections. All of these activities, which continue to collect coins, are still going on. However, there are now many who vie for these collections.

One, if not the largest collector of coins in the Nation is the American Telephone and Telegraph Company. Secretary Dillon has furnished you with a coin survey made by this company last August. With your permission, Mr. Chairman, I would like to offer for the record an updated study which they have been so good to make for us.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
195 BROADWAY, NEW YORK, N.Y. 10007

February 10, 1965

Miss Eva Adams, Director of the Mint
Main Treasury, Room 2064
Washington, D.C. 20220

Dear Miss Adams:

Mr. K. M. Failor of your office by telephone on February 2 asked if we would be willing to update our study of September 2, 1964 on the subject of handling coin with a view to the material being used in a hearing on February 16 before a subcommittee of the Committee on Government Operations, House of Representatives.

We have accordingly brought the material up to date so as to reflect comparable data for December 1964 and also to indicate our current practices in getting our coins into banking channels. We are pleased to make this information available to you for the purposes requested, and are attaching it hereto.

As a matter of interest, the progress that we have made over recent years in the speedy handling of our coin so as to get it into banking channels as promptly as possible is reflected in the following tabulation:

	Dollar amount and percentage of a month's coin collections deposited by end of first day following receipt in the coin counting centers	
1960	$17,047,000	46%
1962	21,381,000	56%
1964	34,661,000	79%

Please feel free to call upon us should you wish any further information relative to our coin handling practices.

Yours very truly,

N. C. Potter
General Financial Supervisor

Attachment

BELL SYSTEM OPERATING COMPANIES
COIN TELEPHONE COLLECTION DEPOSITS
DECEMBER 1964

	Deposited by Business Days Following Receipt in Counting Center						
	First Day		Second Day		Third Day or Later		
Counting Centers	Amount	Per Cent	Amount	Cum. Per Cent	Amount	Cum. Per Cent	Total
New England.....	$1,847,000	85.8	$301,600	99.8	$4,300	100	$2,152,900
New York							
Eastern Manhattan.	600,049	46.3	663,380	97.5	31,937	100	1,295,366
Western Manhattan.	731,586	59.1	485,487	98.3	20,727	100	1,237,800
Bronx-Westchester.	336,764	29.2	762,381	95.2	55,693	100	1,154,838
Brooklyn.....	994,515	69.1	445,080	100	-	-	1,439,595
Queens.....	509,200	59.1	352,391	100	-	-	861,591
Nassau-Suffolk....	890,335	99.0	8,569	100	-	-	898,904
Albany.....	300,130	88.9	18,178	94.3	19,196	100	337,504
Syracuse.....	356,132	84.0	68,031	100	-	-	424,163
Buffalo.....	399,520	93.7	27,071	100	-	-	426,591
Total.....	5,118,231	63.4	2,830,568	98.4	127,553	100	8,076,352
New Jersey							
Northern.....	-	-	914,245	100	-	-	914,245
Essex.....	-	-	910,858	100	-	-	910,858
Central.....	-	-	548,369	100	-	-	548,369
Southern.....	-	-	328,405	100	-	-	328,405
Total.....	-	-	2,701,877	100	-	-	2,701,877
Pennsylvania							
Philadelphia.....	754,489	79.0	200,106	100	-	-	954,595
King of Prussia...	557,674	100	-	-	-	-	557,674
Harrisburg.....	452,772	91.8	40,515	100	-	-	493,287
Pittsburgh.....	660,173	90.3	70,854	100	-	-	731,027
Total.....	2,425,108	88.6	311,475	100	-	-	2,736,583
Ches. & Pot.							
Washington.....	860,048	95.9	36,123	100	-	-	896,171
Maryland.....	837,500	100	-	-	-	-	837,500
Virginia.....	673,514	100	-	-	-	-	673,514
West Virginia.....	199,056	86.9	29,881	100	-	-	228,937
Total.....	2,570,118	97.5	66,004	100	-	-	2,636,122
Southern							
Birmingham.....	250,500	56.1	186,600	97.9	9,800	100	446,900
Jacksonville.....	274,200	68.9	123,800	100	-	-	398,000
Ft. Lauderdale....	258,100	75.8	82,300	100	-	-	340,400
Miami.....	519,100	100	-	-	-	-	519,100
Atlanta.....	737,600	100	-	-	-	-	737,600
Louisville.....	363,200	98.8	4,500	100	-	-	367,700

BELL SYSTEM OPERATING COMPANIES
COIN TELEPHONE COLLECTION DEPOSITS--Continued
DECEMBER 1964

Counting Centers	Deposited by Business Days Following Receipt in Counting Center						
	First Day		Second Day		Third Day or Later		
	Amount	Per Cent	Amount	Cum. Per Cent	Amount	Cum. Per Cent	Total
Southern (Cont.)							
New Orleans.....	$407,900	77.5	$118,600	100	-	-	$526,500
Jackson.....	253,100	100	-	-	-	-	253,100
Charlotte.....	306,700	100	-	-	-	-	306,700
Columbia.....	274,200	100	-	-	-	-	274,200
Nashville.....	561,300	100	-	-	-	-	561,300
Total.....	4,205,900	88.9	515,800	99.8	$9,800	100	4,731,500
Ohio							
Northeastern.....	779,200	89.3	93,600	100	-	-	872,800
Southwestern.....	662,400	98.9	7,300	100	-	-	669,700
Total.....	1,441,600	93.5	100,900	100	-	-	1,542,500
Michigan.....	1,773,500	92.3	148,100	100	-	-	1,921,600
Indiana.....	375,200	69.0	168,700	100	-	-	543,900
Wisconsin.....	546,500	100	-	-	-	-	546,500
Illinois							
South.....	961,836	82.3	206,218	100	-	-	1,168,054
North.....	1,213,292	100	-	-	-	-	1,213,292
Central.....	1,445,244	98.2	26,551	100	-	-	1,471,795
Total.....	3,620,372	94.0	232,769	100	-	-	3,853,141
Northwestern							
Des Moines.....	300,406	99.8	599	100	-	-	301,005
Minneapolis.....	504,438	97.4	13,410	100	-	-	517,848
Omaha.....	252,639	95.6	11,581	100	-	-	264,220
Total.....	1,057,483	97.6	25,590	100	-	-	1,083,073
Southwestern							
Little Rock.....	124,600	51.8	115,900	100	-	-	240,500
Kansas City.....	425,900	66.8	141,900	89.0	70,400	100	638,200
St. Louis.....	467,800	60.2	286,400	97.1	22,800	100	777,000
Oklahoma City.....	373,700	99.0	600	99.2	3,200	100	377,500
Dallas.....	331,600	83.7	64,400	100	-	-	396,000
Fort Worth.....	261,800	61.5	163,700	100	-	-	425,500
Houston.....	381,500	60.3	251,600	100	-	-	633,100
San Antonio.....	262,900	63.7	149,800	100	-	-	412,700
Total.....	2,629,800	67.4	1,174,300	97.5	96,400	100	3,900,500
Mountain States							
Denver.....	508,800	99.1	4,800	100	-	-	513,600
Salt Lake City....	278,700	100	-	-	-	-	278,700
Phoenix.....	538,500	96.3	20,500	100	-	-	559,000
Total.....	1,326,000	98.1	25,300	100	-	-	1,351,300
Pac. NW Bell							
Portland.....	293,500	100	-	-	-	-	293,500
Seattle.....	473,400	100	-	-	-	-	473,400
Total.....	766,900	100	-	-	-	-	766,900
Pacific							
San Francisco.....	1,795,716	91.8	161,202	100	-	-	1,956,918
Los Angeles.....	2,246,400	98.3	36,000	99.9	1,200	100	2,283,600
Total.....	4,042,116	95.3	197,202	99.9	1,200	100	4,240,518
System.....	33,745,828	78.9	8,800,185	99.5	239,253	100	42,785,266
So. New England.....	741,900	100	-	-	-	-	741,900
Cin. & Subn.....	173,200	53.2	152,616	100	-	-	325,816
All Companies.....	34,660,928	79.0	8,952,801	99.4	239,253	100	43,852,982

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Coin Depositing
Bell System Associated Companies
February 1965

Company and Counting Center	Deposit Practices	Remarks
New England Tel.	Concentrated in Boston for whole Company. Receptacles shipped in via American Express, Brinks and others. Company pays shipping costs. After counting, full bags deposited via Brinks in Federal Reserve Bank; partials in First National Bank of Boston. Company pays transportation costs.	First National Bank counts coin and charges Co. for counting. Company has been approached by other banks in its territory for coin and have furnished this information to Federal Reserve Bank.
So. New England	Concentrated in New Haven for Company. Receptacles brought in by Co. collectors. Deposited via Brinks in First New Haven National Bank. Company pays transportation costs.	First New Haven distributes coin throughout New Haven county. Other banks in territory have asked Co. for coin.
New York Tel.	Coins are deposited in local banks with haulage paid by the Company. Arrangements have been made that some of the Company's other depositaries may occasionally buy coin when extremely hard pressed. They do this by picking up the coin at the counting center and delivering a check in payment.	The Banks send no coin to the Federal Reserve Bank but distribute what they do not use themselves to their correspondent banks.

Bank of Deposit

Eastern Manhattan	-	Manufacturers Hanover Trust Company
Western Manhattan	-	Manufacturers Hanover Trust Company
Bronx-Westchester	-	County Trust Company - White Plains
Brooklyn	-	Kings County Trust Company
Queens	-	Chase Manhattan Bank
Nassau and Suffolk	-	Meadow Brook National Bank
Upstate-Eastern	-	State Bank of Albany
Upstate-Central	-	Marine Midland Trust Company
Upstate-Western	-	Manufacturers and Traders Trust Company-Buffalo

Company and Counting Center	Deposit Practices	Remarks
New Jersey Tel.	In each of the six counting centers coins are deposited in one bank. Company pays transportation costs.	Company with concurrence of Federal Reserve Bank advises inquiring banks as to the depositary used for coin deposit.
	Bank of Deposit	
Northern	- First National Bank of Passaic County	
Hudson	- Commercial Trust Company of New Jersey	
Essex	- Fidelity Union Trust Company	
Raritan	- Union County Trust Company - Elizabeth	
Central	- Monmouth County National Bank	
Southern	- First Camden National Bank and Trust Co.	
Bell of Pa. and Diamond State	Deposited in a bank or banks in each counting center area. Company pays shipping charges except in case of four banks in King of Prussia area where coins are bought from the Company whose account is credited and bank pays shipping costs.	Many local banks have asked for coins.
Philadelphia	- First Pennsylvania Bank and Trust Company	
Pittsburgh	- Mellon National Bank	
Harrisburg	- Harrisburg National Bank and Trust Company National Bank & Trust Co. of Central Pa. Central Pennsylvania National Bank	
King of Prussia	- Bank of King of Prussia Peoples National Bank & Trust Co. of Norristown Fidelity Philadelphia Trust Company Gerard Trust Bank - Phil. Wilmington Trust - Del. Farmers Bank of Delaware First Pennsylvania Bank & Trust - Phil.	

Company and Counting Center		Deposit Practices	Remarks
Ches. & Pot. Tel. Co.			
Washington	-	Coin is transported by Brinks at Company expense to U.S. Treasury. Amount is credited to Co. account in Riggs National Bank and no charge made.	
Maryland	-	Three days a week coin deposited in Baltimore Nat'l. Bank and two days a week in First National Bank of Baltimore. Shipping charges paid by Company.	
Virginia	-	All coins sent to Richmond where deposit is made in First and Merchants National Bank. Coin from Tidewater area is purchased by Bank of Virginia which pays shipping charges.	
West Virginia	-	Coins are deposited in the Kanawha Valley Bank, The National Bank of Commerce, Charleston and The Charleston National Bank with shipping charges paid by the Co.	
Southern Bell		Full bags of coins from the New Orleans and the Nashville centers are deposited in the local Federal Reserve Bank and partial bags are deposited in local banks. All shipping charges paid by Company:	The Company and the Federal Reserve have cooperated to develop best practices for the coin counting centers. Federal Reserve originally indicated a desire that coin be deposited directly with it so that it can operate to bring about a better distribution among all banks in the territory, but has not pressed for change in Company's present practice.
New Orleans	-	Whitney National Bank (partial bags)	
Nashville	-	First American National Bank (partial bags)	
		Coins are deposited in local banks with shipping costs paid by the Company:	
Birmingham	-	First National Bank of Birmingham	
Jacksonville	-	Atlantic National Bank Barnett National Bank Florida National Bank of Jacksonville	
Fort Lauderdale	-	Broward National Bank of Ft. Lauderdale	
Miami	-	First National Bank of Miami	

Company and Counting Center		Deposit Practices	Remarks
Atlanta	-	Citizens and Southern National Bank First National Bank of Atlanta Fulton National Bank Trust Company of Georgia	
Louisville	-	Citizens Fidelity National Bank	
Jackson	-	First National Bank of Jackson	
Charlotte	-	First Union National Bank	
Columbia	-	Citizens and Southern National Bank South Carolina National Bank	
Ohio Bell			
Northeastern	-	Coin deposit is made to four Cleveland banks with shipping charges paid by Company. These banks distribute coin to their correspondents. Central National Bank Cleveland Trust Company National City Bank of Cleveland Union Commerce Bank	Coin is made available in shorter time by willingness of the banks to accept deposit beyond the 2 P.M. limit maintained by Federal Reserve Bank.
Southwestern	-	Coin deposit is made to three Columbus banks with shipping charges paid by Company. These banks distribute coin to their correspondents, Toledo being of major concern. Bank of Deposit City National Bank & Trust Company Huntington National Bank Ohio National Bank	Formerly deposited with one bank which sent surplus to Federal Reserve Bank in Cincinnati.

Company and Counting Center	Deposit Practices	Remarks
Cin. & Sub.	Coins sent to Federal Reserve Bank by Brinks, with Company account in Provident Bank & Trust Co. being credited. Company pays shipping charges.	
Indiana Bell	Coins are deposited with the two principal Company depositaries, American Fletcher National and Indiana National with arrangements that these banks distribute coins up to a set limit to three out-state depositaries.	
Michigan Bell	Coin is deposited by Brinks in National Bank of Detroit, Manufacturers National Bank of Detroit and Detroit Bank and Trust Co. Company pays shipping charges.	Due to coin shortage there has been a redistribution of the amounts going to the three banks. Coin is made available in shorter time by change in banks' policy whereby they adopted Company's suggestion of accepting deposits during an additional hour beyond the former 3 P.M. limit.
Wisconsin	On three days of each week coins are deposited in First Wisconsin National Bank. On one day of each week coins are purchased by the Marshall and Ilsley Bank and on one day by the Marine Exchange National Bank. Each bank distributes coin to its member banks throughout the State. Coin transportation charges to the three Milwaukee banks are paid by the Company.	
Illinois Bell	All coins are sent to local banks for deposit with shipping charges paid by Company.	Federal Reserve Bank has agreed to Company practice of depositing coins with local banks.
South -	Continental Illinois Bank & Trust Company	
North and Central -	First National Bank of Chicago	Full bags of dimes are sent to the Federal Reserve Bank by First National Bank when the supply is ample.
Northwestern Bell	In two counting centers coin is sent to local banks and in one counting center it is sent direct to the Federal Reserve Bank. All shipping charges are paid by the Company.	

Company and Counting Center		Deposit Practices	Remarks
Omaha	-	Coins are sent to Federal Reserve Bank	
Minneapolis	-	Coins are sent to First National Bank of Minneapolis	
Des Moines	-	Coins are sent to Iowa-Des Moines National Bank	
Southwestern Bell		All coins are sent to local banks, the Company paying haulage.	
		Bank of Deposit	
Little Rock	-	Worthen Bank and Trust Company	
Kansas City	-	Commerce Trust Company	
St. Louis	-	First National Bank in St. Louis	
Oklahoma City	-	First National Bank & Trust Company	
Dallas	-	First National Bank in Dallas	
Fort Worth	-	Continental National Bank First National Bank	
Houston	-	Texas National Bank of Commerce	
San Antonio	-	Frost National Bank	
Mountain States		All coins sent to local banks, the Company paying haulage.	
Denver	-	Denver U.S. National Bank Colorado National Bank	
Salt Lake City	-	First Security Bank	
Phoenix	-	First National Bank of Arizona Valley National Bank	
Pacific Northwest Bell		All coins deposited in local bank, the Company paying haulage.	Federal Reserve Bank has agreed to Company practice of depositing coins with local banks.

Company and Counting Center		Bank of Deposit
Portland	-	U.S. National Bank
Seattle	-	National Bank of Commerce At request of Peoples National Bank of Washington a set amount of dimes and nickels are supplied to that bank which picks up the coins at the counting center.
Pacific Tel.		Coins are deposited in local banks, haulage being paid by the Company.
Los Angeles	-	Security First National Bank
San Francisco	-	Bank of America

If I have counted correctly, there are 61 Bell System counting centers, many of them in Federal Reserve cities, which process over 40 million dollars in coin every month. Considering that they are dealing primarily in quarters, dimes and nickels, this makes them, by far, a larger supplier of coin than the Mint.

I am impressed with the fact that by the close of the first day this telephone money reaches a counting center, it has been verified and 79% has been transferred to one of the Bell System's bank depositaries.

A large part of the decline in the delivery of coin by member banks to the Federal Reserve Banks can be attributed to the fact that fewer member banks deposit telephone money with the Reserve Banks, as they are using it to meet their own needs and to service correspondent banks, which in many cases may be members of the Federal Reserve System.

We count it as a blessing that the Mint does not have the job of shipping new as well as circulated coin to merchants in every hamlet in the country. That is the function of commercial banks, happily. To be able to supply coin to their customers and their correspondents with whom they do business is an important part of their service. Naturally, they are interested in protecting their coinage position, for competitive purposes, and that is as it should be.

We are wondering, however, if by giving us a small window to their coinage position, both we and the Federal Reserve Banks could better determine coin needs and achieve a more equitable distribution of existing stocks of coin. If some system for exchange of information and a better voluntary recirculation program could be worked out, without using giant electronic brains, this perhaps would contribute to better coin forecasts by the Mint, and at the same time, place the commercial banks in a better position to serve their customers.

Thank you for this opportunity to be with you today and if you have any questions, we will be happy to provide the answers to the best of our ability.

EXHIBIT 2

MESSAGE FROM THE PRESIDENT, JUNE 3, 1965, RELATIVE TO THE COINAGE PROGRAM, AND DRAFT OF PROPOSED BILL.

To the Congress of the United States:

From the early days of our independence the United States has used a system of coinage fully equal in quantity and quality to all the tasks imposed upon it by the Nation's commerce.

We are today using one of the few existing silver coinages in the world. Our coins, in fact, are little changed from those first established by the Mint Act of 1792. For 173 years, we have maintained a system of abundant coins that with the exception of pennies and nickels is nearly pure silver.

The long tradition of our silver coinage is one of the many marks of the extraordinary stability of our political and economic system.

Continuity, however, is not the only characteristic of a great nation's coinage. We should not hesitate to change our coinage to meet new and growing needs. I am, therefore, proposing certain changes in our coinage system--changes dictated by need--which will help Americans to carry out their daily transactions in the most efficient way possible.

There has been for some years a worldwide shortage of silver. The United States is not exempt from that shortage--and we will not be exempt as it worsens. Silver is becoming too scarce for continued large-scale use in coins. To maintain unchanged our high silver coinage in the face of this stark reality would only invite a chronic and growing scarcity of coins.

We expect to use more than 300 million troy ounces--over 10,000 tons--of silver for our coinage this year. That is far more than total new production of silver expected in the entire free world this year. Although we have a large stock of silver on hand we cannot continue indefinitely to make coins of a high silver content--in the required quantity--in the face of such an imbalance in the production of silver and the demand for it.

We must take steps to maintain an adequate supply of coins, or face chaos in the myriad transactions of our daily life--from using pay telephones to parking in a metered zone to providing our children with money for lunch at school.

The legislation I am sending to the Congress with this message will insure a stable and dignified coinage, fully adequate in quantity and in its specially designed technical characteristics to the needs of our 20th century life. It can be maintained indefinitely, however much the demand for coin may grow.

Much as we all would prefer to retain the silver coins now in use, there is no practical alternative to a new coinage based on materials in adequate supply.

THE NEW COINAGE

I propose no change in either the penny or the nickel.

The new dime and the quarter--while remaining the same size and design as the present dime and quarter--will be composite coins. They will have faces of the same copper-nickel alloy used in our present 5-cent piece, bonded to a core of pure copper. The new dime and quarter will, therefore, outwardly resemble the nickel, except in size and design, but with the further distinction that their copper core will give them a copper edge.

This type of coin was selected because, alone among practical alternatives, it can be used together with our existing silver coins in the millions of coin-operated devices that Americans now depend upon heavily for many kinds of food and other goods.

THE HALF DOLLAR

Our new half dollar will be nearly indistinguishable in appearance from the present half dollar.

It will continue to be made of silver and copper, but the silver content will be reduced from 90 to 40 percent. It will be faced with an alloy of 80 percent silver and 20 percent copper, bonded to a core of 21 percent silver and 79 percent copper. The new half dollar will continue to be minted with the image of President Kennedy. Its size will be unchanged.

THE SILVER DOLLAR

No change in this famous old coin, or plans for additional production, are proposed at this time. It is possible that implementation of the new coinage legislation that I am proposing, greatly reducing the requirement for silver in our subsidiary coinage, will actually make feasible the minting of additional silver dollars in the future. Certainly, without this change in the silver content of the subsidiary coinage, further minting of the silver dollar would be forever foreclosed.

It is our intention that the new coinage circulate side by side with our existing coinage. We plan to continue the minting of our current silver coins while the new coinage is brought into quantity production.

The new coins will be placed in circulation some time in 1966.

In terms of the present pattern of coin usage, adoption of the new coinage will permit a saving of some 90 percent of the silver we are now putting into coins annually.

I want to make it absolutely clear that these changes in our coinage will have no effect on the purchasing power of our coins. The new ones will be exchanged at full face value for the paper currency of the United States. They will be accepted by the Treasury and by the Federal Reserve banks for any of the financial obligations of the United States. The legislation I am proposing expressly recognizes the new coins as legal tender.

It is of primary importance, of course, that our new coins be specifically designed to serve our modern, technological society. In the early days of the Republic, silver

coins served well because the value of a coin could only be measured by the value of the precious metal contained in it. For many decades now the value of a particular coin has depended not on the value of the metal in it, but on the face value of the coin. Today's coinage must primarily be utilitarian. The new coinage will meet this requirement fully, while dispensing with the idea that it contain precious metal.

It is, above all, practical. It has been specifically designed to function, without causing delays or disruptions of service, in coin-operated merchandising machines.

Furthermore, it is composed of materials low enough in value and readily enough available to insure that we can have as many coins as we need.

The legislation I am proposing also contains these additional recommendations:

OTHER AUTHORITY REQUESTED

First.--As a useful precautionary measure, I request standby authority to institute controls over the melting and export of coins to assist the protection of our existing and our new silver coinage.

Second.--I request authority to purchase domestically mined silver at not less than $1.25 per ounce.

Third.--I am asking for authority to reactivate minting operations temporarily at the San Francisco Assay Office.

Fourth.--As a safeguard for assured availability of the new coinage, I am asking for new contracting authority for the procurement of materials and facilities related to it.

Fifth.--I propose the establishment of a Joint Commission on the Coinage, composed of certain Members of the Congress, the public, and the executive branch of the Government, to report to me later the progress made in the installation of the new coinage and to review any new technological developments and to suggest any further modifications which may be needed.

WHY THE SILVER CONTENT OF THE COINAGE MUST BE REDUCED AT THIS SESSION

These recommendations for revision of our silver coinage rest upon extensive study of the silver situation, and of alternatives to our present coinage, by both governmental and private specialists. The Treasury Department's comprehensive report, known as the Treasury Staff Silver and Coinage Study, is being released today as background to my recommendations. Its principal finding was that the supply of silver in the free world has become progressively incompatible with the maintenance of silver in all our subsidiary coins.

On the average, in the 5 years from 1949 through 1953, new silver production in the free world amounted to about 175 million troy ounces per year, while consumption amounted to more than 235 million ounces. There was an average deficit in those 5 postwar years of more than 60 million ounces of silver per year.

In the latest completed 5 years, 1960 through 1964, free world consumption of silver has averaged 410 million ounces annually, but new production has averaged a little less than 210 million ounces a year. The result has been an average annual deficit of about 200 million ounces. That is three times the average annual deficit in the 5 years from 1949 through 1953.

If no silver at all had been used for coinage there would have been a deficit in new production in free world silver during the last 5 years averaging over 40 million troy ounces, or some 1,370 tons, a year.

The gap between the production of silver and silver consumption is continuing to increase. In 1964 the silver production deficit swelled to over 300 million ounces--half again the 1963 figure. And in 1964, the use of silver in coinage, and the use of silver for the arts and industry of the free world were each--taken separately--greater than new production.

There is no dependable or likely prospect that new, economically workable sources of silver may be found that could appreciably narrow the gap between silver supply and

demand. The optimistic outlook is for an increase in production of about 20 percent over the next 4 years. This would be of little help. Further, because silver is produced chiefly as a byproduct of the mining of copper, lead, and zinc, even a very large increase in the price of silver would not stimulate silver production sufficiently to change the outlook.

Short of controls that are undesirable in a peacetime free society, there is no way to diminish the bounding growth of private demand for silver for use in jewelry, silverware, photographic film, and industrial processes. The one part of the demand for silver that can be reduced is governmental demand for use in coinage.

Most free world countries no longer use silver in their coins. A few--as we now propose--continue to make limited use of it. It is true that U.S. coinage does not currently depend upon new silver production, because for many years we have supplied silver for our coinage out of large Treasury stocks, which still amount to 1 billion troy ounces.

But--and this is the crux of the matter--at the present pace, this stock cannot last even as much as 3 years. We would then be shorn of our ability to maintain the coinage, and, if there were no alternative to our present silver coinage, the Nation would be faced with a chronic coin shortage. That is why definitive action is necessary at this session of the Congress.

PROTECTION OF THE COINAGE

It is necessary for the U.S. Government to have large stocks of silver in addition to the quantity needed for coinage.

We need these stocks because our silver coins in circulation must be protected from hoarding or destruction. Protection of the silver coinage will continue to be a necessity since we plan for it to continue to circulate alongside the new coins. Our silver coins are protected by the fact that the Government stands ready to sell silver bullion from its stocks at $1.29 a troy ounce. This keeps the price of silver, as a commodity, from rising above the face value of our coins. This, in turn, makes hoarding or melting of the silver coinage unprofitable.

It is as additional protection for the existing coinage that I am requesting standby authority to institute controls over the melting, treating, or export of U.S. coins.

It may be asked why we seek standby control authority since we retain a large stock of silver with which to protect our silver coins through operations in the silver market.

The answer is clear. Given the magnitudes by which demand for silver is outrunning new production, we must consider the possibility, however unlikely, that the silver stock we possess could itself require the support and protection that would be afforded by authority to forbid melting and export of our coins.

We believe our present stocks of silver to be adequate, once the large present drains from coinage are greatly reduced, to meet any foreseeable requirements for an indefinite period. However, prompt action on a new coinage will help us protect the silver coinage by freeing our silver reserves for redemption of silver certificates at $1.29 per ounce. Thus, we can assure that no incentive will be created for hoarding our present coins in anticipation of a higher price for their silver content.

There is the opposite, although in all likelihood short-run, possibility that a fall in the price of silver might result from the enactment of this legislation largely removing silver from our subsidiary coin. It is for the purpose of protecting silver producers from a precipitate drop in the price of silver resulting from the action of the Government that I am requesting authority for the Secretary of the Treasury to purchase any newly mined domestic silver offered to him, at the price of $1.25 per troy ounce.

THE SAN FRANCISCO ASSAY OFFICE

Coinage operations at the San Francisco Mint were ended in 1955. Legislation converting the mint to the San Francisco Assay Office was passed in 1962. As part of our efforts to overcome the coin shortage of the past year, coin blanks have been cut and

annealed at the San Francisco Assay Office. Present law forbids full minting there. However, we will temporarily need the facilities of this plant to move into large quantity production of the new coinage and to continue production of existing coins until enough new small money is made to make certain we have adequate supplies. Consequently, I am asking for authority to reactivate minting operations at San Francisco on a temporary basis.

A new, fully modern mint is to be built in Philadelphia. However, it cannot be completed and in operation before late 1967. It is our expectation that when the new Philadelphia Mint's capacity is added to that of the Denver Mint, our coinage requirements can be met efficiently and economically. Consequently, no more than temporary authority to mint coins in San Francisco is recommended in the draft legislation I am sending to you.

WHY COMPOSITE COINS ARE RECOMMENDED

We have no choice but to eliminate silver, for the most part, from our subsidiary coinage. The question was: What would be the best alternative? After very thorough consideration of all aspects of this highly complex problem, we have settled upon the two types of composite, or clad, coins I have already described. These are 10- and 25-cent pieces with cupronickel alloy faces bonded to a solid copper core, and a new half dollar with outer and inner layers of differing silver-copper alloys.

This type of coin was found to be necessary if the new coinage is to be compatible with the existing silver coinage in all the 12 million coin-operated devices in use in the United States.

The convenience of using coins in automatic merchandising and service devices is a fact that, like the coins in our pockets and in our store tills, we take for granted. But if our coinage were suddenly to be such that it would not work in coin-operated devices, the public would be subjected to very great inconvenience and serious losses would occur to business with harmful effects upon employment.

The automatic merchandising industry is a large and growing part of our national economy. Last year, $3½ billion worth of consumer items were sold through 3½ million of these machines. On more than 30 billion separate occasions a consumer made a purchase by putting a coin in a machine. In growing numbers, factories, hospitals, and other places now depend upon automatic vending for the service of goods. A million and a half people now rely upon coin-controlled vending for at least one meal a day. The use of coin-operated devices is expanding rapidly, not only in merchandise vending, but also in a number of other services.

Six million of our coin-operated devices, including nearly all vending machines, have selectors set to reject coins or imitations of coins that do not have the electrical properties of our existing silver money. Highly selective rejectors are a necessity in these machines if they are to be a low-cost source of food and other goods and services. Otherwise, fraudulent use would soon make them costly.

The sensors in these machines are set to accept or reject coins on the basis of the electrical properties of our traditional coins; which have a high proportion of silver. To be compatible in operation with our existing coinage, therefore, our new coins must duplicate the electric properties of a coin that is 90-percent silver. No single acceptable metal or alloy does so. The composite coins, made of layers of differing metals and alloys, that I am asking the Congress to approve, are coins made to order to duplicate the electrical properties of coins with a high silver content. They are the only practical alternatives we have discovered to our present coinage.

Selectors exist that can handle coins with the widely varying electrical properties of, say, nearly pure silver and nearly pure nickel. But that is not enough. When the selectors are set to accept coins with greatly differing electrical properties, the selectivity of the mechanism declines and they will accept wrong coins and imitations. Unless the coins in use have very similar electrical properties, the coin-operated machines become subject to a high degree of fraudulent use. This would be costly to all concerned.

The future may bring selectors of a different kind able to accept coins of widely varying electrical properties while at the same time rejecting imitations and wrong coins. They are not available now. When and if they become available, our new coinage will work in them. On the other hand, if we now chose an incompatible coinage, there would be delays and interruptions lasting a year to 3 years in the services of these machines. This would impose heavy inconveniences upon the public and would cause business and employment losses in a large and growing industry.

In view of these considerations of public interest, we have concluded that our new coinage must without fail be able to carry out the technical merchandising functions of a modern coinage, working alongside our existing silver coinage. The new coins that I am recommending to you do this, and do it well, because they were specifically designed for the task.

The new half dollar was designed with the strong desire in mind of many Americans to retain some silver in our everyday coinage. We believe that by eliminating silver from use in the dime and the quarter, we will have enough silver to carry out market operations in protection of our existing silver coinage--and to make a half dollar of 40 percent silver content. It is clear and unmistakable that we would not have enough silver to extend this to the dime and quarter: they are heavily used, indispensable coins that we must have at all times in large quantity. We are convinced that we can include a 40-percent silver half dollar in the new coinage, but we cannot safely go beyond that. As a precaution, we intend to concentrate at first on getting out large quantities of the new quarter and dime before we embark upon quantity production of the new half dollar.

THE JOINT COMMISSION ON THE COINAGE

We believe the recommendations being made for a new coinage are sound and durable and in the best public interest. However, the installation of a new coinage is a matter so intimately affecting the life of every citizen, and so delicately related to the Nation's commerce, that it is impossible to be certain in advance that all problems have been foreseen, even by such a long and arduous process of research as has gone into the selection of the proposed new coins.

Consequently, I am including among my recommendations the proposal for a Joint Commission on the Coinage. It will be composed of the four officers of the executive branch most directly concerned with matters affected by the coinage--the Secretary of the Treasury, the Secretary of Commerce, the Director of the Budget Bureau and the Director of the Mint; of four members representing the public interest, to be appointed by the President; of the chairmen and ranking members of the Banking and Currency Committees of the House and the Senate; of one Member each from the two Houses of the Congress, to be appointed by the Vice President and the Speaker of the House. The Commission will be appointed soon after the new coinage is issued. It will study such matters as new technological developments, the supply of various metals, and the future of the silver dollar. It will report as to the time and circumstances in which the Government should cease to maintain the price of silver. It will be directed to advise the President, the Congress, and the Secretary of the Treasury on the results of its studies.

THE COINAGE--CURRENT AND PROSPECTIVE

I am pleased to report to the Congress substantial progress toward overcoming the coin shortage the Nation has been experiencing. Greatly increased minting has eliminated the shortage of pennies and of nickels. We are still somewhat on the short side of the demand for dimes and quarters, but this deficit is rapidly being overtaken. A severe shortage of the half dollar continues, due to the popularity of the new 50-cent pieces bearing the image of President Kennedy.

I want to emphasize that we will continue to make the existing coins while the new ones come into full production, and that we contemplate side-by-side circulation of the old and new coins for the indefinite future. There is no reason for hoarding the silver coinage we now use, because there is no reason for it to disappear.

We are gearing up for maximum production of the new coins as soon as they are authorized by the Congress. Supply of the materials for them is assured. Both copper and nickel are economical and available in North America. Their usage in coins will not add enough to overall employment of these metals to create supply or price problems.

In the first year after new coins are authorized, we expect to make 3½ billion pieces of the new subsidiary coins. That is a billion and a half more pieces than will be made of the corresponding silver coins in the current fiscal year.

In the second year after authorization of the new coinage, we expect to be able to double the first year's output of the new coins, reaching a production total of 7 billion pieces.

We expect in this way to avoid any new coin shortage in the transition to production of the new coins, and within a period of less than 3 years to reach a point at which we could, if necessary, meet total coinage needs out of production of the new coins.

I am satisfied, that taking into account all of the various factors involved in this complex problem, the recommendations that I am making to you are sound and right. Your early and favorable action upon the proposed legislation will make it possible to produce and issue to the public a coinage that will be acceptable, provide the maximum convenience, and serve all the purposes--financial and technical--of modern commerce. In considering this problem the needs of the economy and the convenience of the public have been placed ahead of all other considerations. They are the factors that have resulted in my recommendations to the Congress. I urge their approval at the earliest possible date.

LYNDON B. JOHNSON.

The White House, June 3, 1965.

[H. Doc. 199, 89th Cong., 1st sess.]

DRAFT OF ADMINISTRATION BILL

A BILL To provide for the coinage of the United States

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as "The Coinage Act of 1965."

TITLE I

Section 1. (a) The Secretary of the Treasury is authorized to cause to be minted and issued the following coins:

(1) A half dollar or fifty-cent piece which shall be composed of an alloy of 800 parts of silver and 200 parts of copper per each one thousand parts by weight clad on a core of a silver-copper alloy of such fineness that the composition of each coin shall be 400 parts of silver and 600 parts of copper out of each 1000 parts by weight.

(2) A quarter dollar or twenty-five-cent piece and a dime or ten-cent piece each of which shall be composed of an alloy of 75 percent of copper and 25 percent of nickel clad on a core of pure copper.

(b) The cladding alloy used for the outside layers of such coins shall comprise not less than thirty percent of the weight of each coin. Such coins shall be of the same diameter, respectively, as the coins of the United States of corresponding denominations current at the time of enactment of this Act.

(c) The weight of the half dollar provided for herein shall be 11.50 grams, of the quarter dollar 5.67 grams and of the dime 2.268 grams.

Sec. 2. Subject to the requirements of section 1, the methods of manufacture of the coins therein provided, the wastage allowances, and the allowable deviations in the metallic percentages and weights, shall be as determined by the Secretary of the

Treasury. Such coins shall be subject to the laws pertaining to the designs and inscriptions on coins of the United States.

Sec. 3. All coins minted pursuant to the provisions of this Act shall be legal tender for all debts, public and private, public charges, taxes, duties and dues.

Sec. 4. Nothing herein contained shall be deemed to prohibit the continued minting of coins of the United States authorized by law at the time of enactment of this Act.

Sec. 5. Whenever in the judgment of the Secretary of the Treasury such action is necessary to protect the coinage of the United States, he is authorized under such rules and regulations as he may prescribe to prohibit the exportation, melting or treating of coins of the United States.

Sec. 6. The Secretary of the Treasury is authorized to sell on such terms and conditions as he may deem appropriate, at not less than the monetary value thereof, any silver of the United States in excess of that required to be held as reserves against silver certificates.

Sec. 7. The Secretary of the Treasury is authorized and directed to purchase at the price of $1.25 per fine troy ounce silver mined after the date of enactment of this Act from natural deposits in the United States or any place subject to the jurisdiction thereof and tendered to a United States mint or assay office within one year after the month in which the ore from which it is derived was mined. The bullion fund provided by section 3526 of the Revised Statutes, as amended (31 U.S.C. 335), may be used for such purchases.

Sec. 8. In order to expedite acquisition of essential equipment, patents, patent rights, technical knowledge and assistance, metallic strip and other materials necessary to assure the prompt and continued availability of materials required to produce an adequate supply of the coins provided for herein, the Secretary of the Treasury, during such period as he may deem necessary, is authorized, without regard to the provisions of section 3528 of the Revised Statutes, as amended (31 U.S.C. 340), or any other law, to enter into contracts upon such terms and conditions as he may deem appropriate and in the public interest, for the acquisition or transportation of such equipment, patents, patent rights, technical knowledge and assistance, metallic strip, or other materials.

Sec. 9. (a) The Act of September 3, 1964, Public Law 88-580, is amended to read as follows:

"Notwithstanding section 3517 of the Revised Statutes (31 U.S.C. 324), all coins minted from the date of enactment of this Act shall be inscribed with the year of the coinage or issuance unless in the judgment of the Secretary of the Treasury such inscription is likely to contribute to a shortage of coins, in which case the particular coins involved may be inscribed with the last preceding year whose date has been inscribed on coins of the same denominations."

(b) Section 3550 of the Revised Statutes (31 U.S.C. 366) is repealed.

Sec. 10. The first sentence of section 3558 of the Revised Statutes, as amended (31 U.S.C. 283), is amended to read as follows:

"The business of the United States assay office in San Francisco shall be in all respects similar to that of the assay office of New York except that until such time as the Secretary of the Treasury determines that the mints of the United States are adequate for the production of ample supplies of coins, its facilities may be used for the production of any coins of the United States authorized by law."

Sec. 11. Section 4 of the Act of August 20, 1963 (31 U.S.C. 294), is amended by striking out "$30,000,000" and inserting in lieu thereof "$45,000,000".

Sec. 12. Section 3 of the Act of December 18, 1942 (31 U.S.C. 317c), is amended by striking out "minor" each place it appears in such section. Section 9 of the Act of March 14, 1900 (31 U.S.C. 320), is hereby repealed.

Sec. 13. Section 3528 of the Revised Statutes, as amended (31 U.S.C. 340), is amended (1) by striking out "this Act," in the first sentence and inserting in lieu thereof "law,"; (2) by striking out "minor" each place it appears in such section; and (3) by striking out "$3,000,000" and inserting in lieu thereof "$30,000,000".

Sec. 14. Section 485 of the Act of June 25, 1948 (18 U.S.C. 485), is amended by striking out "the gold or silver coins" and inserting in lieu thereof "gold, silver, silver-clad, or cupronickel-clad coins".

Sec. 15. The Secretary of the Treasury is authorized to issue such regulations as he may deem necessary to carry out the provisions of this Act.

Sec. 16. Whoever knowingly violates any of the provisions of section 5 hereof or of any order, rule, regulation, or license issued pursuant thereto shall, upon conviction, be fined not more than $10,000 or imprisoned not more than five years, or both. In addition, there shall be forfeited to the United States any coins exported, melted, or treated in violation of this Act or any order, rule, regulation or license issued hereunder, or any metal resulting from such melting or treating of coins. Such coins or metal may be seized and condemned by like proceedings as those provided by law for the forfeiture, seizure, or condemnation of property imported into the United States contrary to law.

TITLE II

Section 1. The President is hereby authorized to establish a Joint Commission on the Coinage to be composed of the Secretary of the Treasury as Chairman; the Secretary of Commerce; the Director of the Bureau of the Budget; the Director of the Mint; the chairman and ranking minority member of the Senate Banking and Currency Committee; the chairman and ranking minority member of the House Banking and Currency Committee; one Member of the House of Representatives to be appointed by the Speaker; one Member of the Senate to be appointed by the President of the Senate; and four public members to be appointed by the President, none of whom shall be associated or identified with or representative of any industry, group, business, or association directly interested as such in the composition, characteristics, or production of the coinage of the United States.

Sec. 2. No public official or Member of Congress serving as a member of the Joint Commission shall continue to serve as such after he has ceased to hold the office by virtue of which he became a member of the Joint Commission. Any vacancy on the Joint Commission shall be filled by the choosing of a successor member in the same manner as his predecessor.

Sec. 3. The Joint Commission shall study the progress made in the implementation of the coinage program established by this Act, and shall review from time to time such matters as the needs of the economy for coins, the standards for the coinage, technological developments in metallurgy and coin-selector devices, the availability of various metals, renewed minting of the silver dollar, the time when and circumstances under which the United States should cease to maintain the price of silver, and other considerations relevant to the maintenance of an adequate and stable coinage system. It shall, from time to time, give its advice and recommendations with respect to these matters to the President, the Secretary of the Treasury, and the Congress.

Sec. 4. There are authorized to be appropriated, to remain available until expended, such amounts as may be necessary to carry out the purposes of this title.

EXHIBIT 3

STATEMENT BY SECRETARY OF THE TREASURY FOWLER, JUNE 4, 1965, BEFORE THE HOUSE BANKING AND CURRENCY COMMITTEE, ON THE PRESIDENT'S COINAGE AND SILVER PROPOSALS.

Thank you, Mr. Chairman, for this opportunity to appear before your committee today in support of the legislation the President has recommended for a new and efficient U.S. coinage.

We particularly appreciate the promptness with which this hearing has been called following the submission of the President's message, because time is an important element in the matter with which we have to deal.

We are recommending a change in the coinage because there is not enough available silver to assure the continued minting of our traditional 90-percent silver coins for the years ahead in the quantities necessary to meet our rapidly increasing coinage requirements.

As much as all of us would prefer to keep our old and handsome silver coinage, there is no choice but to reduce drastically our heavy dependence upon silver for this purpose for one simple reason: the demand for silver has far outrun supply.

The only option open to us in this matter, without gravely risking the national interest in adequate and plentiful coinage, has been choice of what new material to use in the place of silver.

The new coinage the President has recommended that you authorize has all the attributes of a strong and stable coin system, and that, moreover, it is fully modern, and specifically engineered to carry out efficiently all the tasks that American merchandising of our day requires.

The new coins recommended to you will provide uninterrupted service as a medium of exchange. They can be made without the necessity of further change for a long period ahead. These coins are made of materials for which there is assured access. They can be minted without undue difficulty and at moderate cost. They can be used across the counter--and in all of the 12 million coin-operated devices in use in the United States--side by side with our existing silver coins.

There is, of course, no substitute for the appearance of silver. In one of the three new coins we are asking authority to make--the half dollar--the beauty of the "noble metal" is preserved intact, although the actual silver content is much reduced. The proposed new dime and quarter are a departure from the tradition of silver, but they are coins that have a distinctively modern appearance and that will serve us well because they can protect us from future coin shortages. The fact that they are not silver, but are composite coins made of a nickel alloy bonded to a copper core, is a change that requires getting used to. But I think the ruddy edge resulting from their copper core gives these coins a character we will come not only to accept, but to value.

Now, for a few comments as to the underlying need for this legislation, which is simply the shrinkage of silver supplies.

In the statement there is a table attached which presents the silver supply situation as briefly and succinctly as possible. I have taken it from our "Treasury Staff Study of Silver and Coinage," which I understand is or will be made available to the members of the committee.

Estimated free world silver consumption and production, 1949-64

[Millions of fine troy ounces]

Calendar year	Industry and the arts	Use--Coinage demand			Total consumption	New production	Gross deficit	Deficit, excluding U.S. coinage demand
		U.S.	Foreign free world	Total				
1949-53, averages	153	36	48	85	238	174	64	28
1953-57, averages	190	37	36	74	264	191	73	36
1957-61, averages	216	47	51	98	314	200	114	67
1962	248	77	50	128	375	207	169	72
1963	252	112	56	167	419	214	205	93
1964	286	203	62	265	550	216	335	132

Note.--A troy ounce equals 480 grains, an avoidupois pound equals 7,000 grains, a 2,000-pound ton equals 14,000,000 grains; hence, 1,000,000,000 troy ounces (480,000,000,000 grains) equals 34,285 tons.

Source: "Treasury Staff Study of Silver and Coinage," pt. III, table 1, figures rounded.

The table shows a steadily worsening of our silver supplies, from a small deficiency of production in the early postwar years to a slightly bigger deficiency in the next 5-year period, a much larger inadequacy in the 5 years from 1957 through 1961, and to a bounding growth of the deficiency in the last 2 calendar years. Actual market deficits are smaller than the difference between total consumption and new production because the United States meets its coinage needs for silver out of its stocks. These, however, are being depleted at a rate which cannot be permitted to continue indefinitely.

It is notable that in 1964 each major type of usage--the use of silver by industry and the arts, and use of silver for coinage--taken separately, was greater than new supply.

This is the crux of the matter.

There is simply not enough silver appearing on the market to continue to satisfy the demand for it in the foreseeable future.

There is no dependable--or, for that matter, likely--prospect, in the opinion of experts both inside and outside the Treasury, of new economically workable sources of silver that would appreciably narrow the gap between silver supply and demand. In fact, optimistic projections envision an increase of no more than 20 percent over the next 4 years. Projected increases in consumption are at least equally as great.

This standoff between future increases of production and consumption in a situation where deficits are already very heavy could not change the basic conclusion that use of silver in our coinage must be very sharply curtailed. Also, because silver is produced chiefly as a byproduct of the mining of copper, lead, and zinc, even a very great increase in the price of silver would not stimulate new production sufficiently to change the situation.

Most free world countries have long since ended or nearly ended the use of silver in their coinage. Except for Canada and Switzerland, those countries still using silver coins make only limited use of it, in one or two "prestige" coins, as we now propose to do with the new half dollar. As seen in the table, in the early postwar years, the United States accounted for less than half of total free world employment of silver for coins, but at present we use more than three-quarters of all silver put into coins in the free world.

We have no choice but to make a large reduction of silver in the coinage, and no choice but to do so now. We have on hand some 1 billion ounces of silver in the Treasury stock. At current rates of mint production we are using silver for coinage at the rate of 300 million ounces a year; and for the redemption of silver certificates at 120 million ounces a year.

Even should demands upon our stock increase no more, it is clear that at present rates of use we can expect to exhaust our resources in 2 or 3 years. This gives us enough time to shift to a new coinage if we act promptly.

As to the basic requirement for the new coinage system--in arriving at our recommendations for new coinage alloys our overriding consideration, Mr. Chairman, was the necessity of continuing at all times to provide an adequate means of exchange and of avoiding any disruption of commerce. Experience shows all too clearly that, under modern conditions, the essential medium of exchange function is imperiled if a subsidiary coinage alloy threatens to become more valuable as a commodity than as money.

The Treasury's own staff study, and that of the Battelle Memorial Institute, establish certain other criteria which an acceptable coinage alloy should have, beyond the basic criterion of efficiency in its function as a medium of exchange. These include, the degree to which a coinage material lends itself to being minted into coins which would be durable in use; its acceptability to the public; ease and sureness of production; cost and availability of raw materials, and counterfeiting potential.

An additional criterion is a critical factor for a modern American coinage. Present-day coins should perform not only as a medium of exchange, but also as technical merchandising instruments, in use in coin-operated vending and service machines.

As to the need for compatibility of old and new coinage: The new coins should be made compatible with the existing coinage in use today in coin-operated devices, particularly in coin-operated vending machines. This is one of the most desirable characteristics of a modern coinage, and a characteristic fully met by the President's proposal. If the new coinage could not be used in these mechanisms, the public would be subjected

to great inconvenience, and trade and commerce in many sectors of distribution harassed and handicapped. If the new coins were not compatible, two alternatives would be presented, both of them undesirable from the point of view of the public at large:

(1) The vending machines would have to be shut down until new sensing and rejecting devices could be installed; or

(2) Their devices for sensing and rejecting wrong coins and slugs would have to be deliberately circumvented, exposing the machines to a high rate of fraud.

In the case of merchandise vending machines alone--that is, not including such service devices as pay telephones and coin-operated laundries--over $3\frac{1}{2}$ billion worth of goods were dispensed to consumers last year, in over 30 billion separate transactions.

These vending machines are equipped with sensitive selectors, which reject wrong coins, slugs, foreign coins, and the like. Highly selective rejectors are necessary if coin machines are to be low-cost supply points for foods and for many other kinds of goods, available by night and by day, in out-of-the-way as well as accessible places, such as the modern factory, which we have all observed.

Approximately half of the 12 million coin-operated machines in the United States are equipped with sensors that accept or reject coins on the basis of the electrical properties of our traditional high silver content coinage. To be compatible in operation with our existing coinage, our new coins must duplicate the electrical characteristics of a coin with high silver content. The coins we are recommending to you reproduce precisely the electrical properties of coins with high silver content. Moreover, they are made of the only materials that do so, satisfactorily, among the practical alternatives. Any other course would subject the public to extensive inconvenience.

If noncompatible materials are used, there will have to be an interregnum while new selectors are developed and brought into mass production that are--

(1) capable of handling coins of high silver content together with coins that do not have the electrical properties of nearly pure silver, and

(2) at the same time capable of rejecting slugs, low value foreign coins and coins of wrong denominations. Selectors exist that can handle coins with a wide range of electrical properties. But when they are set for a wide range, their selectivity falls, and they become subject to fraudulent use.

During the 1 to 3 years that development, manufacture and installation of a new kind of sensor would take, the public would not be able to use the incompatible new coinage in the 6 million of our coin-operated devices, chiefly those vending merchandise, fitted with sensitive selectors. The choice of the coins recommended here avoids these difficulties and the attendant interferences with trade and commerce.

Now, to outline briefly the recommendations that appear in the proposed legislation:

Section 1 of the proposed legislation describes the metallic content of the proposed new coinage:

A. THE MINOR COINAGE

The penny and the 5-cent piece: No change is proposed.

B. THE SUBSIDIARY COINAGE

1. The dime and the quarter: It is proposed that silver be eliminated from the dime and quarter. Instead, they should be composite, or clad, coins, faced with an alloy of 75 percent copper and 25 percent nickel--the same cupronickel alloy used throughout the 5-cent piece--bonded to a core of pure copper.

2. The half dollar: It is proposed that the 50-cent piece should also be a composite coin, with the silver content reduced from the present 90 percent to a new ratio of 40 percent. It would be faced with an alloy of 80 percent silver and 20 percent copper, clad on core alloy of approximately 21 percent silver and 79 percent copper.

The Silver Dollar: No change is proposed. Authority to make a silver dollar of the same weight and fineness--412.5 grains, 90 percent silver--made at various times since

the act of 1837, would be continued. However, we would not plan to mint any new coins of this denomination at the present time.

Section 2 provides that the new coins would be subject to the current laws as to design and inscription.

With respect to these coins, I would like to emphasize the following points, some of them already discussed:

1. It is our intention that the existing silver coinage should circulate side by side with the new coinage, indefinitely.

2. The proposed new dime and quarter would have a copper-colored edge, due to the use of a pure copper core.

3. The new coinage would meet the exacting technical requirements necessary to permit it to be used in the coin-operated devices now in use in the United States, including those fitted with rejectors set to refuse coins or imitations of coins that do not have the electrical properties of our current silver coins.

4. We plan to place the new coins in circulation some time in 1966.

5. The new coins would be of the same size and design as present coins of the same denomination. They would be slightly lighter in weight.

Section 3 provides specific recognition of the new coins as legal tender.

Section 4 provides for continued minting of the existing coins as needed until production of the new coinage is adequate, continuing without change the standard silver dollar.

Section 5 provides for standby authority for the Secretary of the Treasury to prohibit the melting, exportation, or treating of U.S. silver coins.

Section 6 provides for sales by the Treasury of silver in excess of what is needed to back silver certificates, at a price not less than the monetary value of silver.

Section 7 would authorize the Treasury to purchase newly mined domestic silver at $1.25 per fine troy ounce.

Section 8 provides for legal authority to procure the materials and technical assistance, equipment and patents needed to make the new coinage in the required quantity.

Section 9 provides authority to continue dating the new coins as of the first year they are issued.

Section 10 would authorize the temporary use of the San Francisco Assay Office for the minting of new coins, and would authorize the conversion of that facility for the refining of precious metals, if necessary, after it is no longer needed for coin production.

Sections 11 to 16: An act requiring recoinage of all worn and uncurrent subsidiary silver received in the Treasury is repealed; the minor-coinage metal fund is renamed the coinage-metal fund, and the minor-coinage profit fund is renamed the coinage-profit fund, and the amount available in the coinage-metal fund is raised from $3 million to $30 million; expenditure of not more than $15 million is authorized for additional mint facilities to accommodate manufacturing requirements of the new materials; the counterfeiting laws are amended to cover the new coinage; the issuance of necessary regulations by the Secretary of the Treasury under the proposed act is authorized; and penalties are provided for violations of regulations issued under section 5.

A separate title of the proposed legislation of great significance provides for the establishment of a Joint Commission of the Coinage after the new coinage is issued.

The Commission would be composed of the Secretary of the Treasury, the Secretary of Commerce, the Director of the Bureau of the Budget, the Director of the Mint, of four public members, not representatives of interest groups, appointed by the President, of the chairmen and ranking minority members of the House and the Senate Banking and Currency Committees, and of two other congressional members, one appointed by the Speaker of the House and one by the President of the Senate.

The function of the Commission would be to study the progress of the implementation of the new coinage program, new technological developments that may intervene, the supply of various metals, and the future of the silver dollar. It would report as to the time and circumstances in which the Government should cease to maintain the price of silver, if that decision should seem desirable. And it would advise the President, the Congress, and the Secretary of the Treasury on the results of its studies.

As to the protection of existing coinage:

The continued use of coins that are 90 percent silver also requires protection of this high silver content coinage from hoarding or destruction.

There is no reason for hoarding of coins in anticipation of a coin shortage. We expect no such shortage during the period when we are installing the new coinage. We can, if necessary, step up production enough to replace completely, in less than 3 years, the entire body of existing silver coinage while at the same time keeping up with the normal growth of coin demand.

We can defend the existing silver coinage against the second possible danger--the threat of destruction by melting them for their silver content. To make certain that the silver coinage is not destroyed in this manner, it will be necessary for the Treasury to protect the monetary value of our silver coinage by supplying silver to the market upon demand at the present monetary price of silver of $1.29 plus per troy ounce. The Treasury has been doing this since 1963 by exchanges of silver bullion against silver certificates.

The value of the silver in our existing coinage, as silver, would exceed the face value of the coins if the price were allowed to rise above a so-called melting point of these coins of $1.38 per ounce. We hold the price of $1.29 plus per ounce by standing ready freely to redeem silver certificates in silver at this price. The prudent course is to maintain the price of silver at its present level.

It is as additional protection for existing silver coinage, which includes the silver dollar, that we recommend asking for standby authority to institute controls over the melting, treating or export of U.S. coins, practices not now forbidden by law.

We believe strongly that suggestions for more extensive controls would operate against our best interests.

As to the sufficiency of coinage supply:

As you know, we have recently experienced a shortage of coins. I am happy to say that as a result of intensive production efforts on the part of the Mint the supply of coins in circulation and in inventory in the Federal Reserve banks is improved. There is no longer a shortage of the 1-cent and 5-cent pieces.

We still have a problem with dimes and quarters supply but substantial improvements have been made. The shortage of half dollars is still severe.

In view of the continuing shortages of high denomination coins and the uncertainties inevitable during the changeover period, we are gearing up for maximum production of the new coins as soon as the legislation is passed. In the first year after enactment, we expect to make at least 3 1/2 billion of the new subsidiary coins--a billion and a half more than we will make of the silver coins in fiscal 1965. This is more than double the production in fiscal 1964 and four or five times what we would consider as a normal year's production of silver coins. In the second year after enactment we would expect to make well over 7 billion of the new coins, doubling production again.

As to the silver dollar:

The silver dollar will remain as an authorized coin of the United States, at 90 percent fineness. This is a central element in our program for holding the price of silver to its present level for the protection of our existing subsidiary silver coin. The future of the silver dollar can better be decided when the Joint Commission of the Coinage, which we have recommended, can take a look at the world's silver supply and demand situation and other relevant factors and make its recommendations. At that time, the facts can largely govern the decision on the issue of the future of the silver dollar.

Now, as to maintaining some silver in the subsidiary coinage:

We have considered it desirable to maintain some silver in our subsidiary coinage. It was to this end that the new silver half dollar was designed. The new composite coin reduced the silver content of the half dollar from 90 to 40 percent. It nevertheless retains without readily apparent differences, the aspect and ring of a coin with high silver content, although it is slightly lighter than the present half dollar. It is to be of the same design as the present half dollar, that is, bearing the image of the late President Kennedy.

One reason for retaining some silver in our coinage is a desire to continue the 173-year-old tradition of American silver coinage. Inclusion of a 40 percent silver half dollar is as far as we can safely go to satisfy this tradition. We expect that, barring unforeseen changes in industrial demand for silver, we will have adequate silver to make this one coin in normal amounts for an indefinite period. After the new coins are in full production it should require no more than 15 million ounces a year--less than 5 percent of expected 1965 silver consumption for coins. One reason for continuing this particular coin is the fact that we could, if unforeseen difficulties developed, do without the half dollar temporarily. It can be replaced in use by two quarters.

In conclusion, a change in our coinage is unavoidable. We have reviewed very carefully the results of all of the studies which have been made on this subject. We are satisfied, that, taking into account all of the various factors involved in this problem, our recommendations for the new coinage are sound proposals that will, if enacted, provide the United States with a dependable, technically perfect, and distinctive coinage that can be produced in whatever quantity desired. It is a coinage that, I emphasize, "will perform not only across the counter, but will also carry out fully and without interruption its function as a technical merchandising instrument." This is absolutely necessary for the public interest. I, therefore, strongly urge approval of these recommendations and that they be enacted into law at the earliest possible date.

EXHIBIT 4

STATEMENT BY SECRETARY OF THE TREASURY FOWLER, JUNE 9, 1965, BEFORE THE SENATE BANKING AND CURRENCY COMMITTEE, ON THE PRESIDENT'S COINAGE AND SILVER PROPOSALS.

This statement is presented in support of the legislation the President has recommended for a new and efficient coinage. The new coinage will use a composite copper and nickel alloy in the 10- and 25-cent pieces in place of the present 90-percent silver, and a composite silver alloy of 40 percent in the 50-cent piece.

In response to this committee's desire for a detailed description of the proposed program, my statement contains sections on "The New Coinage System," "Outline of Legislative Recommendations," "The Shortage of Silver" (including a table at p. 98), "The Choice of a New Coin Alloy," "Importance of the Operation of the New and Existing Coins in Coin-Operated Machines," and "The Adequacy of Coin Supplies."

THE NEW COINAGE SYSTEM

The new alloys reflect the latest developments in modern technology. Precisely engineered characteristics will insure the consistent operation of the new dimes and quarters alongside our high content silver coinage in all our millions of coin-operated machines. These new 10- and 25-cent pieces will be functional. They will be attractive in appearance, durable, and available in needed amounts. They will be full legal tender, circulating alongside, and with the same purchasing power, as our present silver dimes and quarters. Their copper colored edge and special production process will reduce counterfeiting potential.

The realities of the silver situation have made it impossible for us to continue much longer the production of silver coins in large volume.

During calendar year 1964, we used more than 200 million ounces of silver in coinage and we are coining silver at about a 300 million ounce rate this year. While Treasury stocks of silver of 1 billion ounces are still very large, they obviously cannot withstand this rate of use for long. Moreover, Treasury stocks must also be available for the continuing redemption of silver certificates which will keep the market price of silver from rising above $1.29 plus.

We have no choice but to remove silver entirely from the dime and the quarter. Any other course could have serious consequences. By switching to the new cupronickel clad alloy for dimes and quarters, a major and available drain upon our supplies of silver is removed. As a result, it should be possible to maintain our tradition of silver coinage with a silver 50-cent piece in the new coinage system. At anticipated rates of production, this 50-cent piece of reduced silver content would use relatively small amounts of silver, possibly 15 million ounces a year once we are "on stream." In addition, the present legal definition of the silver dollar would remain unchanged, although planning for renewed minting of that coin would be premature.

The new coinage system looks to the future in providing functional coins for a modern America. The new system also retains a valued tie with the past by extending a 173-year-old tradition of silver in our coinage. We do not expect this combination of the new and the old to require any major modifications in the future. But, we recognize the complexity of the silver and coinage problem and the fact that any change in this area touches the daily lives of all our citizens. Therefore, in the consideration of future silver policies, the role of the silver dollar and other matters, it is fitting that we should provide now for an orderly review of the issues in the light of conditions as they develop. Provision is made as an integral part of this legislation for the formation of a Joint Commission on the Coinage. I will comment upon the duties of the Commission in a moment.

OUTLINE OF LEGISLATIVE RECOMMENDATIONS

The specific legislative proposals now before you are best summarized by a brief section-by-section review.

Title I of the proposed legislation

Section I describes the metallic content, weight, and other technical specifications, of the proposed new coinage.

1. The dime and the quarter: It is proposed that silver be eliminated entirely from the dime and the quarter. Instead, they should be composite, or clad, coins faced with an alloy of 75 percent copper and 25 percent nickel (the same cupronickel alloy used in the 5-cent piece) bonded to a core of pure copper. By use of this modern technique, it has become possible to duplicate exactly the electrical properties of our existing silver coins. This is essential to avoid disruption to commerce and great inconvenience to the public, as I shall explain later in some detail.

2. The half dollar: It is proposed that the 50-cent piece should also be a composite, or clad, coin. The overall silver content would be reduced from the present 90 to 40 percent. This would be accomplished by cladding outer faces of a high content silver-copper alloy on a low content silver-copper core. The outside alloy would be 80 percent silver and 20 percent copper, and the inner core would be approximately 21 percent silver and 79 percent copper. The result is a handsome coin, not readily distinguished from our present 50-cent piece.

Samples of the 10-cent, 25-cent, and 50-cent coins are available for your inspection.

A final clause of section I defines certain technical specifications for the new coins. Among these is a requirement that the outside cladding of the new coins should be at least 30 percent of their weight. This will more than insure that the outside facing of the coins will not be worn away in circulation. Extensive wear tests have been conducted on the new coins with entirely satisfactory results. The new 10-cent and 25-cent cupronickel clad coins can be expected to outwear our present silver coins of the same denomination.

Section II provides that the new coins would be subject to the current laws as to design and inscription. This is desirable in terms of maintaining continuity with the past and increasing ready public acceptance of the new coins.

Section III provides specific recognition of the new coins as legal tender. Such express provision will eliminate any possible doubt or misunderstanding on this score and make it absolutely clear that the new coins will be accepted along with the present coinage. The present coinage would, of course, retain its full legal tender status. We expect the existing silver coinage to remain in active circulation into the indefinite future.

Section IV provides for the continued minting of the existing coins as needed. Silver dimes and quarters and the present half dollar would be phased out of production as rapidly as possible in favor of the new coins. But efficient utilization of mint capacity during the early parts of next year, may require the production of some amounts of the old coins.

Section IV also provides for the continuation without change of the present specifications of the penny, the nickel, and the standard silver dollar. Authority to make a silver dollar of the same weight and fineness (412.5 grains, 90 percent silver) made at various times since the act of 1837, would thereby be continued. That standard silver dollar, whose pure silver content has actually remained the same since 1792, defines the monetary value of silver at which we are legally and morally obligated to continue the redemption of silver certificates. No change should be made in the legal definition of the standard silver dollar. However, we would not plan to mint any new coins of this denomination under existing circumstances.

Section V provides for standby authority for the Secretary of the Treasury to prohibit the melting, exportation, or treating of U.S. coins. While these prohibitions probably will not have to be used, we seek the standby authority to use them as a precautionary measure, and as an appropriate permanent provision of law.

We plan to continue our existing silver coins in active circulation alongside the new coins. The existing high silver content coins will be protected by the Treasury supplying silver to the market through exchanges against silver certificates at $1.29-plus per ounce. This will prevent the development of any incentive to melt or export our silver coins. And, once the large present drains from the production of silver coins have been removed, our silver stocks should be adequate to protect our coinage for an indefinitely long period ahead.

Section VI provides for sales of silver by the Treasury in excess of that needed to back silver certificates, at a price not less than the monetary value of silver. This is an additional measure designed to insure that there will be no increase in the price of silver above its monetary value, even should silver certificates not be readily available for redemption. There is general agreement that preventing an increase in the price of silver is essential to the protection of the existing coinage.

Section VII would authorize the Secretary of the Treasury to purchase newly mined domestic silver at $1.25 per fine troy ounce. It is not believed that enactment of our proposals to reduce drastically the use of silver in the U.S. coinage would cause any sizable or persistent decline in the market price of silver. However, since we are imposing a ceiling on the price of silver, it seems reasonable to provide domestic producers of silver with protection against any sizable decline in price. The purchase provision at $1.25 is included for that purpose.

Section VIII provides for legal authority to procure the materials and technical assistance, equipment, and patents needed to make the new coinage in the required quantity.

Section IX provides authority to continue dating the new coins as of the first year of coinage or issuance. This will help to avoid hoarding of the initial issue of the new coins.

Section X would authorize the temporary use of the San Francisco Assay Office for the minting of coins and would authorize the conversion of that facility for the refining of precious metals, if necessary, after it is no longer needed for coin production. During early stages of the production of the new coins, the mint's production load will be particularly heavy and temporary minting facilities at San Francisco will be needed. Subsequently, the provision of refining facilities there will contribute to the efficiency of operations at the mints and assay offices.

Sections XI through XVI deal with various minor legislative changes required to assist the establishment of the new coinage system. An act requiring recoinage of all worn and uncurrent subsidiary silver received in the Treasury is repealed; the Minor-coinage Metal Fund is renamed the Coinage-Metal Fund, and the Minor-coinage Profit Fund is renamed the Coinage-Profit Fund and the amount available in the Coinage-Metal Fund is raised from $3 million to $30 million; expenditure of not more than $15 million is authorized for additional mint facilities to accommodate manufacturing requirements of the new materials; the counterfeiting laws are amended to cover the new coinage; the issuance of necessary regulations by the Secretary of the Treasury under the proposed act is authorized; and penalties are provided for violations of regulations issued under section V.

THE JOINT COMMISSION ON THE COINAGE

Title II of the proposed legislation provides for the establishment of a Joint Commission on the Coinage.

The Commission would be composed of the Secretary of the Treasury, the Secretary of Commerce, the Director of the Bureau of the Budget, the Director of the Mint, of four public members, not representative of interest groups, appointed by the President, of the chairmen and ranking minority members of the House and Senate Banking and Currency Committees and of two other Congressional Members, one appointed by the Speaker of the House and one by the President of the Senate.

The function of the Commission would be to study and report on the progress of the implementation of the new coinage program, new technological developments, the supply of various metals, and the future of the silver dollar. It would report as to whether the Government should continue to control the price of silver or get out of the silver market. And it would advise the President, the Congress and the Secretary of the Treasury on the results of its studies.

The provision for a continuing appraisal of these issues is a very useful step. The problems are complex, and final answers in some areas can only await the fuller information the future will provide. The elimination of silver from our dimes and quarters is a final step, enforced by a developing shortage of silver of inescapable dimensions. But decisions in other areas, such as the quantity of production of the silver 50-cent piece and the future of the silver dollar can be reviewed. Such decisions are better judged against what actually happens, rather than what we think, or hope, may happen. It will be the important function of the proposed Joint Commission to appraise these issues and to suggest any courses of action that may be desirable.

THE SHORTAGE OF SILVER

The need for the changes contained in the proposed legislation arises from a chronic, and steadily worsening, shortage of silver. That shortage has now become so severe relative to the demands for silver that we have no option but to reduce drastically our use of silver for coinage. The main dimensions of this problem are shown in an accompanying table derived from the Treasury staff study of silver and coinage.

The table shows a steady worsening of silver supplies from a small deficiency of production in the early postwar years to a slightly bigger deficiency in the next 5-year period, a much larger inadequacy, on the average, in the 5 years from 1957 through 1961, and a bounding growth of the deficiency in the last 2 calendar years. Last year the gross production deficit was more than 330 million ounces. It will probably be even larger this year.

Actual market deficits are smaller than this difference between total consumption and new production because the United States meets its coinage needs for silver out of its stocks. These, however, are being depleted at a rate which cannot be permitted to continue indefinitely. Even with U.S. coinage demand excluded, the production gap reached some 130 million ounces in 1964 and has been growing steadily.

Estimated free world silver consumption and production, 1949-64

[Millions of fine troy ounces]

Calendar year	Consumption					New production			Gross deficit (-)	Deficit, excluding U.S. coinage demand (-)
	Industry and the arts	Coinage			Total consumption	United States	Foreign free world	Total new production		
		United States	Foreign free world	Total						
1949-53 averages...	153	37	48	85	238	39	135	174	-64	-27
1953-57 averages...	190	38	36	74	264	38	153	191	-73	-35
1958	191	38	41	79	270	37	169	206	-64	-26
1959	213	41	45	86	299	23	165	188	-111	-70
1960	225	46	58	104	329	37	170	207	-122	-76
1961	240	56	81	137	377	35	168	203	-174	-118
1962	248	77	50	128	375	36	171	207	-169	-92
1963	252	112	56	167	419	35	179	214	-205	-93
1964	286	203	62	265	550	36	180	216	-335	-132

Source: Treasury staff study of silver and coinage, pt. III, tables 1 and 3, figures rounded.

It is notable that in 1964 each major type of free world consumption (the use of silver by industry and the arts, and use of silver for coinage) taken separately was greater than new production.

Thus, there is simply not enough silver appearing on the market to continue to satisfy the demand for it in the foreseeable future.

During the past 15 years, there has been a steady expansion in the worldwide use of silver in industry and the arts. Rising incomes have stimulated increases in such consumer-oriented uses as photography, silverware, and jewelry. In addition, the relatively unique physical and electrical properties of silver have led to its rapidly expanding use in a range of industrial and defense applications. As a consequence, growth in the noncoinage uses of silver has been very substantial as may be seen from the attached table.

There has been some expansion of new production of silver in the free world but not at a pace sufficient to prevent the appearance of the large and widening deficits to which I have already directed your attention. The expansion in silver production that has occurred has been outside the United States, and has largely been a consequence of rising levels of copper, lead, and zinc production with which silver is sometimes found as a byproduct.

Production of silver in this country has shown no upward trend in the postwar period, but has averaged a more or less steady 35 to 40 million ounces annually. This level of production is small relative to U.S. industrial demand for silver and this country has typically had to import substantial amounts of silver and rely on Treasury stocks.

During the past 4 years, free world industrial use of silver has grown by an estimated 60 million ounces, but free world production has grown by only about 10 million ounces, and U.S. production has not grown at all. There are some signs that new production of silver in this country and abroad may increase by modest amounts in the future.

In the opinion of experts both inside and outside the Treasury, there is no dependable--or, for that matter, likely--prospect of new economically workable sources of silver that would rapidly and appreciably narrow the gap between silver supply and demand. In fact, optimistic projections envision a production increase of no more than 20 percent over the next 4 years. Projected increases in consumption in industry and the arts are at least equally as great. Thus, there is a standoff between future increases of silver production and noncoinage uses of silver in a situation where deficits are

already very heavy. Expected increases in silver production could not, therefore, change the basic conclusion that use of silver in our coinage must be very sharply curtailed. Also, because silver is produced chiefly as a byproduct of the mining of copper, lead, and zinc, we could not count on even a very great increase in the price of silver stimulating enough new production to change the situation.

Most free world countries have long since ended or nearly ended the use of silver in their coinage. Except for Canada and Switzerland, those countries still using silver coins make only limited use of it, in one or two "prestige" coins, as we now propose to do with the new half dollar. As seen in the attached table, in the early postwar years, the United States accounted for less than half of total free world employment of silver for coins, but at present we use more than three-quarters of all silver put into coins in the free world. We have no choice but to make a large reduction of silver in the coinage, and no choice but to do so now. We have on hand some 1 billion ounces of silver in the Treasury stock. At current rates of mint production, we are using silver for coinage at the rate of about 300 million ounces a year; and for the redemption of silver certificates at nearly 120 million ounces a year.

Even should demands upon our stock increase no more, it is clear that at present rates of use we can expect to exhaust our resources in 2 or 3 years. This gives us enough time to shift to a new coinage, but requires that we act promptly.

THE CHOICE OF A NEW COINAGE ALLOY

In arriving at our recommendations for new coinage alloys, an overriding consideration was the necessity of continuing at all times to provide an adequate means of exchange and avoiding any disruption to commerce. Experience shows all too clearly that, under modern conditions, the essential medium of exchange function is imperiled if a subsidiary coinage alloy threatens to become more valuable as a commodity than as money. In addition to insuring that the all important needs of commerce would be met, our coinage choice has been influenced by technical and metallurgical considerations.

In order to be sure that these important technical and metallurgical considerations would be fully investigated, the mint supplemented its own intensive efforts through a contract study carried on by the Battelle Memorial Institute. This nonprofit research organization has a worldwide reputation in the metallurgical field; and by virtue of this special competence it was uniquely equipped to assist the Mint and the Treasury in a study of the alternative coinage alloys that might be appropriate for use in the new coinage system.

Battelle's investigations and those of the Treasury were guided by specific criteria essential for a modern coinage system. These included criteria relating to:

(1) Availability and price of the raw materials required for the coinage program;

(2) Public acceptability in terms of the technical characteristics of the coins and the effects of the overall program;

(3) Technical characteristics of the coinage material in terms of color, density, mechanical, chemical, and physical properties, including those required at present by coin selector devices in vending machines;

(4) Minting characteristics of alternative materials and assurance of high levels of coin production; and

(5) Counterfeiting and slug potential.

Every coinage alloy showing any sign of promise was investigated both by Battelle and by the mint. Advocates of particular coinage materials were given an opportunity to present their case. Trial strikes of a wide range of different alloys were made by the mint in the course of its own investigations, and to assist Battelle in theirs. The results of these investigations and the extent to which the different alloys met or fell short of minimum standards of acceptability are set forth in detail in the Battelle report entitled "A Study of Alloys Suitable for Use as U.S. Coinage" and in somewhat lesser detail in section IV of the Treasury staff study--both of which have been made available to your committee.

Consequently, I shall not describe the specific reasons which led to the rejection of some alloys upon technical and metallurgical grounds and the provisional acceptance

of others. However, I do want to comment upon the importance we have placed upon the new coins working in vending and service machines. This was a major consideration which, along with its other desirable properties, led us to a final selection of the cupronickel clad coin for use in the 10-cent and 25-cent denominations.

IMPORTANCE OF THE OPERATION OF THE NEW AND EXISTING COINS IN COIN-OPERATED MACHINES

Because of the greatly increased reliance we now place upon the use of coin-operated devices, our coins must serve us as a technical merchandising instrument as well as a medium of exchange in the traditional sense. The extent of that reliance is suggested by the fact that there are today more than 12 million coin-operated machines in this country. In the case of merchandise vending machines alone--excluding such devices as pay telephones and most coin-operated laundries--over $3 1/2 billion worth of goods were dispensed to consumers last year, in over 30 billion transactions.

Our own dependence upon coin-operated machines is much greater than that in any other country. This fact has added an extra dimension to our coinage problem and imposed certain requirements which any new coinage alloy should meet, if at all possible. We now take for granted the fact of ready access to machine-vended goods and services, available by night and by day, in out-of-the-way as well as accessible places. It is clear that a coinage alloy that did not work alongside existing coins in coin-operated devices would impose extreme inconvenience upon the public and some disruption to the orderly flow of commerce would be sure to occur.

About half of our 12 million coin-operated devices are equipped with sophisticated mechanisms which subject coins to a variety of tests before accepting them and dispensing the merchandise or service. The most important of these tests is based upon the electrical resistivity of the coinage material, and has been built around the rather special properties of our existing silver coinage alloy. Yet, the continued use of any silver in our dimes and quarters is out of the question because of the overall silver situation. Therefore, the alternatives for the dime and the quarter are a nonsilver alloy which would be compatible in the sense of working in vending machines alongside the existing coinage, or one which would not.

If a noncompatible alloy were chosen, two alternatives would be presented, both of them undesirable from the point of view of the public at large:

(1) The vending machines would have to be shut down until new sensing and rejecting devices could be developed and installed, or

(2) Their devices for sensing and rejecting wrong coins and slugs would have to be deliberately circumvented, exposing the machines to a high rate of fraud.

In due course, entirely new rejector mechanisms could probably be developed which would accept any new alloy along with our existing coins. All evidence suggests that it would take at least 1 to 3 years, even after a successful design had been developed, to produce and install new rejector mechanisms. During this period, the public would experience serious inconvenience if machines were shut down entirely and would probably have to pay higher prices if machines were kept in operation but were subjected to a high rate of loss through the use of slugs.

My technical staff advises me that there may well be serious difficulty in designing a rejector which would accept the existing coins together with coins of very different electrical properties, without at the same time seriously compromising the ability of the mechanism to accept genuine coins and to reject slugs, low-valued foreign coins, and coins of wrong denominations. It may be, as I have noted, that these technical limitations can be overcome in time, but they represent an additional factor arguing for the use of a compatible coinage alloy.

I have not mentioned the financial costs to the vending machine industry of adapting to an incompatible coinage alloy. These would undoubtedly be sizable. Very approximate figures are suggested by the Battelle and Treasury studies. The existence of these financial costs did not appreciably influence our final recommendation of the best coinage

alloy for the dime and the quarter. Every industry must be reconciled to the costs of adapting to change when it occurs. But widespread inconvenience to the consuming public, disruption of commerce, and loss of employment were factors which did influence our choice.

The cupronickel alloy clad on a core of pure copper, that we recommend for use in the dime and quarter, is a remarkable example of technical ingenuity. The faces of cupronickel provide a tested, attractive, and durable coinage material. Solid cupronickel coins would not work, however, in the 10-, 25-, and 50-cent channels of existing rejector mechanisms. But the same cupronickel material clad on a copper core in the proportions proposed duplicates exactly the electrical properties of our existing silver coins. The new coins work alongside of the existing ones dependably in all of our coin-operated devices.

THE ADEQUACY OF COIN SUPPLIES

The compatibility of the new coins with existing silver coins in vending machines will do much to insure side-by-side circulation. However, it will be essential to continue to protect our high silver content coinage from hoarding or destruction.

There is no reason for our silver coins to be hoarded because of the introduction of the new coins. The existing silver coins can be expected to remain in active circulation indefinitely. There are no plans for their accelerated withdrawal.

Hoarding of coin, of course, is greatly stimulated by fear of shortages. No such fear need be felt in the case of the new coins. The mint has already shown with pennies and nickels how successfully a massive production effort can overcome an even fairly severe shortage. With silver removed from the dime and the quarter, there will be no barrier to a very large production effort on the new subsidiary coins, if such should be required.

In view of the existing tight supplies of high-denomination coins and the uncertainties inevitable during any changeover period, we are gearing up for maximum production of the new coins, beginning very soon after the actual enactment of legislation. In 1 year from the passage of the legislation, we expect to make at least 3 1/2 billion of the new subsidiary coins. This would be a billion and a half more subsidiary coins than we will be producing in fiscal 1965 even under the greatly increased crash coinage program. It would be more than double the production of similar coins in fiscal 1964 and four or five times what we could consider as a normal year's production of silver coins. In the second year after enactment we will have the capacity to make well over 7 billion of the new coins, doubling production again if that is necessary.

Production capabilities of this size should provide an adequate safeguard against any hoarding of silver coins that might possibly occur.

In addition, however, it will be necessary to continue to protect our existing silver coins from the threat of destruction by melting them for their silver content. To make certain that the silver coinage is not destroyed in this manner, it will be necessary for the Treasury to protect it by supplying silver to the market upon demand at the present monetary value of silver of $1.29-plus per troy ounce. The Treasury has been doing this since 1963 by exchanges of silver bullion against silver certificates.

The value of the silver in our existing coinage, as silver, would exceed the face value of the coins if the price were allowed to rise above a so-called melting point of these coins of $1.38 per ounce. We hold the price of $1.29-plus per ounce by standing ready freely to redeem silver certificates in silver at this price. The prudent course is to maintain the price of silver at its present level. In order to remove any possible question as to our intention and ability to maintain the current price of silver, authority is requested to sell silver not needed to back silver certificates. Such sales could only take place at or about the monetary value of silver.

As additional protection for existing silver coinage, which includes the silver dollar, we ask for standby authority to institute controls over the melting, treating, or export of U.S. coins, practices not now forbidden by law.

We believe strongly that suggestions for more extensive controls would operate against our best interests. It has been suggested that we should institute a comprehensive system of controls, including prohibitions on the hoarding of silver coin and bullion and the institution of end-use certificates to regulate the industrial use of silver.

It is our opinion that a prohibition against hoarding coins would be extremely difficult to administer and therefore of doubtful success. An essential initial step would be the determination of what would constitute a normal supply of coins for businesses and individuals. This would appear to be an insoluble problem for which little relevant information is available, and involving massive interference in private businesses. Furthermore, it is difficult to escape the conclusion that any efforts along these lines would be quite likely to stimulate the very hoarding that it is desired to avoid, by giving rise to the impression that the Government fears large-scale hoarding is about to occur.

Controls over hoarding or exporting of silver bullion and the regulation of industrial consumption through end-use certificates might seem, in principle, a more feasible undertaking. However, such action would result in a dual-price system for silver which could jeopardize our supply of circulating silver coins. One price, $1.29 plus, would be available to legitimate industrial, professional, and artistic users of silver who could obtain it from the Government. However, it is difficult to see how the development of a second price paid by speculators, hoarders, and foreign users of silver could be avoided. This second price which would be entirely dependent upon the unregulated supply of and demand for silver could rise high enough to constitute a threat to our silver coinage. The best way to achieve a smooth transition to the new coinage is to make silver freely available at the $1.29 plus price that will avoid the creation of incentives to melt or export our present coinage.

THE SILVER DOLLAR

The silver dollar will remain as an authorized coin of the United States, with 90-percent silver. This is a central element in our program for holding the price of silver to its present level for the protection of our existing subsidiary silver coin. The future of the silver dollar can best be decided when the Joint Commission of the Coinage, which we have recommended, can take a look at the world's silver supply and demand situation and other relevant factors and make its recommendations. At that time, the facts can largely govern the decision on the issue of the future of the silver dollar.

MAINTAINING SOME SILVER IN THE SUBSIDIARY COINAGE

We have considered it desirable to maintain some silver in our subsidiary coinage. It was to this end that the new silver half dollar was designed. The new composite coin reduces the silver content of the half dollar from 90 percent to 40 percent. It nevertheless retains without readily apparent differences, the aspect and ring of a coin with high silver content, although it is slightly lighter than the present half dollar. It is to be of the same design as the present half dollar, that is, bearing the image of the late President Kennedy.

The reason for retaining some silver in our coinage is a desire to continue the 173-year-old tradition of American silver coinage. Inclusion of a 40-percent silver half dollar is as far as we can safely go to satisfy this tradition. We expect that, barring unforeseen changes in industrial demand for silver, we will have adequate silver to make this one coin in normal amounts for an indefinite period. After the new coins are in full production they should require no more than 15 million ounces a year--less than 5 percent of expected 1965 silver consumption for coins. One reason for confining our use of silver to this particular coin is the fact that we could, if unforeseen difficulties developed, do without the half dollar temporarily. It can be readily replaced in use by two quarters.

SUMMARY

A change in our coinage is unavoidable. We have reviewed very carefully the results of all of the studies which have been made on this subject. We are satisfied that, taking into account all of the various factors involved in this problem, our recommendations for the new coinage are sound proposals that will, if enacted, provide the United States with a dependable, technically perfect, and distinctive coinage that can be produce in whatever quantity desired. It is a coinage that, I emphasize, will perform not only across the counter, but will also carry out fully and without interruption its function as a technical merchandising instrument. This is absolutely necessary in the public interest. I therefore strongly urge approval of the President's recommendations on coinage and silver and that they be enacted into law at the earliest possible date.

EXHIBIT 5

TREASURY STAFF STUDY OF SILVER AND COINAGE, UNITED STATES TREASURY DEPARTMENT, 1965.

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FOREWORD

This study has served as a basic document assisting in the development of policies to insure the adequacy of the United States coinage.

It is the result of research and analysis that has extended over the past 2 years. The objective was to consider all aspects and possibilities of the silver and coinage problems.

The study is made public as an informational service. In using it, account should be taken of the fact that since it was undertaken questions as to wear, and procurement, of some materials, then uncertain, have been answered.

One of the central aims of the study was the application of objective criteria for the development of a modern coinage system. The new coinage recommendations contained in legislative proposals being sent to the Congress meet the criteria for a modern United States coinage set forth here.

A critical part of the study was a thorough exploration of the silver supply and demand situation. This exploration provided the substance for the most basic decision that had to be made with respect to our coinage system: had it become unavoidably necessary for the United States to turn away from the large-scale use of silver in its coinage?

The conclusion of the Treasury Staff Study of Silver and Coinage that there is not a sufficient supply of silver to warrant the retention by the United States of its traditional silver coinage is supported by an independent study, commissioned by the Treasury, of the Battelle Memorial Institute, also being made public at this time, and by other inquiries into this subject.

Responsibility for the study was concentrated in the Treasury's Office of Financial Analysis. However, the study has been a cooperative undertaking to which personnel in the Bureau of the Mint, Office of Domestic Gold and Silver Operations, the Treasurer's Office, and the Office of the General Counsel have all contributed.

DIGEST OF THE TREASURY STAFF STUDY OF SILVER AND COINAGE

[Note.--The study's final conclusions are summarized here, followed by a brief review of each of its sections]

I. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

1. The fundamental finding of this study is that 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.

2. Cupronickel is the best permanent material for a new subsidiary coinage, ignoring the vending machine problem. However, cupronickel coins would require "factory" adjustment of the coin rejectors in some 6 million coin-operated vending machines, entailing significant costs and public inconvenience.

3. Since extensive experiments confirm that cupronickel clad on a copper core operates successfully in unaltered vending machine rejectors, preferable options are available. Cupronickel-clad coins can be used during a transition period, or permanently. An overriding requirement with cupronickel-clad coins is the production feasibility of the strip and the assurance of an adequate supply for processing in the Mint.

6. Subsidiary silver coinage of reduced content, such as silver-copper alloys clad on a low-content silver-copper core, suffers both from difficult transitional problems and incomplete assurance that the subsidiary coinage would not be imperiled again within a fairly short period of time, due to the shortage of silver. If any silver is to be retained in the subsidiary coinage system, it should be limited to a clad silver 50-cent piece of 400 fineness. There is no suggestion that the silver content of the silver dollar be changed.

7. During the installation of any new coinage system, it will be obligatory to hold the market price of silver at its current level of $1.29+ in order to protect the existing coinage. Since this will remove the incentive to melt the existing coinage, controls over melting would probably not serve any useful purpose. Effective controls on the hoarding of coin appear impractical. Controls on the export of coin may serve a useful purpose during the transition period. There is something to be said for having standby authority to invoke controls. A prompt transition to base alloy coinage would make the actual use of controls unnecessary.

8. New coins should be placed in circulation through normal channels. Every effort should be made as soon as possible to prepare for extremely high rates of production of the new coins.

II. CRITERIA BY WHICH A NEW COINAGE CAN BE JUDGED

Summary of Criteria

The criteria are listed in the order in which they are discussed rather than in descending importance. However, it is felt that the single most essential objective must be the facilitation of the orderly flow of financial and commercial transactions.

A new coinage should meet the following principal criteria:

1. No interruption of essential medium of exchange function.
2. Promise of requiring minimum changes for a long period of time.
3. Assured access to raw materials.
4. Public acceptability in terms of--
    a. Need for the change.
    b. Technical characteristics of the coins.
    c. Degree of inconvenience the new coinage imposes.
    d. Absence of extreme hardship to any group or region.
5. Minting characteristics and coinage costs:
    a. Assurance of high levels of production.
    b. Minimization of dollar cost.
    c. Minimization of any adverse impact upon balance of payments and international financial position.

6. Compatibility with present coinage:
   a. Probable need for side-by-side circulation.
   b. Vending machines usage.

III. SILVER MARKET TRENDS

The discussion of silver market trends is divided into two parts. First, the dimensions of the growing imbalance in world silver markets are established and the implications for Treasury policy are discussed briefly. Second, the extent to which production and consumption of silver would adjust to higher prices is examined in order to reach a preliminary judgment as to the feasibility of reduced content silver coinage. [To avoid misunderstanding, it should be stressed that while this preliminary examination of silver markets does not definitely rule out the possibility of a low-content silver coinage system, that possibility is ruled out by a later examination (Section V) of the specific difficulties of achieving a safe transition.]

1. Recent years have seen the development of an enormous gap between Free World production and consumption of silver. The overall deficit, inclusive of coinage demands, was 200 million ounces in 1963 and almost 340 million ounces in 1964. Even if all coinage demands, United States and foreign, are subtracted, a deficit remains.

2. U.S. Treasury stocks of silver declined to 1,218 million ounces by the end of 1964 and may be down to 1,000 million ounces or less by mid-1965. Legislative action by 1965 on a new coinage system is essential while Treasury stocks of silver are still large.

3. On the basis of past experience, higher silver prices and increases in base-metal production promise to increase world silver production. The independent influence of higher silver prices cannot be estimated with any precision, but there is no reason to doubt that substantially higher prices would lead to some expansion in silver output. However, the current production deficit is so large that it cannot be closed from the production side.

4. During the last 15 years, most of the growth in the industrial consumption of silver has occurred in foreign countries; U.S. consumption has grown more slowly. There were some signs that the recent increases in silver prices had checked the overall growth in world industrial use of silver, but only temporarily, and in 1964 there was a sharp advance in silver consumption, here and abroad.

5. A simple extension of the postwar trend of silver prices suggests that $2 an ounce might easily be reached by 1980 or 1985. Analysis of supply-and-demand factors does not yield any precise estimate of the level that silver prices might reach in a free market. The analysis does suggest that there is a very appreciable risk that the price could reach $2 an ounce then, or even much sooner. Battelle's detailed quantitative projections of the rate of exhaustion of Treasury stocks lead to an even more pessimistic appraisal since with coinage of 50 percent silver content they can foresee the complete exhaustion of Treasury silver as early as 1969.

6. In view of these considerations, it does not appear that reduction of silver content to 800, 700, or 600 fineness would constitute a longrun (20- to 25-year) solution to the coinage problem. On the basis of longrun supply-and-demand factors, there is an unmistakable risk that a rising market price of silver would soon imperil coinage of 500 fineness. That risk would be overwhelming even for lower silver contents if future U.S. coinage demand could not be met exclusively from Treasury silver holdings.

IV. METALLURGICAL AND TECHNICAL CHARACTERISTICS OF ALTERNATIVE COINAGE ALLOYS

This section divides the possible coinage alloys into those that are acceptable on technical and metallurgical grounds and those that are not acceptable. Findings are summarized in the tables that follow.

Acceptable Coinage Alloys

TABLE 1.--Summary of Coinage Alloys Meeting Minimum Standards of Metallurgical and Technical Acceptability

Material	Public acceptability				Operation in vending machines
	Weight	Color	Wearing qualities	Examples of foreign use	
Cupronickel or nickel silver clad on a copper core.	About the same as straight cupronickel or nickel silver.	Acceptable if the red edge of the coin is not regarded as objectionable. Test coins are very attractive.	Very good. Wear tests indicate an expected 20-30-year life. Only cupronickel cladding has been tested.	None.....	Exhaustively tested by Mint and rejector industry. Coins are expected to operate better than present silver coinage in existing, unaltered vending machines.
Nickel silver (65 copper, 18 nickel, and 17 zinc).	Good. Slightly lighter than pure nickel and cupronickel.	Excellent when minted but develops some yellow tarnish with age.	Good. Somewhat inferior to cupronickel.	Portugal, Philippines, Taiwan.	Practically the same properties as cupronickel and would operate in machines adapted to accept cupronickel.
Cupronickel (75 copper-25 nickel).	Good. Density, 8.9	Very good.....	Very good.....	Very widely used including U. S. 5-cent piece. Notable foreign users: United Kingdom, Spain, Norway, New Zealand, Australia.	Resistivity of 32.0 is too high for coins to work in 10-, 25-, and 50-cent channels.
Nickel (95 nickel- 5 silicon with magnetic core).	Same.....	...do.....	Excellent.....	None.....	Not successful in achieving an acceptable success ratio under actual operating conditions despite intensive effort.
Silver-copper clad on copper or on low-content silver-copper core.	About the same as 500 silver-500 copper.	Acceptable. Low-content silver core removes or reduces the reddened edge of the coin.	Satisfactory.....	None.....	Will work alongside existing coinage. In the case of a pure copper core, minor modifications in alloy or adjustment of rejectors would be required.

Acceptable Coinage Alloys--Continued

TABLE 1. --Summary of Coinage Alloys Meeting Minimum Standards of Metallurgical and Technical Acceptability--Continued

Material	Public acceptability				Operation in vending machines
	Weight	Color	Wearing qualities	Examples of foreign use	
Silver (United Kingdom alloy: 500 silver, 400 copper, 50 nickel, 50 zinc).	Very good. About the same as 500 silver-500 copper.	Very good when minted but develops dark tarnish and mottled appearance in circulation.	Fair. Addition of nickel and zinc improves wear characteristics somewhat.	Still circulates alongside cupronickel in United Kingdom. Formerly used very widely in British Commonwealth.	Because electrical resistivity is raised to 6.8, these coins would not work in most machines.

Material	Counterfeiting potential		Ease and certainty of production	Cost and availability of raw materials	Conclusion
	Actual counterfeiting	Vending machine			
Cupronickel or nickel silver clad on a copper core.	Very low potential. Red edge of coin is an advantage since clad materials are not readily available to the public.	Same as with present coinage.	Mint purchase of strip would be required at least for a time. Tests on production-sized lots indicate that no serious minting problems should be encountered.	Readily available. Cost of clad strip will be substantially higher than straight cupronickel or nickel silver.	Acceptable as coinage material which will work in existing vending machines.
Nickel silver (65 copper, 18 nickel, and 17 zinc).	More counterfeiting potential than cupronickel, since nickel silver is readily available to the general public.	Same as cupronickel.....	Much the same as cupronickel.	Zinc is substituted for copper and some nickel in the cupronickel alloy. Zinc is cheaper and readily available.	Acceptable but would not work in 10-, 25-, and 50-cent vending machine channels.
Cupronickel (75 copper-25 nickel).	Low risk.....	Appreciable risk--foreign coins.	Excellent.....	Cheap and readily available.	Acceptable. An excellent coinage material easily fabricated by the Mint. However, will not work in 10, 25, and 50-cent vending machine channels.

Nickel (95 nickel-5 silicon with magnetic core).	...do.....	Same as silver.....	Purchase of annealed blanks would be required pending completion of new Mint.	Cost per pound of strip might be estimated at $1.50.	Acceptable but a hard material difficult to stamp. Could not be manufactured with existing Mint facilities. Does not work in vending machines consistently under actual operating conditions.
Silver-copper clad on copper or on low-content silver-copper core.	Low potential.....	Same as present coinage	If production requirements exceeded Mint's melt-roll capacity, purchase of strip would be required. In any event, Mint would have to have all bonding operations performed in private plants until new facilities provided.	Availability is clouded by uncertainty as to size of Treasury stocks, if any, left after the period of transition.	Acceptable on technical and metallurgical grounds. While the bonding operation is no more difficult than in the case of cupronickel clad, existing melt-roll capacity limits the feasible output of the silver-copper clad on low silver-copper alloys. The silver supply situation remains as an overriding difficulty, as in the case of any silver alloy.
Silver (United Kingdom alloy: 500 silver, 400 copper, 50 nickel, 50 zinc).	Some eventual encouragement as worn coins become common.	The wider resistivity range needed to accept these coins and existing coins would encourage the use of slugs made from such materials as zinc.	Much more difficult to produce than 500 silver-500 copper. Would require double melting.	Some reduction in present raw materials cost because of lower silver content. Availability of silver is clouded by uncertainty as to the size of Treasury stocks left after the period of transition.	Barely acceptable because of bad appearance when worn and need for vending machine changes. The silver supply situation remains as an overriding difficulty, as in the case of any silver alloy.

Not Acceptable Coinage Alloys

TABLE 2.--Summary of Coinage Alloys Not Meeting Minimum Standards of Metallurgical and Technical Acceptability

Material	Public acceptability				Operation in vending machines
	Weight	Color	Wearing qualities	Examples of foreign use	
Aluminum.....	Very poor. Density, 2.71	Good.....	Fair to poor.....	Low denomination coins in poor countries. Also some use in Austria, Japan, Italy.	Resistivity of 2.65 is near to that of present coins. Hardening agents raise resistivity. Coins too light to work in vending machines.
Columbium.....	Fair. Density, 8.6	Good. Silver-gray	Very good	Not used anywhere....	Resistivity of 12.5 to 16 is unlike that of most other coinage materials. Rejectors would have to be adapted unless columbium metal were clad on a copper core. No satisfactory material of this sort has been presented to Battelle or the Mint for testing.
Nickel (pure)	Good. Density, 8.9	Very good to excellent..	Excellent	Canada, France, and South Africa.	Magnetic and will not be accepted by existing coin rejectors. Complete redesign of rejector units would be required.
Silver (500 silver and 500 copper).	Very good.....	Excellent at first if given acid bath.	Very poor. Wear quickly exposes yellowish and reddish areas beneath the silver surface coating.	None. South Africa was the only country still using it and is now substituting pure nickel.	Coins work with only very minor adjustments needed on some machines.

Stainless steel.....	Fair. Density range, 7.8 to 8.0.	Good.....	Excellent.....	Italy, Turkey.....	Won't operate in existing 50-, 25-, and 10-cent vending machine channels.
Titanium.....	Poor. Density, 4.5....	Whitish-gray.....	Very good.....	None.....	Won't work. Too light.
Zirconium-hafnium.....	Fair. Zirconium density, 6.49.	Good.....	(?).....	...do.....	Zirconium resistivity, 40- Hafnium, 35.
Also rejected: Copper 98-zinc 2, plastics, and steel coins with cladding.					

Material	Counterfeiting potential		Ease and certainty of production	Cost and availability of raw materials	Conclusion
	Actual counterfeiting	Vending machine			
Aluminum.....	Very great risk.....	Very great risk.....	Very good	Cheap and abundant. Coinage requirements negligible proportion of total consumption.	Rejected. Poor weight and appearance. Vending machine and counterfeiting problems.
Columbium.....	Very low risk.....	Very low risk.....	Probably OK.....	Prohibitive cost and uncertain supply outlook.	Rejected. Prohibitive cost and uncertain supply plus need to adapt vending machines.
Nickel (pure)	...do	No basis for judgment ...	Very difficult problem for the Mint. Purchase of strip would probably be required pending completion of new Mint.	Relatively cheap at $0.79 a pound. Would involve dependence upon imports from Canada or use of excess nickel from strategic stockpile.	Rejected. Magnetic, hence won't work in vending machines. Difficult to fabricate.
Silver (500 silver and 500 copper).	Some eventual encouragement as worn 500 coins become common.	Very little different from present situation.	About a 10 percent increase in operating cost over present levels. No really new problems would be encountered and high levels of production could be achieved.	Some reduction in raw materials cost because of lower silver content. Availability is clouded by uncertainty as to the size of Treasury stocks left after the period of transition.	Rejected because of very bad appearance when worn.

Not Acceptable Coinage Alloys--Continued

TABLE 2. --Summary of Coinage Alloys Not Meeting Minimum Standards of Metallurgical and Technical Acceptability--Continued

Material	Counterfeiting potential		Ease and certainty of production	Cost and availability of raw materials	Conclusion
	Actual counterfeiting	Vending machine			
Stainless steel.....	Very low risk.....	Considerable risk on the basis of what is known at this time.	Very difficult minting process. Strip would have to be purchased.	Low cost and assurance of required quantities. No domestic production of chromium.	Rejected: Doubtful acceptability, vending machine and difficult production problems.
Titanium	...do.....	Uncertain.....	No Mint experience.....	Strip is estimated to cost about $5 per pound. Supplies probably adequate for Mint requirements.	Rejected: Too light, too expensive, and no vending machine work done to date.
Zirconium-hafnium.....	Negligible risk	...do.....	...do.....	Zirconium strip would cost $8 per pound. Suggested addition of hafnium would raise cost near that of silver.	Rejected: Prohibitive expense and need to adapt vending machines. No work done on the problem.
Also rejected: Copper 98-zinc 2, plastics, and steel coins with cladding.					

V. PROBLEMS WITH A CHANGEOVER TO REDUCED CONTENT SILVER COINAGE

The present section examines the feasibility of achieving a successful transition to a new coinage system using low-content silver alloys. An appendix considers the possibility of a silver 50-cent piece of 400 fineness. Major conclusions can be summarized as follows:

1. The transition to silver coinage of reduced content would be an extremely risky undertaking, and Treasury silver stocks would probably be depleted within a relatively short period of time. If there is a partial and limited exception to this overall conclusion, it arises with 400 fineness where a high proportion of the existing coinage is recovered at a rapid rate.

2. Even there the risks would have to be judged intolerably great unless there were clear evidence, at the time a decision was reached, that the coin shortage had ended and subsidiary coinage was temporarily redundant.[1] No one could be sure in any case that the price of silver would not be driven again to the melting point of subsidiary coinage; this might not occur within the immediate future. In general, analysis of the special problem of the transition to reduced content silver coinage suggests that attention can appropriately be concentrated from this point in the study upon the base alloy alternatives.

VI. THE RELATIVE MERITS OF THE BASE METAL ALLOYS

This section first considers the respective merits of the four remaining alloys: cupronickel, nickel silver, 95 percent nickel (Inco coin), and cupronickel clad on a copper core. The nature of the production effort required for a smooth transition is described and the possible use of controls is examined, and largely rejected. Major conclusions are summarized below.

1. Assuming that vending machine rejectors were to be modified, the choice of permanent coinage material lies primarily between cupronickel and nickel silver. The difference between these homogeneous alloys is not great, although in most respects cupronickel is slightly superior. The preference would be for cupronickel subsidiary coinage with the present 5-cent piece unchanged.

2. The cupronickel (or nickel silver) clad on a copper core has the great advantage of avoiding the need for modification of vending machines. The Inco coin does not work acceptably, and, even if it did, it would be superior to the clads only on the basis of appearance. The clad coin is to be preferred since it would lead logically and easily to a permanent coinage of cupronickel, or nickel silver, or, as seems equally desirable, could be retained as the permanent coinage material.

3. Full replacement of the existing subsidiary coinage with straight cupronickel could be achieved in less than 3 years with existing and planned Mint capacity, even more rapidly if capacity were expanded further. The Mint is conducting an exhaustive investigation of the supply situation in the case of cupronickel clad on copper.

4. Standby authority to impose controls on the melting and export of coin might be a useful backstop. A prompt transition to base alloy coinage would make the use of controls unnecessary.

TREASURY SILVER AND COINAGE STUDY

I. INTRODUCTION

This study examines the silver coinage problem and evaluates ways in which that problem can be resolved. It draws upon a range of previous Treasury studies and memoranda in arriving at its specific recommendations for a new coinage system. Some sections of the present study, particularly those dealing with the metallurgical and technical characteristics of alternative coinage alloys, have also benefited from findings of a parallel study for the Treasury by the Battelle Memorial Institute. Other sections of the present study incorporate information that has been made available to the Treasury

[1] This is clearly not the case at the present time.

by private groups and by other government agencies. The published literature dealing with the silver situation and with suggested changes in our coinage system has been examined.

II. DISCUSSION OF THE CRITERIA BY WHICH ANY FUTURE COIN PROGRAM SHOULD BE JUDGED

The selection of a set of criteria by which alternative coinage systems are to be judged necessarily involves a prior view as to what a coinage system should do and how it should do it. This study takes it to be axiomatic that, under modern conditions, the primary and essential function of a coinage system is to assist the unimpeded flow of transactions throughout the economy, by acting as a medium of exchange.

There are collateral objectives; for example, the preservation of historical tradition, the minimization of costs to the private sector of any transition to a new coinage system, the avoidance of strain upon the balance of payments, the maximization of Treasury "profit" (seigniorage) on coinage operations. No single plan for a new system will be able to achieve fully all of the ends that are desirable in themselves.

The importance of the coinage system to overall economic and financial activity is so great that any compromises should be between the attainment of the various subsidiary objectives, and not at the expense of the major objective of continuing to provide a reliable medium of exchange.

A. Permanence of the Program

No alteration in our coinage system is likely to guarantee complete immunity from the possible future need for modification. An ideal program should offer assurance against a shortage of coinage materials for a long period into the future. The likelihood of any disruption within 5 to 10 years should be regarded as disqualifying.

B. Raw Material Requirements

The raw materials needed in a new coinage system should be readily available, preferably from domestic production or excess stockpiles. Silver and base-metal alloy systems pose somewhat different problems in this respect. With silver coinage of reduced content, the major problems are the extent to which a higher silver price would deter industrial uses, encourage exploration activity, and stimulate mine production; the degree to which existing Treasury silver stocks at the time of the transition would be conserved by lower silver content per coin; the effective addition to Treasury silver supplies made possible by the capture of higher content coins in circulation at the time of the transition; and the extent to which the existing silver coinage might be lost from circulation at the time of the transition; and the extent to which the existing silver coinage might be lost from circulation by being hoarded, melted down, or exported. With base-metal alloys, the questions are the relatively less complex ones of the availability of whatever raw materials are required as an input into coinage manufacture, and the strength of competing demands in relationship to prospective supplies.

In the case of silver as well as base-metal alloys, there is the question whether a coinage system is acceptable only if its materials can be found domestically at reasonable cost, or if imported materials could be used. From the standpoint of security, it would probably be sufficient if there were substantial domestic, or even North American, supplies relative to maximum potential coinage demand and other vital uses during an emergency period. It is true that for a time during World War II silver had to be used in the 5-cent piece because of the shortage of nickel and copper, and the 1-cent piece was made of zinc-coated steel. Certainly, it would be unwise for a coinage program to involve a major continuing dependence upon a foreign source for raw materials if there were strong indication that supplies might be interrupted because of revolution, expropriation, strikes, etc.

C. Public Acceptability

The feasibility of a change in our coinage system rests upon the general agreement of the public that such a change is necessary and desirable, and upon the reasonableness of the proposed change. It seems probable that the main element in public acceptability will be (1) demonstrated necessity of the change, (2) characteristics of the new coins, (3) degree of inconvenience to which the public is subjected by the change, and (4) absence of extreme hardship suffered by any particular group or industry as a result of the change.

1. Need for the change

In view of the silver situation, present and prospective, the existing system of subsidiary coinage cannot possibly be continued for much longer.

2. Characteristics of the new coins

The new coins should be similar in size, weight, ring, and color to present coinage. It seems probable that in the new series as in the old only the 1-cent piece should be red in color. New coins should have wearing qualities not greatly inferior to those of the present coinage, and any increase in durability would be a valuable dividend.

It is assumed from the outset that the existing diameter and thickness of U.S. coinage will be continued. On the assumption that it is desirable to retain some continuity with the past, it can also be argued that the retention of silver in our subsidiary coinage is desirable. Certainly, there is no question that continuation of subsidiary coinage of the present silver content would offer many advantages. Because that is not possible, the main choice comes down to subsidiary coins of lower silver content and coins of no silver content.

3. Degree of inconvenience

Inconvenience to the public would be minimized if new coins have desirable technical characteristics, are readily available in required amounts, and can be used with confidence in present coin-operated devices.

Inconvenience will also be reduced if new coins can be placed into circulation through normal channels in the ordinary way, rather than by requiring the public to exchange old coins for new. The exchange approach would involve complications such as having large numbers of exchange locations; an adequate inventory of new coins for exchange purposes at each location; educating the public regarding the exchange, etc. New legal prohibitions should be held to the irreducible minimum consistent with the protection of existing coinage and the achievement of a smooth transition to the new system.

4. Absence of extreme hardship

A new coinage program should avoid inflicting a demonstrably serious hardship upon a particular group or industry. The coin-machine industry could claim such hardship if new coins did not work in its machines. The manufacturers of rejector devices could claim a serious hardship if a proposed period of transition to the new system were too short to allow an orderly adaptation of existing equipment, if adaptation is required. A considerable hardship to the public at large would arise if the usefulness of coin-operated devices were seriously impaired over a long period of time. Silver producers could claim that a new coinage system that threatened to lead to a sharp fall in the price of newly mined silver would place an undue burden upon them. Silver users could claim that a new coinage system that promised to lead to a sharp increase in the price of refined silver would be inequitable.

D. Minting Characteristics and Coinage Costs

Relative ease and certainty in the manufacturing process for new coins is particularly desirable in view of the current coin shortage. There are some signs that the coin shortage has been alleviated to a certain degree. Even so, the need will remain for an assured transition to high levels of output for the new coins, particularly since large amounts of any new coin are likely to be taken out of circulation temporarily by the public. However, feasibility from the production side would have to be clearly demonstrated if new materials or new processes were to be used.

The minimization of the manufacturing cost of a given system of coins of acceptable quality is desirable as a simple matter of efficiency. There is general agreement that within the limitations with which they have had to work, Mint operations have been conducted very efficiently. A slightly broader aspect of the cost question is whether or not the Treasury should seek to achieve the lowest possible total coinage cost, inclusive of materials used. Unless it can be shown that higher cost does for some reason make coins more acceptable, there would seem to be reason to favor low-cost coinage.

The possibility must be examined that the potential scope for counterfeiting would thereby be encouraged, although this does not appear likely to be of consequence in the case of any alloy that would be acceptable on other grounds. Aside from seeking the minimum level of materials and manufacturing costs consistent with coinage of acceptable quality, there is a case under present circumstances for holding the foreign exchange cost of coinage to reasonable proportions. It will also be essential to insure that the transition to a new system of subsidiary coinage does not have harmful side effects on the international position of the dollar.

E. Compatibility with Present Coinage

The production requirements for a new coinage system can be eased if there is side-by-side circulation of new and old coins during the period of transition. The only exception would arise if it were believed that an entire set of new coins could be produced and the substitution of new for old coins made in one step. This does not appear to be an available alternative at the present time. Because of the coin shortage, it is necessary to keep Mint facilities fully employed on the production of coins of the present type. Therefore, it is particularly desirable that a new coinage system provide for a high degree of side-by-side circulation of new and old coins.

In addition to minimizing production problems and protecting the existing coinage, it would be desirable that new and old coins be compatible in the sense of working in existing coin machine rejectors. If this is not possible, problems will be eased to the extent that the required modification of rejectors can be made within a reasonably short period of time at an expense that is not prohibitive.

III. SILVER MARKET TRENDS

The present section discusses recent trends in silver markets and the implications of these trends for a new coinage system. The discussion falls into two major divisions. First, recent developments in silver consumption and production are examined at world, foreign, and U.S. levels. This concludes with a review of what has happened to Treasury silver stocks and what is likely to happen to them in the near future. Second, with this background established, the discussion turns to the special problem of the effects that higher silver prices might be expected to exert upon world and U.S. consumption and production of silver.

World Production and Consumption

Since World War II, and particularly since 1958, there has been a widening gap between Free World silver consumption and production. Continuing pressure upon U.S. silver

stocks is basically attributable to that gap between Free World production and use of silver, although in any given year imbalances have been met from a variety of sources including use of silver stocks, demonetized coin, liquidation of private holdings of silver, and, for a time, sizable sales by Red China.

The relatively sluggish expansion of silver production in the face of rapidly expanding consumption may be seen in Table 1 which estimates Free World silver consumption and production since 1949. It will be noticed that Free World silver production has risen only moderately since 1958, and has averaged about 205 million ounces annually over the entire period 1958-64. In that same period, world consumption of silver, for coinage and industrial use taken together, has just about doubled. As a result, the sizable annual deficits of 65 to 70 million ounces that were the rule from 1949 to 1958 had tripled to a massive 205 million ounces by 1963, when silver usage grew to twice new silver production, despite an appreciable production increase in 1963. Data for 1964 are still subject to revision but they suggest an overall deficit of 325 to 350 million ounces, with estimated total usage up to more than two and one-half times the estimates of total new production.

The "indicated deficits" of Table 1 are gross measures of the degree of disequilibrium that has existed in world silver markets. They considerably overestimate the excess demand that has actually impinged upon world markets, chiefly because of the inclusion of U.S. coinage demand in overall consumption. U.S. coinage demand has been met from official stocks, not from new production. From some standpoints, it is the balance between production and industrial demand, alone, that is of interest. Therefore, the indicated deficit in Table 1 is also shown exclusive of total coinage demand, and U.S. and

TABLE 1.--Estimated Free World Silver Consumption and Production, 1949-64

[In millions of fine troy ounces]

	Industry and the arts (1)	U.S.A.	Coinage demand, foreign (2)	Total	Total consumption (3)	New production (4)	Indicated deficit (-) (5)	Deficit excluding all coinage demand (-) (6)
1949-53 average..	153.1	36.5	48.2	84.7	237.8	173.9	-63.9	20.8
1953-57 average..	190.1	37.5	36.0	73.5	263.6	191.0	-72.6	.9
1958.....	190.5	38.2	41.3	79.5	270.0	205.8	-64.2	15.3
1959.....	212.9	41.4	45.0	86.4	299.3	188.4	-110.9	-24.5
1960.....	224.6	46.0	57.9	103.9	328.5	206.9	-121.6	-17.7
1961.....	239.5	55.9	81.2	137.1	376.6	203.0	-173.6	-36.5
1962.....	247.8	77.4	50.2	127.6	375.4	206.9	-168.5	-40.9
1963.....	252.2	111.5	55.5	167.0	419.2	213.8	-205.4	-38.4
1964.....	285.9	203.0	61.5	264.5	550.4	215.5	-334.9	-70.4

Source: Columns (1) and (2) are from Handy and Harman, Annual Reviews. Column (4) is derived from the world totals published in the Annual Reports of the Director of the Mint and compiled by the Bureau of Mines. Production for the following countries has been subtracted from the world totals: Czechoslovakia, East Germany, Hungary, Rumania, Poland, U.S.S.R., China, and North Korea. The world production estimate for 1963 is from the Bureau of Mines, Mineral Industry Surveys, August 21, 1964; and that for 1964 is from Handy and Harman, Annual Review, 1964, adjusted on the basis of the 1958-63 relationship between the Handy and Harman and Bureau of Mines estimates.

foreign coinage demands are shown separately so that other measures of the deficit can readily be computed. Foreign coinage demand is, by and large, met in the market. But, in terms of the overall balance between world consumption and production, inclusion of all demands is the indicated course to follow, whether met from existing stocks or current output. Indeed, it might even be argued that U.S. coinage demand should be increased to include the amounts of old silver dollars placed in circulation during recent years. To do so would raise 1963's indicated deficit by more than 50 million ounces.

Although the indicated deficits cannot be interpreted literally as measures of excess demand, these gross statistics do show most clearly the drastic alteration that has taken place in world silver consumption and production, and the overall dimensions of the Free World production deficit. It is particularly significant that in each of the last 6 years the use of silver in industry and the arts has, itself, exceeded new production.

This strongly suggests the possibility that, even if coinage demand for silver were to dry up entirely, there would still be an appreciable gap between the world's industrial consumption of silver and prospective levels of silver produced at current prices. Since U.S. coinage requirements have been met from existing stocks of silver, market demand would not be directly affected if the United States were entirely to discontinue the use of silver in coinage. If other countries were also to abandon the use of silver for coinage, and if their demands had previously been met from current production, there would be some resulting effect upon market demand. But, total consumption requirements would still appear quite likely to continue to exceed current production at the price-cost relationships now existing in the silver industry. In 1963, for example, it will be noticed from Table 1 that there was an indicated Free World deficit of about 40 million ounces wholly aside from coinage demand, and this deficit appears to have widened to 70 million ounces, or so, in 1964 when speculative purchases of silver again became important, as they were in 1961.

The possibility that a sharp reduction in coinage demand would still find silver in relatively short supply in world markets does not take into account the effect on silver prices of any ultimate disposition of existing official stocks. World silver stocks in official hands outside of the United States are believed to be quite modest in size. On the basis of the statistics presented in the Annual Report of the Director of the Mint, they would appear to total little more than 100 million ounces. As for this country, at current rates of U.S. coinage demand and bullion redemptions, the question is scarcely one of how to dispose of any residual U.S. official stocks without disrupting the market. Existing U.S. official stocks of silver are likely to be no more than adequate for the short-run stabilization of world silver prices which the United States will find essential in making an assured, trouble-free transition to a new coinage system. Even if the decision is to replace silver subsidiary coinage with a base alloy, some silver might be required after the transition period for stockpile or other purposes.

Unless one envisions some radical departure from the recent pattern of world industrial consumption and production of silver, demand for silver appears certain to be strong over the long run, even if silver is very largely abandoned as a coinage material.

Free World Silver Production and Consumption Outside the United States

Until recent years there had been approximate balance between silver production and consumption outside of the United States, but, in the last few years, overall deficits of some size have begun to appear. Table 2 estimates foreign silver production and consumption, 1949-64.

Consumption

The rise in foreign use of silver in industry and the arts has been very great. It is estimated that Free World foreign industrial use of silver may have amounted to something like 60 million ounces prior to World War II. That level had been regained by 1953. A period of rapid growth in silver consumption then led to more than doubling of the 1953

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TABLE 2.--Estimated Foreign Silver Consumption and Production, 1949-64 [1]

[In millions of fine troy ounces]

	Average, 1949-52	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Industrial uses:													
Canada	4.7	4.7	3.9	4.6	3.8	5.8	4.6	4.5	4.3	4.5	4.6	4.6	4.8
United Kingdom	12.4	11.9	12.6	14.2	13.8	14.7	14.8	17.5	16.5	20.0	20.0	20.0	23.0
France	[2] 7.4	14.5	15.0	15.7	15.9	17.9	14.1	10.6	13.0	14.0	13.5	13.9	14.8
West Germany	8.5	11.9	24.2	28.1	31.5	33.1	31.1	33.3	40.2	43.5	41.8	40.5	46.3
Japan	2.2	5.6	5.8	6.3	7.9	8.8	8.2	13.6	21.6	19.1	19.6	20.0	20.0
Other countries	12.3	14.7	14.3	23.9	43.0	37.3	32.7	30.4	29.0	33.4	38.3	43.2	54.0
Total: Foreign industrial uses	47.5	63.3	75.8	92.8	115.9	117.6	105.5	109.9	124.6	134.5	137.8	142.2	162.9
Foreign coinage demand	48.3	48.0	30.2	44.4	35.4	32.2	41.3	45.0	57.9	81.2	50.2	55.5	61.5
Total foreign consumption, industrial and coinage	95.8	111.3	106.0	137.2	151.3	149.8	146.8	154.9	182.5	215.7	188.0	197.7	224.4
Total foreign production	131.4	148.8	146.3	154.9	153.7	158.6	169.0	165.4	170.1	168.1	170.6	178.6	179.5
Indicated deficit (-)	35.6	37.5	40.3	17.7	2.4	8.8	22.2	10.5	-12.4	-47.6	-17.4	-19.1	-44.9
Surplus, excluding coinage demand	83.9	85.5	70.5	62.1	37.8	41.0	63.5	55.5	45.5	33.6	32.8	36.4	16.6

[1] Estimates exclude the Sino-Soviet bloc.
[2] Average, 1950-52.

Source: Handy and Harman Annual Reviews, Annual Reports of the Director of the Mint, and Table 1.

level by 1961. Industrial demand in Canada, United Kingdom, France, West Germany, and Japan rose more or less steadily from an average 35.8 million ounces in 1949-52 to an average 96.4 million ounces in 1959-62. The increase in the industrial use of silver has been most striking in West Germany and Japan. There was some indication of a reduced rate of growth in Free World industrial use of silver outside the United States during 1962 and 1963, probably due to the effect of the increasing price of silver in those years. However, as the price of silver remained at the ceiling imposed by the monetary value of the U.S. silver dollar during 1964, the growth in foreign industrial use of silver was very sizable, some 20 million ounces on the basis of preliminary data.

Foreign coinage demand remained relatively stable through 1959, averaging about 40 million ounces annually. It then rose appreciably in the period from 1960 through 1964, when it averaged some 65 million ounces annually, with a good part of this increase accounted for by the French coinage program. Future coinage demand in the Free World outside of the United States is difficult to estimate, but few observers see much likelihood of any marked further expansion from present levels. Foreign coinage demand might very possibly decline.

Production

Production of silver in the Free World outside the United States increased fairly steadily until 1958. It then reached a temporary plateau, before increasing by about 8 million ounces in 1963. Preliminary reports suggest that foreign production in the Free World did not rise by a similar amount during 1964. As a result of relatively slow overall growth in production and rapidly increasing demand, the surplus of new production over consumption, which had already begun to narrow sharply after 1954, disappeared altogether in 1960. Deficits have been substantial since that time. The indicated deficit, including coinage demand, has averaged a little less than 30 million ounces annually in the last 5 years. The deficits were larger in 1961 and 1964, partly, it would seem, because of some speculative purchases of silver in each of those years. Excluding coinage demand, production of silver in the Free World outside the United States has exceeded consumption by an average 32 million ounces during the last 5 years, but this surplus fell in 1964 to 13 billion ounces.

U.S. Production and Consumption

Consumption

In contrast to the very rapid growth in foreign silver consumption, industrial consumption of silver in the United States has not changed greatly in the postwar period. As shown in Table 3, industrial consumption averaged about 100 million ounces during 1949-52 and had only risen to about 110 million ounces by 1963, although it apparently increased to more than 120 million ounces during 1964. There is some evidence of a cyclical pattern, with declines in 1954 and 1958, but not much sign of the sharp upward trend that has characterized foreign silver consumption in most of the postwar period.

Detailed statistics on the uses of silver consumed in industry are scarce especially in the case of foreign countries. However, the U.S. data presented in Table 4 give some indication of the relative importance of silver in various uses and of the changes that have taken place since 1959. The general picture is one of relatively rapid expansion in newer uses--batteries, electrical and electronic components--and some contraction in more traditional uses--silverware and jewelry. Photographic use remained about constant from 1961 through 1963, before increasing substantially in 1964. These end-use statistics suggest a slightly higher level of U.S. industrial consumption in 1964 than the 123-million-ounce Handy and Harman figure used elsewhere in this study.

U.S. coinage demand averaged a little under 40 million ounces annually from 1949 through 1960. Coupled with relative stability in the industrial use of silver during the same years, this meant that total U.S. silver consumption remained relatively constant. For example, U.S. industrial demand plus U.S. coinage demand was 148.8 million ounces

TABLE 3.--U.S. Silver consumption and sources of supply, 1949-64

[In millions of fine troy ounces]

	Average, 1949-52	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Industrial consumption	99.9	106.0	86.0	101.4	100.0	95.4	85.5	101.0	102.0	105.5	110.4	110.0	123.0
New production	39.2	37.7	35.6	36.5	38.7	38.7	36.8	23.0	36.8	34.9	36.3	35.0	36.0
Difference	60.7	68.3	50.4	64.9	61.3	56.7	48.7	78.0	65.2	70.6	74.1	75.0	87.0
Add: U.S. coinage	35.0	42.8	53.2	8.2	31.4	52.0	38.2	41.4	46.0	55.9	77.4	111.5	203.0
Equals: Indicated deficit	95.7	111.1	103.6	73.1	92.7	108.7	86.9	119.4	111.2	126.5	151.5	186.5	290.0
Accounted for by--													
Net commercial imports	-95.4	-92.9	-88.1	-56.5	-68.5	-50.1	-71.2	-55.3	-29.5	-9.1	-63.3	-30.2	+45.0
Lend-lease, returns (-)	.....	.....	.....	-23.2	-88.8	-89.8	-103.4	-45.0	-15.7	-10.4	-8.3	.....	.....
Change in Treasury stocks	-3.0	-14.9	-9.2	-4.8	+51.1	+33.6	+91.9	-46.3	-67.7	-129.5	-94.4	-184.0	-366.3
Total accounted for	-98.4	-107.8	-78.9	-84.5	-106.2	-106.3	-82.7	-146.6	-112.9	-149.0	-166.0	-212.5	-321.3
Discrepancy ((-) values imply net additions to domestic inventory)	-2.7	+3.3	+24.7	-11.4	-13.5	+2.4	+4.2	-27.2	-1.7	-22.5	-14.5	-27.7	-31.3

Source: Consumption, coinage, and production data from Annual Reports of the Director of the Mint, except for 1964 when consumption and production are from Handy and Harman's Annual Review. Preliminary estimates suggest that U.S. mine production of silver in 1964 was about 37 million ounces. Net commercial imports from Handy and Harman, Annual Reviews and Minerals Yearbooks. Lend-lease returns from Annual Reports of the Director of the Mint. Change in Treasury silver stocks from Treasury Daily Statements.

TABLE 4.--Estimated U.S. Silver Consumption, by Field of Use or End Product, 1959-64

[In millions of fine troy ounces]

Field of use or end product	1959	1960	1961	1962	1963	1964
Batteries	3.5	3.5	5.0	6.0	6.2	9.0
Brazing alloys and solders	10.5	10.5	11.0	13.0	13.0	15.8
Dental and medical	4.8	4.8	4.9	5.0	5.1	5.2
Electrical contacts and other electrical uses; Electronic components	20.5	19.5	24.0	25.0	26.0	30.3
Mirrors	3.0	3.0	3.1	3.1	3.1	3.1
Missiles	.....	.....	.....	1.0	.2	1.0
Photographic film, plates, and sensitized paper	30.8	31.7	32.3	33.3	33.3	40.3
Silverware and jewelry	28.0	29.0	25.0	22.0	22.0	22.5
Miscellaneous	.....	.....	.2	2.0	1.1	.....
Net industrial use	101.0	102.0	105.5	110.4	110.0	127.1

Source: U.S. Department of Commerce estimates published in the Congressional Record, Apr. 23, 1965, p. 8069.

in 1953 and 148.0 million ounces in 1960. Subsequently, silver requirements for coinage have grown at a tremendous pace, most recently because of the Treasury's efforts to overcome the shortage of subsidiary coin. Accompanied by a moderate increase in industrial demand, the result has been more than a doubling of overall U.S. consumption of silver in the 4 years since 1960. On the basis of available statistics it appears that U.S. industrial consumption plus coinage use during calendar year 1964 amounted to about 325 million ounces; it was less than 150 million ounces in 1960.

Production

Production of silver in this country has remained remarkably constant during the postwar period--a fact which suggests that there may be no dramatic increases in the offing. During the individual years covered in Table 3, production fluctuated narrowly between 35 and 40 million ounces except for a 1959 decline to 23.0 million caused by a prolonged copper strike. Early indications are that 1964 refinery production of silver may amount to about 36 million ounces. From 1949 through 1960, approximate constancy in production and relatively stable consumption held the U.S. silver deficit around an average of about 100 million ounces annually, or about 65 million ounces exclusive of coinage demand. However, the deficit has widened with the precipitous increase in the coinage demand for silver and probably totaled more than 290 million ounces during calendar year 1964.

The lower section of Table 3 summarizes briefly the way in which the indicated deficit between U.S. silver consumption and production has been met. An excess of commercial imports over exports, ranging from 50 to 100 million ounces, has typically met a substantial part of industrial needs. The decline of net imports in 1961 reflects higher silver exports and during 1964 there was a net export of silver because of the sharp increase in bullion redemptions, some of which were undoubtedly for foreign account. Lend-lease returns of silver are shown separately in the next line of the table, and the

change in Treasury stocks of silver is the last entry for which direct information is available.

A final line in the table shows the discrepancy between the indicated deficit and the amount accounted for by net imports, lend-lease returns, and changes in Treasury stocks. While this discrepancy contains residual errors and Treasury sales of silver to Government agencies, it may also provide a rough measure of changes in domestic inventory. Beginning in 1959 the residuals are consistently negative in sign which would be the case where there were net domestic accumulation of privately held inventories of silver.

Analysis of Changes in Treasury Stocks of Silver and a Projected Rate of Depletion

The dominating feature of the world silver situation is the existence of a massive production deficit. As noted earlier, the indicated world deficit in 1963 was about 210 million ounces, 25 million ounces in the Free World outside the United States, and 185 million ounces in this country. During 1964 the overall world deficit widened to 325 to 350 million ounces, chiefly because of a sharp increase in U.S. coinage demand. As Table 3 shows, the indicated U.S. deficit of 185 million ounces in 1963 was almost exactly matched by a decline in the Treasury's stock of silver. In 1964, U.S. silver consumption (both industrial and coinage) exceeded production by about 290 million ounces, and Treasury stocks fell by an even larger amount because of increased redemptions of silver certificates. In 1965, the consumption deficit seems likely to be substantially larger than in 1964.

The past decline in Treasury stocks of silver is detailed in Table 5. A rough indication of the possible rate at which remaining Treasury stocks might be depleted can be obtained by simple extension of the rate of loss in recent years. It is true, of course, that any projection of that nature is limited in its value by uncertainty as to the shape that future developments will take. The single most important future influence in 1965 will be the nature and timing of the Treasury's own legislative recommendations and subsequent developments in Congress. Additional factors are the extent to which the existing coin shortage can be overcome by the much higher levels of coin production now underway, and the point at which declining Treasury stocks of silver would cause a sustained acceleration in the demand for the redemption of silver certificates.

The data of Table 5 for past years have mainly come from Treasury Daily Statements and Circulation Statements. In the interests of simplicity in presentation, a number of relatively minor influences upon the Treasury silver stock have been grouped into the single category "other causes of change." It should be noted that the total silver stock figure shown in Table 5 includes the four Daily Statement categories: "Silver," "Silver dollars," "Subsidiary coin," and "Other silver bullion." This overall figure customarily exceeds the single Daily Statement entry for "Silver" by varying amounts which have recently averaged some 30 to 35 million ounces. Working with the larger total allows Table 5 to provide a more coherent picture of the separate influences on the Treasury silver stock.

The three memorandum columns at the extreme right give the amounts of silver certificates outside of the Treasury converted to a bullion equivalent at 0.7734375 ounces per dollar. It will be noted that by the end of 1964 retirement of silver certificates had reduced the bullion equivalent of those in circulation almost 300 million ounces below the total Treasury silver stock. As long as retirement of silver certificates proceeds at a rate in excess of the decline in the Treasury's silver stock--as it has thus far in 1965--the Treasury's margin of "uncommitted" silver will be widening. No doubt the rate of retirement of silver certificates will fall over time, particularly since a relatively large amount of silver certificates are probably lost or destroyed and will never be presented for redemption or retirement. There would be no point in immobilizing any substantial fraction of Treasury silver as backing for these notes and it might conceivably interfere with an orderly resolution of the coinage problem.

TABLE 5.--Analysis of Changes in U.S. Treasury Silver Stocks Since 1958

[In millions of fine troy ounces]

	Silver used in coinage	Bullion exchanged for silver certificates	Old silver dollars paid out	Other[1] causes of change	Total change in silver stocks	Silver stock at end of period[2]	Memorandum: Bullion equivalent of silver certificates[3] at end of period		
							In circulation	Held by Federal Reserve Banks and agents	Total
1958	-38.2	.....	-12.7	+142.8	+91.9	2,106.2	1,683.5	188.3	1,871.8
1959	-41.4	.....	-15.7	+10.8	-46.3	2,059.9	1,651.1	209.3	1,860.4
1960	-46.0	.....	-16.2	-5.5	-67.7	1,992.2	1,632.0	215.9	1,847.9
1961	-55.9	.....	-23.8	-49.8	-129.5	1,862.7	1,616.3	191.2	1,807.5
1962	-77.4	.....	-27.4	+10.4	-94.4	1,768.3	1,536.0	177.5	1,713.5
1963	-111.5	-19.0	-51.5	-2.0	-184.0	1,584.3	1,440.4	105.4	1,545.8
1964: January	-9.8	-3.5	-1.0	+3.1	-11.2	1,573.1	1,331.8	192.4	1,524.2
February	-11.3	-2.2	-2.3	+1.2	-14.6	1,558.5	1,317.4	175.0	1,492.4
March	-15.3	-3.9	-16.5	+1.9	-33.8	1,524.7	1,326.4	153.1	1,479.5
April	-16.4	-8.0	.....	-.8	-25.2	1,499.5	1,314.1	112.5	1,426.6
May	-16.2	-3.4	.....	+1.4	-18.2	1,481.3	1,317.6	100.2	1,417.8
June	-11.5	-8.2	.....	-11.8	-31.5	1,449.8	1,321.1	80.3	1,401.4
July	-11.4	-3.4	.....	+3.0	-11.8	1,438.0	1,271.4	92.7	1,364.1
August	-18.9	-5.1	.....	+.1	-23.9	1,414.1	1,245.3	100.0	1,345.3
September	-20.3	-21.4	.....	+3.7	-38.0	1,376.1	1,205.4	96.4	1,301.8
October	-22.3	-44.1	.....	-2.5	-68.9	1,307.2	1,117.5	88.3	1,205.8
November	-23.7	-20.5	.....	-1.9	-46.1	1,261.1	1,049.6	66.5	1,116.1
December	-26.0	-17.6	.....	+.5	-43.1	1,218.0	952.3	82.1	1,034.4
1964	-203.0	-141.4	-19.8	-2.1	-366.3	1,218.0	952.3	82.1	1,034.4
1965: January	-26.1	-11.2	.....	+.2	-37.1	1,180.9	866.6	103.3	969.8
February	-22.5	-8.7	.....	+2.6	-28.6	1,152.3	817.0	88.7	905.7
March	-25.3	-7.3	.....	-3.0	-35.6	1,116.7	763.9	68.5	832.4
April	-27.3	-12.4	.....	-.4	-40.1	1,076.6	.....	.....	.....

[1] Includes purchases, lend-lease returns, net sales and transfers to Government agencies, sales to industry during 1959-61, variation in the amount of subsidiary coin and bullion held in the Treasurer's General Account, and a residual discrepancy arising from the fact that coinage and bullion exchanges are shown here on a Mint accounting basis while the total change in silver stocks is shown on the more widely available Daily Statement basis. [2] As shown in the Daily Statement. The total includes approximately 64.8 million ounces held by certain agencies of the Federal Government. [3] Issued after June 30, 1929.

Source: Treasury Daily Statements, Circulation Statements, and unpublished material.

On the basis of the information in Table 5, it appears possible that Treasury stocks of silver might be depleted in 2 to 3 years if present trends continued. The projected rate of use of silver in coinage would probably fall back as the present crash coinage program achieved its aims. On the other hand, it is quite possible that the Treasury would have to supply larger amounts of silver in holding the market price of silver--an absolute essential to protect the existing coinage--as its own stocks neared depletion.

The latter possibility counsels against any delay in beginning the transition to a new coinage system. It is encouraging that redemptions of silver certificates in the early months of this year have been relatively modest in amount, well below the peak levels last year when a dock strike and other factors led to a sharp but temporary increase. This decline in the rate of redemptions has been more or less roughly paralleled by a decline in the futures price of silver which may well signify that market expectations of any increase in the spot price of silver are considerably dampened. However, it is clear that any failure to proceed promptly with the creation of a new subsidiary coinage system reducing the need for silver would encourage speculation and might lead to a rapid depletion of Treasury stocks of silver.

If the Mint were to switch over to the production of nonsilver coinage by the beginning of 1966, Treasury stocks would surely be adequate to stabilize the silver market through sales and/or redemptions during the time that would be needed to produce large amounts of new, nonsilver coins.

If the Mint were to switch over to the production of reduced content silver coinage during 1965, it is not self-evident that Treasury stocks would be large enough to hold world silver prices below, say, $1.29+ during the transition period, let alone for any extended period thereafter. Stocks might conceivably be adequate to negotiate the transition, but a favorable outcome depends upon a number of factors about which little assurance can be felt. Net coinage requirements would probably be smaller (private hoarding could outweigh Treasury net recoveries of silver from the existing stock of coinage), but speculative demands for silver would surely be much larger. The market would not expect that the Treasury would, or could, hold silver prices at $1.29+ beyond a fairly short period of transition, and the volume of Treasury redemptions, or sales to the market, at $1.29+ could expand rapidly as the market anticipated the imminent appearance of much higher silver prices. Indeed, this psychology could even develop with a transition to base alloy subsidiary coinage if at the same time the silver content of the dollar were reduced since this would raise the monetary value of silver and encourage the belief that the market price would also rise.

The problem of the transition to silver coinage of reduced content is examined more fully in Section V of this study.

The Influence of Price on Silver Production and Consumption

The remainder of this section of the discussion will examine the extent to which an increase in the market price of silver would be likely to bring production and consumption into an early balance. In principle, there should be some increase in the relative price of silver that would help to bring about market equilibrium. Higher prices can be expected to encourage net substitutions and economies in use on the consumption side and also to encourage some increase in silver production beyond that which would otherwise occur. In the context of the present study, the pertinent issues are the size of the increase in price that would be required, and the nature of the adjustments that would take place during a transition to the new equilibrium. Only the first of these issues--the eventual price at which the market might balance--will be discussed at this stage. It must be emphasized that at this stage no attention is to be paid to the feasibility of achieving a successful transition to a new system of reduced content silver coinage.

Actually, the question of how the transition would be achieved is fully as important, indeed much more important from the standpoint of the Treasury and the provision of an adequate supply of coinage, than the eventual price at which the market might settle. Any proposal to reduce the silver content of U.S. coinage would have to allow for the fact that a quicker supply response to rising silver prices would come from existing stocks

of silver--including silver coinage in circulation--than from an expansion in new production, which would only occur after some lapse of time. Because an increase of market price much above $1.38 an ounce would imperil the existing subsidiary coinage, the transitional problems take on unique significance. How, or whether, the transition to silver coinage of reduced silver content could be effected is a complicated issue, better explored separately from the probable longer-run effects of higher price on the consumption and production of silver.

Consideration of the prices that might eventually be reached in silver markets, after the transitional period during which price would have been stabilized, can, however, throw a good deal of light on the practicability of replacing our present coinage system with one of reduced silver content. Reduction of the silver content of our existing coinage system would increase the ceiling, or ceilings, to which the market price of silver could rise before Treasury sales of silver to the market would again be required. If it appears that the market price of silver might again reach the monetary value of our coinage within a reasonably short period of time, reduction of silver content could not be regarded as an eligible long-run solution, irrespective of whether or not the immediate transition could be safely negotiated.

A limiting consideration is the fact that straight silver-copper alloys with less than 50 percent silver content are not acceptable because of their poor physical characteristics. It will be assumed, pending Section IV's examination of the technical and metallurgical characteristics of alternative coinage alloys, that silver-copper coins of 800,700,600, and 500 fineness do meet at least minimum standards of acceptability and are relatively easy to produce. However, lower silver contents can also be achieved by cladding silver on an inner core of copper or lower content silver and by adding some nickel and zinc to otherwise unacceptable silver-copper alloys. These possibilities will be discussed subsequently. For the present, with attention confined to straight silver-copper alloys, the question is whether, after the transition to a coinage system with reduced silver content, silver prices would be at all likely to reach the ceilings listed in Table 6. If analysis of supply and demand factors suggests very strongly that the ceiling associated with a certain silver content could be reached in the foreseeable future, that particular coinage alternative would have to be ruled out as a long-run solution.

TABLE 6.--Monetary Value of U.S. Coinage of Existing Thickness and Diameter for Various Silver Contents

Silver content	Monetary value	
	Silver dollar	Subsidiary coins
90 percent	$1.29+	$1.38+
80 percent	1.48+	1.58+
70 percent	1.71+	1.83+
60 percent	2.03+	2.17+
50 percent	2.48+	2.66+

Source: Bureau of the Mint.

The Influence of Silver Price Upon Production

An increase in the price of silver which led to an increase in the expected profitability of silver mining would normally be expected to lead to some subsequent increase in production. Higher prices would tend to encourage more exploration, higher production from mines already in operation, reopening of submarginal properties, and the

reworking of old mine tailings. The strongest influence of higher silver prices, as such, would be upon the segment of the industry engaged in silver mining proper. In that case, the immediate effect is to increase total revenue per ton of ore in direct proportion to the increase in silver price. Where silver is found in association with other metals, the importance of a silver price increase is modified by the proportion of total revenue attributable to silver. Where only traces of silver are found with other metals, the increase in revenue will obviously not be of much consequence. Between this extreme and that of pure silver mining there is a range of situations in which an increase in silver price will have a greater or lesser effect upon company receipts.

Against the nominal stimulus to production from a higher price must be set the fact that silver mining is not a manufacturing operation. A higher price for silver may be required simply to maintain production at a given level. As marginal mines and deposits are worked out, continuing exploration activity is required even to maintain known reserves at a constant level. This exploration activity can be increasingly expensive in relationship to the market value of the new silver reserves that are discovered. Technological progress in exploration and mining techniques can arrest or even reverse a tendency for the level of reserves and the amount of current production to decline at any given level of silver prices. But, a fairly rapid rate of technological progress may be essential not only to overcome diminishing returns to exploration effort, but also to offset the effects of steady increase in money wages and other costs over time.

Shallow deposits of silver have presumably been well worked over and deep mining is very expensive. Private efforts here and abroad, and the Bureau of Mines shallow drilling program in this country, may discover sizable additional silver deposits near to the surface. The recent find of Texas Gulf Sulphur in the Timmins region of Ontario is impressive. Published reports at the time estimated that 55 million tons of copper, zinc, and silver ore, with an average grade of 4.85 ounces of silver per ton, had been found under an overburden of 20 feet. It would seem unwise to count on finds of this sort occurring frequently, but it does suggest that sizable new finds may occur.

Rising silver prices would exert some effect on the overall profitability of mining operations in which silver occurs in byproduct association with other metals. Data are not available to estimate the extent of any stimulus to base-metal mining that would result from a higher price of silver. However, it is well to recognize that the very concept of a byproduct is to some extent a convenient accounting fiction and while higher silver prices may not make "by-products" into "co-products" in very many cases, some overall stimulus to the profitability of base-metal mining and some consequent increase in silver production could be expected to occur. There is no evidence, however, that this stimulus would be very strong.

The main line of causation is not likely to run from higher silver prices to base-metal mining. Instead, a major influence upon levels of silver production in the future, as in the past, will be the amounts of copper, lead, and zinc that are produced, and the proportion of silver in total tonnage. Therefore, estimation of the direct effect of higher silver price upon its production must be supplemented by estimation of the amounts of silver that will be forthcoming as a more or less natural consequence of expansion in base-metal mining.

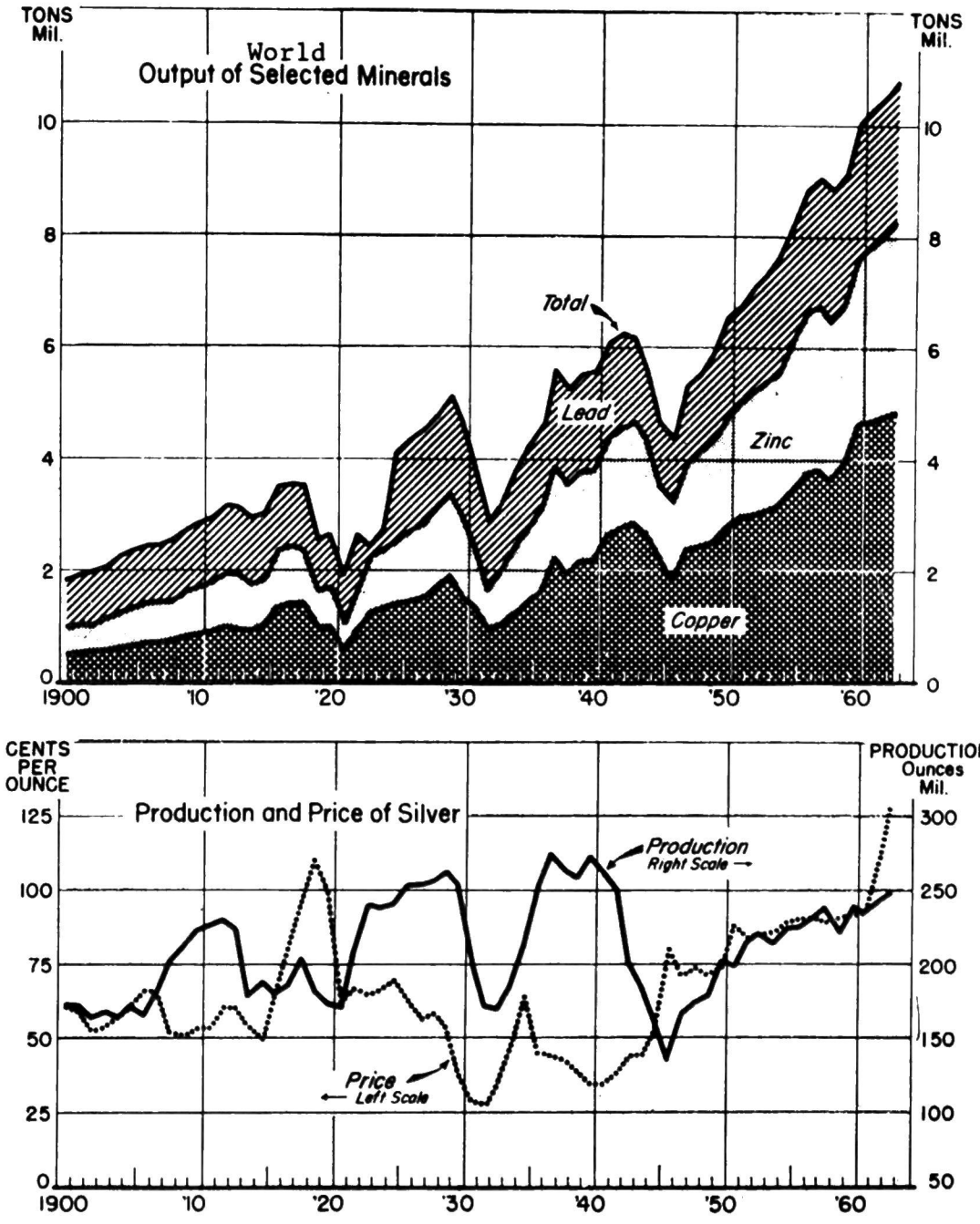
World Silver Production

Some major characteristics of world silver production since 1900 are summarized in Chart 1. It will be noticed that there has been a substantial degree of correspondence between short-run fluctuations in the output of copper, lead, and zinc, and the output of silver. Longer-run trends in the production series were similar until the period following World War II. Since 1945 aggregate world output of copper, lead, and zinc has grown rapidly; the output of silver has also increased, but more slowly.

Some of the appearance of synchronous fluctuation in the upper and lower panels of Chart 1 is due to the three interruptions to production caused by World War I, the Great Depression, and World War II. However, there is little doubt that the byproduct relationship also accounts for much of the parallelism in the production movements.

Chart 1

FACTORS AFFECTING SILVER PRODUCTION
1900 to Date



Unfortunately, there are no comprehensive historical data available at the world level on the amounts of silver mined as byproduct and mined as pure silver. This obstructs any conclusive statistical evaluation of the separate influence of base-metal production and silver price upon the production of silver. Such evidence as there is suggests that the byproduct relationship has generally been the more important.[1]

Indeed, the statistical association of silver production and silver price does not appear to have been particularly close or consistent. Until the depression of the 1930's, there is indication of an inverse relationship with production falling when price was rising, and the reverse. Price and production did fall sharply together during the early depression years and then rose together under the stimulus of the U.S. Silver Purchase Program, and a general revival in base-metal mining. Aside from this cyclical rise and fall, silver price and production seem to have been most closely related in the period following World War II. But, this has also been a period of very rapid growth in base-metal production which would account for the observed increase in silver production. In all likelihood the sustained postwar expansion in copper, lead, and zinc output has, in fact, been the dominant influence on world silver production. The postwar increases in the price of silver may have played some limited part in encouraging the expansion of output, especially in regions where pure silver mining is important. However, it is only recently that the price increases have been sizable and more time is needed to see just how much new production will be forthcoming as a result.

Increases in copper and zinc production in the postwar period have far exceeded the expectations generally held in the early 1950's. It is interesting in this connection to compare the actual increases that have occurred with the projections for 1975 made by the Paley Commission in 1952. Table 7 shows that by 1962 copper production already exceeded the Paley Commission estimate for 1975 by a wide margin. World copper reserves are very large and the Paley estimate for 1975 is quite unlikely to prove to be accurate. Zinc production also gives every indication of rising well above the Paley estimate; the estimate for lead production may be closer to the mark. The apparent failure of these projections, made little more than a decade ago, to anticipate trends in base-metal mining is a sobering reminder of the difficulties involved in any long-range forecast.

There are some general features of the experience since 1900 that do offer guidance as to probable future levels of silver production. During the entire period since 1900 the overall trend in silver production has been positive, but not very large. On the basis of the production experience since 1900, the annual average increase in world silver production has been only about 325,000 ounces. Silver production has known extreme variations in the past, and this cautions against the acceptance of any mechanical projection of past production levels as a guide to what could happen in the future.

Conditions in the postwar years are more relevant as an indication of the degree of future expansion in silver output that may be expected. The 325,000 ounce annual production increment, based upon the entire experience since 1900, is far too low as an estimate of future production increases. The aggregate production of copper, lead, and zinc has grown rapidly in the postwar period, and recent increases in the price of silver

[1] The price and byproduct influences were tested by a multiple correlation of world silver production with silver price and the aggregate output of copper, lead, and zinc during the 1900-1963 period. Erratic influences upon silver production were so strong during the period that the overall correlation is a very poor one, with only about 35 percent of the overall variation in silver production explained by silver prices and base-metals production taken together. Silver prices and production were actually negatively correlated, although base-metal production was, as expected, positively related with silver production. The relationships are much closer in the postwar period, particularly between silver production and the production of base metals. However, the period of time is short and the correlation between silver prices and base-metals production is relatively high. Under these conditions, the multiple correlation technique does not yield dependable estimates of the independent influence of the explanatory variables, in this case silver price and base-metals production.

TABLE 7.--Comparison of Paley Commission 1975 Estimates of Free World Copper, Lead, and Zinc Production with Actual Production, 1950 and 1962

[Production in thousands of short tons]

	1950 actual	1962 actual	1975 Paley estimate	Percentage increase	
				1962 over 1950	1975 estimate over 1950
Copper.....	2,515	4,145	3,850	65	53
Lead	1,644	2,060	2,700	25	64
Zinc	1,931	3,010	3,200	56	68

Source: Report of the President's Materials Policy Commission and Bureau of Mines.

have offered additional encouragement for the expansion of silver mining. While base-metal production will not necessarily continue to grow so rapidly, increases in silver prices might compensate for some slackening in copper, lead, and zinc production. On the basis of the relatively favorable production experience in the postwar period, an annual average increase in world silver production of about 3½ million ounces might be expected in the future. In general, this average increase of 3½ million ounces seems a much better guide to what may be expected in the future than the much lower 325,000 ounce average increase over the entire period, 1900-63.

Even this higher estimate of future production increases may very well be too low. Table 8, dated October 27, 1964, gives estimates of new Free World silver production supplied to the Treasury by Mr. Simon D. Strauss, Vice President, American Smelting and Refining Company, and member of the Silver Committee of the American Mining Congress. These estimates of the new production of silver that may take place in the next 4 years were described as conservative and based upon projects for which financing was already committed. Table 8-A presents estimates made on the same basis but at a somewhat later time by Robert O. Hardy, President, Sunshine Mining Company, and Chairman of the Silver Committee of the American Mining Congress. These estimates of the new production of silver from knowledgeable industry sources should be more accurate, over the timespan to which they refer, than any mechanical projection of past experience. Furthermore, the Strauss and Hardy estimates receive support from the fact of a 7 million ounce increase in Free World silver production during 1963. Preliminary data suggest that a much smaller increase of only some 2 million ounces may have occurred during 1964. The Strauss and Hardy estimates, if they were realized, would mark a fairly significant departure from postwar production experience, but would do very little to close the large gap between Free World consumption and production.

New foreign silver production in the next 4 years would amount to about 25 million ounces according to Table 8, and to about 30 million ounces according to Table 8-A. A net addition of this size to current production would be greater than the gains that have been made in recent years, although not drastically out of line with foreign production increases in the mid-1950's. Between 1949 and the present time, the 4-year moving total of increases in foreign production has been as high as 29 million ounces in 1949-53, and as low as 1.6 million ounces in 1959-62.

TABLE 8.--Estimate of New Free World Silver Production Expected in the Next 4 Years

Location	Ounces of silver
United States:	
Mineral Park	168,000
Battle Mountain	432,000
East Tintic	2,500,000
Bingham Canyon	750,000
Flat Head	1,000,000
Wah Chang	300,000
Blue Hill	117,000
Missouri Lead Belt	500,000
Twin Buttes	1,500,000
Total	7,267,000
Mexico	1,000,000
Central and South America	1,000,000
Europe:	
Consolidated Mogul	550,000
Northgate	1,100,000
Total	1,650,000
Australia and Southeast Asia:	
Cobar	500,000
Mount Isa	5,800,000
Marinduque	1,500,000
Te Aroha	70,000
Total	7,870,000
Africa (No change.)	
Canada:	
Texas Gulf Sulphur	7,750,000
Granduc	750,000
Brunswick	2,500,000
Western Copper	570,000
Lake Dufault	1,500,000
Total	13,070,000

The projected 7- to 8-million-ounce increase in U.S. production during the next 4 years may be slightly more difficult to achieve. No sustained increase of this magnitude has occurred in U.S. production during the postwar period. However, there is reason to believe that some increase in U.S. silver production will occur within the near future, possibly on the scale envisaged in the Strauss-Hardy projections. A study of the silver situation prepared last year in the Department of the Interior projected an increase in U.S. silver production of about 1 million ounces per year, reaching a level of 41 million ounces by 1970. While somewhat below the increases suggested by Strauss and Hardy, the Interior estimate is essentially consistent with them in anticipating some increase above the plateau upon which U.S. silver production has remained for more than a decade. On the other hand, the Interior study projects only an 18-million-ounce increase in world production by 1968, about half the amount anticipated by the American Mining Congress.[1]

[1] It is understood that the Interior study will be published as Information Circular 8257.

TABLE 8-A.--Estimate of New Free World Silver Production Expected in the Next 4 Years

Location	Ounces of silver
United States:	
Mineral Park	168,000
Battle Mountain	432,000
East Tintic	2,500,000
Bingham Canyon	750,000
Flat Head	1,000,000
Wah Chang	300,000
Blue Hill	117,000
Missouri Lead Belt	500,000
Twin Buttes	1,500,000
Silver Summitt	1,000,000
	8,267,000
Mexico	2,000,000
Other America: E. Mochito	1,000,000
Peru:	
Cerro	1,500,000
Machicala	500,000
Kiowa	200,000
Arcata	350,000
Quiruvilca	250,000
	2,800,000
Europe:	
Consolidated Mogul	550,000
Northgate	1,100,000
Largentiere	1,500,000
	3,150,000
Australia:	
Cobar	500,000
Mount Isa	5,800,000
	6,300,000
Southeast Asia:	
Marinduque	1,500,000
Te Aroha	70,000
	1,570,000
Canada:	
Texas Gulf Sulphur	7,750,000
Granduc	2,500,000
Brunswick	750,000
Western Copper	570,000
Lake Dufault	1,500,000
Mount Washington	200,000
	13,270,000
Grand total (approximate)	38,000,000

U.S. Silver Production

Needed increases in silver production will undoubtedly have to come very largely from outside of the United States. Table 9 summarizes the world distribution of silver production in the postwar period. U.S. production of about 60 million ounces in the period immediately following World War I was some 30 percent of world production. The U.S. proportion of world output had fallen below 25 percent after World War II and it has fallen further to less than 20 percent at the present time. Separate discussion of the U.S. industry could hardly be justified on the basis of its importance in the world supply picture. However, there are much fuller and more dependable statistics available on U.S. production than there are on most foreign sources of production. These statistics throw some light on the respective importance of the price of silver and the output of the metals with which silver is found.

The basic data are presented in Table 10. The variations in pure silver production of column 2 do not seem to bear any simple relationship with the silver prices of column 4. Practically all of U.S. pure silver production is located in the Coeur d'Alene region of Idaho and most of it in one mine--the Sunshine. Changes in production sometimes have been due to special reasons not directly connected with the price of silver. For example, there were fairly lengthy interruptions of production at the Sunshine Mine because of labor disputes in 1962 and 1963. These could have prevented the appearance of production increases encouraged by higher silver prices. An even more basic limitation of the price and output data of Table 10, as guides to the price-sensitivity of silver production, is the fact that silver prices had been approximately constant for a decade, until they began their sharp increase late in 1961. Some time may have to elapse before the effect of rising prices is fully registered in production increases.

Average gross hourly earnings in metal mining rose by about 100 percent between 1947 and 1961, while the price of silver rose by only 30 percent. Productivity in silver mining can hardly have risen rapidly enough to prevent a continuing squeeze on profit margins. Whether or not a widening of profit margins could achieve much of an expansion in pure silver production is uncertain, but the possibility cannot be entirely disregarded. Higher silver prices in the mid-1930's were followed by sharp expansion in U.S. silver production from precious metal ores, although the paralleling increase in the price of gold at that time was also an important influence. In any case, the absolute magnitude of any future U.S. production increases from pure silver mining could not be very great relative to total requirements.

While the data of Table 10 do not reveal much evidence of the influence of price upon silver production, there is clear evidence of the importance of the byproduct character of most silver production. An index of the silver found in association with other metals, computed from column 3 of Table 10, is plotted in Chart 2 along with an index of the aggregate U.S. output of copper, lead, and zinc. These series fluctuate together very closely because of the conditions of joint supply under which about two-thirds of U.S. silver output is produced. In addition to the close fluctuation of the two indexes, it is interesting to note the overall decline in silver output relative to copper, lead, and zinc

TABLE 9.--Free World Production of Silver by Countries, 1948-52, 1953-57, and 1962

Country	Average production, 1948-52		Average production, 1953-57		Production, 1962	
	In thousands of fine troy ounces	Percent of Free World total	In thousands of fine troy ounces	Percent of Free World total	In thousands of fine troy ounces	Percent of Free World total
Australia	10,560	6.4	14,222	7.6	17,250	8.5
Bolivia [1]	6,996	4.2	5,987	3.2	3,760	1.8
Canada	21,064	12.7	28,931	15.4	30,669	15.1
Mexico	50,053	30.2	45,191	24.0	41,249	20.3
Peru	13,322	8.0	22,164	11.8	36,017	17.7
United States	39,246	23.6	37,450	19.9	36,345	17.9
All other	24,715	14.9	34,223	18.2	37,815	18.6
Total, Free World	165,956	100.0	188,168	100.0	203,105	100.0

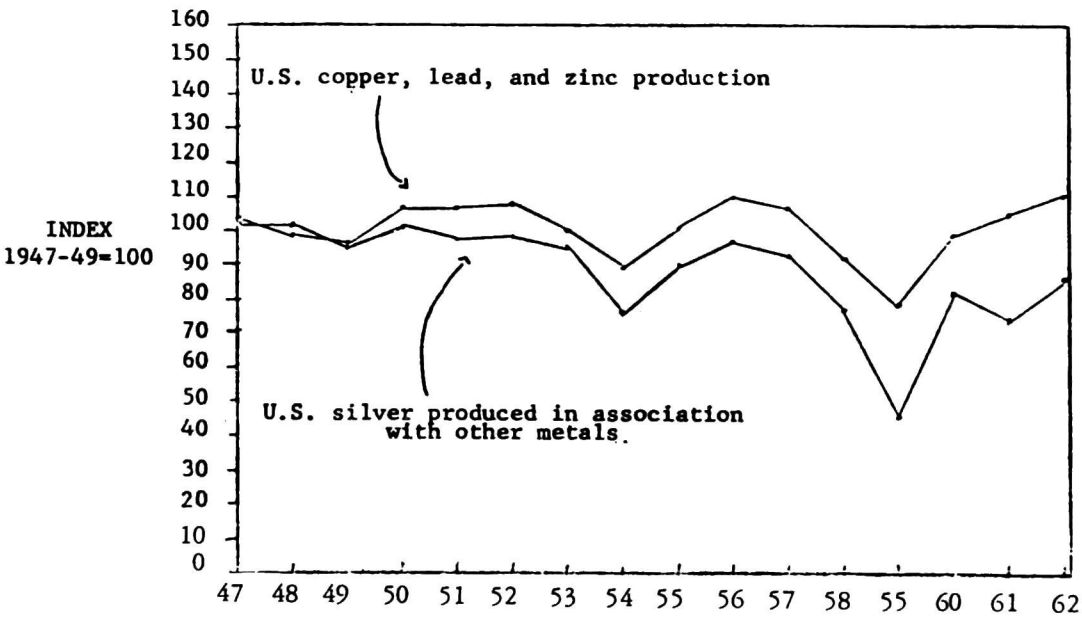
[1] Exports.

Source: Annual Reports of the Director of the Mint.

TABLE 10.--United States Silver Production by Type of Ore and the Price of Refined Silver in New York, 1947-63

Year	Total silver production (million fine troy ounces)	Silver ore and placers (million fine troy ounces)	Silver found in association with base metals (million fine troy ounces)	Silver price (cents per ounce)
1947.....	38.6	10.0	28.6	71.82
1948.....	39.2	10.5	28.7	74.36
1949.....	34.9	8.3	26.6	71.93
1950.....	42.3	14.0	28.3	74.17
1951.....	39.9	12.8	27.1	89.37
1952.....	39.8	12.5	27.3	84.94
1953.....	37.7	11.1	26.6	85.19
1954.....	35.6	14.1	21.5	85.25
1955.....	36.5	11.1	25.4	89.10
1956.....	38.7	11.3	27.4	90.83
1957.....	38.7	12.5	26.2	90.82
1958.....	36.8	15.1	21.7	89.04
1959.....	23.0	10.3	13.0	91.20
1960.....	36.8	13.8	23.0	91.37
1961.....	34.9	13.7	21.2	92.45
1962.....	36.3	11.9	24.4	108.37
1963.....	35.2	11.7	23.5	127.91

Chart 2 Indexes of Copper, Lead and Zinc Production and Silver Produced in Association With Other Metals, 1947-1962



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output. A falling ratio of silver per ton of base-metal production means that increases in silver price may be necessary simply to keep silver's contribution to $1 of total revenue at a constant level. Under such circumstances it does not seem at all likely that moderate increases in silver price would give any net stimulus to base-metal mining.

If this observed decline in the amount of silver found with base metals should continue, the effect on overall silver output could be sizable. It is quite conceivable that silver production could fall in absolute terms even though silver prices were rising, if the yield of silver per ton of base ores were to decline at all rapidly. Statistics for silver mining outside of the United States are inadequate to determine whether or not there is a worldwide trend toward lower silver yield in byproduct situations. Scattered evidence and geological considerations suggest to some observers that there may be such a trend. If there is, and if it should become pronounced, the outlook for any continued expansion of world silver production would be much less certain. Major dependence would then have to be placed upon the effect that higher prices could exert on pure silver mining, an effect for which there really is not much direct evidence at all.

The Influence of Silver Price Upon Consumption

Discussion of the probable influence of silver prices upon noncoinage demand can be quite brief. Statistical information that bears directly upon the issue is very limited in its range and coverage. The available statistics can be supplemented to some extent by descriptive material on new uses for silver, the extent to which rising silver prices are said to encourage economy in the use of silver, etc. While of some value, this descriptive material is not overly enlightening as to the actual effect that rising prices would exert upon consumption.

The chief influences upon silver consumption in the postwar period appear to have been (a) growth in the use of silver as a consequence of rising consumer income, (b) changes in the industrial consumption of silver as a consequence of new uses, and (c) the dampening effect upon the growth of demand exerted by increases in the relative price of silver. U.S. silver consumption, aside from coinage demand, has really shown only very moderate overall growth during the postwar period, although a very large increase in consumption did apparently take place during 1964.

The statistics on U.S. silver consumption presented earlier in this section pointed to considerable expansion in relatively newer uses, such as batteries and electronic and electrical components, but this expansion has been just about matched by decreasing uses in silverware and jewelry, while photographic uses have been relatively constant. The consumption statistics suggest that the declines in the more traditional uses of silver began before the increase in silver prices during 1961, but price increases undoubtedly intensified these reductions in consumption. In the 3 years, 1961-63, overall consumption of silver in this country for noncoinage purposes remained relatively constant, before increasing by about 12 percent in 1964.

Foreign consumption of silver experienced a very rapid growth phase in the postwar period until 1961. Between 1953 and 1961, the industrial use of silver outside of the United States approximately doubled. Most of this increase in consumption is undoubtedly attributable to rapid increases in income in Western Europe and Japan. Foreign consumption of silver showed a tendency to level off in 1961, just as it did in this country. Subsequent upward revisions in the data on foreign consumption now credit 1962 and 1963 with small increases, but much below the earlier rate of growth and the increase that took place during 1964. It seems reasonable to believe that rising prices for silver have exerted some influence in dampening foreign demand. From 1953 to 1961, the increase in average monthly silver prices in London was a little less than 8 percent over all. Practically all of this increase occurred in 1955, and from 1955 through most of 1961, the London price of silver was almost constant. Therefore, the marked postwar expansion in foreign consumption occurred at approximately constant prices. In 1964, when silver prices leveled off, foreign industrial consumption of silver rose by about 15 percent.

The relative constancy in consumption of silver in 1962 and 1963 very probably was the resultant of opposing forces: the continued growth in income and output that would encourage more use of silver, and the higher price of silver that would encourage less. It is uncertain whether or not further price increases, similar in magnitude to those since 1961, would continue to offset the rapid growth in consumption that would otherwise occur because of rising incomes and new uses. However, the assumption of slow growth in consumption of silver in physical terms as a consequence of trend growth in income and rising relative prices of silver does find some support in recent experience.

Prospective Levels of Silver Price in a Free Market

This concluding section considers the danger that within a few decades the market price of silver might reach the higher monetary values associated with various hypothetical reductions in the silver content of the existing coinage. Major reliance is placed upon an examination of the degree to which a given level of higher prices for silver would be successful in removing the excess demand that prevails at the current price of $1.29+, and in keeping silver markets in balance thereafter. This examination of silver supply and demand draws upon the earlier analysis of the factors that influence silver production and consumption. It does not lead to absolutely definite conclusions and there may also be some value in a more direct approach. Therefore, initial considerations will be given to what a direct extention of the postwar trend in the price of silver would imply for coinage alternatives.

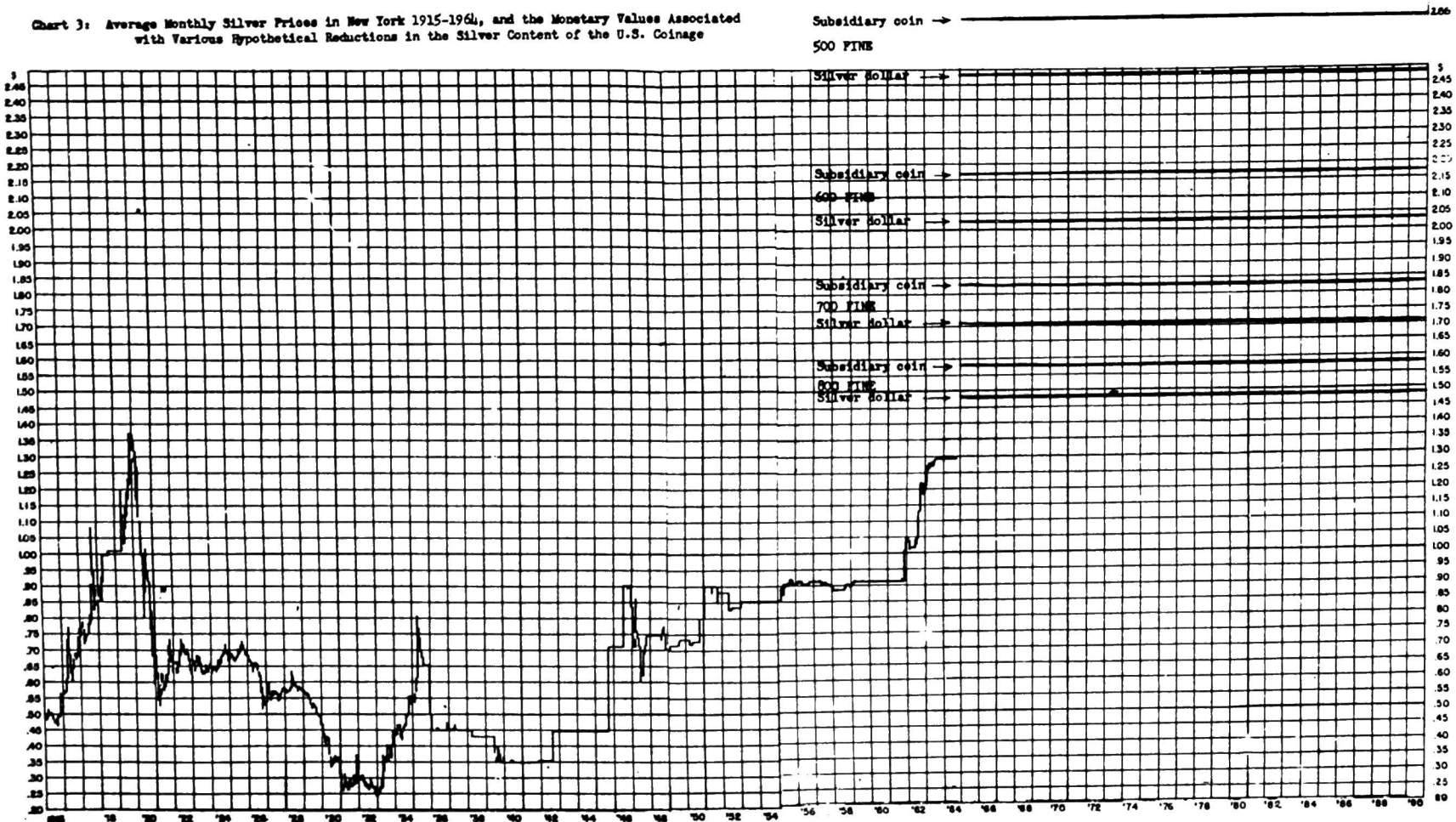
Monthly average New York silver prices are plotted in Chart 3 from 1915 through 1964. The monetary values of U.S. coinage of the existing thickness and diameter for 800, 700, 600, and 500 fineness, taken from Table 6, have also been drawn on the chart. It appears from inspection that if silver prices were to continue something like their postwar increase, which really can be said to date from the depression low of 25¢ silver, a level of $2 an ounce could very easily be reached within the next two decades.

The general level of world costs and prices has moved upwards during much of the postwar period, and it could be argued that continuation of an upward movement of similar proportions is less likely in the future. If so, one factor that has contributed to postwar increases in the price of silver will be lessened in influence. On the other hand, there may be reason to believe that future supplies of silver will be available at increasing real cost because of the steady depletion of known resources and the accompanying need to intensify expensive exploration effort. In such a case, silver prices would be expected to rise relative to a general index of commodity prices. A judgment on this latter score is difficult enough; the byproduct nature of two-thirds of silver production complicates it further.

Extension of past price trends is obviously a very crude forecasting technique. For that matter, the accurate forecasting of a commodity price two decades in the future by any technique whatsoever is not within the realm of possibility. In the present case, however, the question is not so much the single most probable value for the price of silver in, say, 1985, as whether there is reason to believe that by that time the price of silver could have reached the various monetary values drawn in on Chart 3. The postwar trend of the price of silver does suggest that an increase to $2 an ounce, within the next two decades or so, is far from impossible. Unless the analysis of supply and demand can point decisively to factors that promise to hold the price of silver well below its postwar trend rate of increase, it would seem that 800, 700, and even 600 silver content should definitely be ruled out as longrun solutions to the coinage problem.

The alternative to direct projection of the apparent trend in the price of silver is a consideration of the factors bearing upon the supply and demand for silver. The more important of these factors have already been discussed and it is only necessary now to pull together earlier conclusions and apply them to the question at hand. There would, in general, seem to be three major determinants of the extent to which silver prices would rise in a free market. The first is the initial size of the excess demand that will exist at the market price of $1.29+ when prices are permitted to rise. Excess

Chart 3: Average Monthly Silver Prices in New York 1915-1964, and the Monetary Values Associated with Various Hypothetical Reductions in the Silver Content of the U.S. Coinage



Source: Silver price from Handy and Harman; Monetary Values computed by the Bureau of the Mint

demand will continue to exert upward pressure on price until it is eliminated by adjustments in consumption and production. The second determinant of the price rise that would be required to bring silver markets into balance is the net effect over time upon silver production of rising silver prices and trend growth in the production of metals with which silver is found. The third determinant is the net effect over time upon silver consumption of higher silver prices and trend growth in consumer income and the industrial output in which silver is used. An omitted factor of some consequence on the supply side is the supplement to current production that would be forthcoming at various price levels from existing stocks of silver. This omission is probably less serious where longrun trends in prices are at issue, than it would be if the intent were to forecast prices a few years ahead.

In holding the free market price of silver at $1.29+ an ounce the Treasury acts as residual supplier to the world silver market. Consequently, the amounts that the Treasury is obliged to supply to the market are one measure of the excess demand--speculative and nonspeculative--in the market at $1.29+. Since the Treasury has only been holding the line at $1.29+ for a relatively short time and because of the presence of transitory speculative demands, it is questionable how accurate an indication of the behavior of excess demand over time one can gain from this source.

An alternative approach is to subtract U.S. coinage demand from the Free World production deficits presented earlier in this section. The results are shown in Table 11. They suggest a "normal" annual deficit from 1949 to 1958 of about 25 to 35 million ounces, met from a range of sources other than current production. The price of silver was approximately constant during this period. During 1959 and 1960 the residual world deficit increased about 40 million ounces above the earlier level. In 1961 there was a further increase of about 40 million ounces, some of which may have represented speculative demand in anticipation of the halting of Treasury sales of free silver. While deficits decreased somewhat in 1962 and 1963 as the price of silver rose to $1.29+, they remained well above pre-1959 levels. In 1964, the deficit increased by about 40 million ounces. As in 1961, this probably reflected some inventory accumulation in anticipation of an increase in the price of silver. This suggests that aside from speculative demands, which could be expected to carry Treasury redemptions to much higher levels, there may now be excess demand of a "permanent" sort amounting to perhaps 75 million ounces at the current price of silver.

What size this underlying deficit would be after a transition to coinage of reduced silver content is conjectural. Resumption of anything like earlier rates of growth in

TABLE 11.--Free World Silver Production Deficit, U.S. Coinage Demand, and the Residual Deficit, 1949-64

[In millions of fine troy ounces]

	Indicated production deficit	U.S. coinage demand	Residual deficit
1949-53 average.....	-63.9	36.5	-27.4
1953-57 average.....	-72.6	37.5	-35.1
1958.....	-64.2	38.2	-26.0
1959	-110.9	41.4	-69.5
1960	-121.6	46.0	-75.6
1961	-173.6	55.9	-117.7
1962	-168.5	77.4	-91.1
1963	-205.4	111.5	-93.9
1964	-334.9	203.0	-131.9

Source: Table 1.

foreign consumption of silver--and the apparent increase in 1964 was very large--could easily cause annual excess demand to increase to 100 million ounces or more in a few years. However, the more conservative course may be simply to estimate the market gap at 75 million ounces.

How readily could this 75 million ounce gap be closed from the production side? The postwar trend increase in silver production is only 3 1/2 million ounces a year; its continuation would do practically nothing to close the gap and dampen the upward movement of price. The Strauss-Hardy estimate of an 8 to 10 million ounce annual net increment to world silver production includes whatever may have been the stimulating effect of the increase of more than 40 percent in silver prices between late 1961 and 1963 and the generally improved outlook for primary metal output at the present time. That production estimate may prove to be an accurate one, but it is far from clear to what extent a higher price of silver accounts for the increase, or how long one could count on sustained increases in silver production of this size.

It is even less clear to what extent, if any, excess demand could also be closed from the consumption side. The statistical information is meager and firm conclusions are very difficult to reach. There is no doubt that, other things being equal, steadily rising silver prices would reduce the volume of silver consumed. But world incomes will be rising and the potential for new uses of silver is said to be considerable. If the consumption of silver were to remain approximately constant because of rapidly rising silver prices while production grew at something like 8 million ounces annually, excess demand would be narrowed in time, but the potential rise in the price of silver would be very great. Indeed, so long as any excess demand were chronic, silver prices would be likely to rise, although not necessarily at a steady pace because of the intermittent appearance in the market of silver drawn from existing stocks.

The price of silver rose more than 40 percent in 2 years between late 1961 and 1963 and was only stopped by the U.S. Treasury redemption ceiling. Excess demand seems to have been about 70 million ounces, and this gap was only slightly reduced, if at all, by the increase in price. There are now some signs of a lagged response of production. Consumption growth was slowed a little, but only temporarily. It is extremely doubtful whether recent experience offers any assurance whatsoever that silver prices would remain below $2 in the next two decades. Indeed, it is not at all difficult to contemplate price rising much farther. It is very hard to rule out the possibility of a doubling or even a tripling in the price of silver unless it can be shown that a higher price of silver would cut back the consumption of silver appreciably from present levels. A basic difficulty is that the silver supply-demand situation has been changing very rapidly in the last half dozen years, so rapidly that little basis exists upon which to estimate with much assurance the independent effect of silver prices upon consumption.

In the last analysis, it is the uncertainty as to how high silver prices might rise within two decades that argues most strongly against reducing the silver content of the coinage as a longrun solution to the coinage problem. That uncertainty could certainly be held to rule out 500 fineness as well as the higher silver contents. This is a question of judgment. No one can be sure that the price of silver would not double in the next two decades and reach the melting point of 500 fine silver coinage. This does seem somewhat less likely than the possibility that price would reach or exceed $2. Longrun supply and demand factors are not the only reason why silver coinage of 500 or lesser fineness may be unsuitable as a longrun solution. On the basis of longrun market factors alone, silver coinage of 500 fineness is not absolutely ruled out, although the case for it is seriously weakened even without reference to the difficulties of the transition period. Its advantages and disadvantages from a technical and a metallurgical point of view will be considered subsequently along with those of a range of other possible alloys.

All of the discussion to this point has assumed that U.S. coinage demand could be met in the foreseeable future from official stocks of silver remaining at the end of a transition period, possibly supplemented by recovery of old coin. The validity of such an assumption is highly questionable. In the course of its investigation, Battelle made detailed projections of the rates at which Treasury silver would be exhausted on various

assumptions as to silver content and coinage requirements. With 50 percent silver content, Battelle predicted that Treasury silver would be entirely exhausted somewhere between 1969 and 1975, if not before. If it were to prove necessary for the Treasury to add its own demand to that of the market, there can be little doubt that the price of silver would rise well above $2 during the next two decades. Indeed, once Treasury stocks were exhausted, the prospect of keeping any silver coinage in circulation would not be at all bright.

Conclusion

1. Recent years have seen the development of an enormous gap between Free World production and consumption of silver. The overall deficit, inclusive of coinage demands, was over 200 million ounces in 1963 and almost 340 million ounces in 1964. Even if all coinage demands, U.S. and foreign, are subtracted, a deficit remains although relatively modest in size.

2. U.S. Treasury stocks of silver declined to 1,218 million ounces by the end of 1964 and will decline further to 1,000 million ounces or less by mid-1965. Legislative action on a new coinage system is essential while Treasury stocks of silver are still large.

3. On the basis of past experience, higher silver prices and increases in base-metal production promise to increase world silver production. The independent influence of higher silver prices cannot be estimated with any precision, but there is no reason to doubt that substantially higher prices would lead to some expansion in silver output. Unfortunately, the current production deficit is so large that it cannot be closed from the production side.

4. During the last 15 years, most of the growth in the industrial consumption of silver has occurred in foreign countries; U.S. consumption has grown more slowly. There were some signs that the recent increase in silver prices had checked the overall growth in world industrial use of silver, but only temporarily, and 1964 found silver consumption increasing sharply both here and abroad.

5. A simple extension of the postwar trend of silver prices suggests that $2 an ounce might easily be reached by 1980 or 1985. Analysis of supply and demand factors does not yield any precise estimate of the level that silver prices might reach in a free market. The analysis does suggest that there is a very appreciable risk that price could reach $2 an ounce then, or even much sooner. Battelle's detailed quantitative projections of the rate of exhaustion of Treasury stocks lead to an even more pessimistic appraisal since with 50 percent silver content they can foresee the complete exhaustion of Treasury silver as early as 1969.

6. In view of these considerations, it does not appear that reduction of silver content to 800,700, or 600 fineness would constitute a longrun (20- to 25-year) solution to the coinage problem. On the basis of longrun supply and demand factors, silver coinage of 500 fineness is, perhaps, not definitely ruled out, although there certainly is substantial risk that a rising market price of silver would soon imperil coinage of 500 fineness. That risk would be overwhelming even for lower silver contents if future U.S. coinage demand could not be met exclusively from Treasury silver holdings.

IV. METALLURGICAL AND TECHNICAL CHARACTERISTICS OF ALTERNATIVE COINAGE ALLOYS

This section of the discussion is concerned with the metallurgical and technical characteristics of the various coinage alloys that might replace silver of 900 fineness in a new coinage system. The objective is to narrow the field of possible coinage alloys to those which are acceptable from a metallurgical and technical standpoint. It will then be possible to deal more effectively with problems of the transition to a new coinage system.

The analysis of the preceding section has led to the elimination of silver alloys of more than 500 fineness because of the prohibitive risk that the market price of silver would reach, or exceed, $2 an ounce within the next 20 years or so. The metallurgical

and technical characteristics of silver alloys of 500 fineness remain to be considered along with those of a fairly wide range of base alloys. In addition, there are possibilities in the form of composite coinage materials with silver or base alloy outer layers clad on an inner core. These will be discussed in the course of the present section. Intensive analysis of the technical and metallurgical characteristics of these clad materials will be found in the Battelle study, and the Mint has, itself, been conducting an exhaustive investigation of the feasibility of the use of clad material in U.S. coins.

The alternative alloys are taken up in alphabetical order and any material that has been seriously proposed to, or by, the Treasury receives at least brief consideration in the course of the discussion. In the interest of brevity, attention is chiefly concentrated upon those alloys that seem to show promise. Except in the case of few materials which are readily eliminated because of some glaring deficiency, each coinage alloy is considered under five general headings. These are: Public acceptability, operation in vending machines, counterfeiting potential (including the use of blanks and foreign coins in vending machines), ease and certainty of production, and cost and availability of raw materials. Results of the discussion under these headings are summarized in Tables 1 and 2, at the end of this section, which show acceptable and rejected coinage alloys separately.

Aluminum

PUBLIC ACCEPTABILITY

Aluminum coins are unlikely to be acceptable to the public. Pure aluminum is very light in weight with a density of 2.7 grams per cubic centimeter, in contrast to a density of 10.3 for 900 fine silver. Aluminum is also very soft. It could be hardened by the addition of manganese but its wearing qualities would still be relatively poor. Aluminum can be processed so as to produce different colored coins but this seems unlikely to increase its chances for public acceptance. Foreign coinage use of aluminum is chiefly limited to low denominations. There are some examples of use by developed industrial countries; namely, Austria, Italy, and Japan. On balance, it would seem that aluminum would be rated very low in acceptability by the public if proposed as the basic alloy in a new coinage system. It is conceivable that an aluminum 1-cent piece would be acceptable to the public, but its use in high denominations lacks precedent elsewhere and probably would encounter strong public opposition.

OPERATION IN VENDING MACHINES

Pure aluminum has an electrical resistivity of about 2.7 microhms-cm. This is close to the 2.1 resistivity of 900 fine silver and the 3.1 of the present 1-cent piece. However, current vending machines depend not only upon coins being nonmagnetic, of proper size, and of appropriate electrical resistivity; they also depend upon coins being of a certain minimum weight in order to roll properly and they use a bounce test for hardness.[1] Aluminum coins fall below minimum weight requirements and existing vending machine rejectors cannot easily be redesigned to handle lightweight coins. Furthermore, if manganese were added in order to harden aluminum coins, their electrical resistivity would be raised well above that of the present 1-, 10-, 25-, and 50-cent pieces. Undoubtedly, some rejection apparatus could eventually be designed to take aluminum coins and reject other alloys. No such apparatus is available now and no one is known to be working on the problem.

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[1] The best single parameter in this connection is probably the product of an alloy's electrical resistivity and its density. Throughout most of the ensuing discussion that deals with vending machine operation, attention is confined to electrical resistivity because the densities of eligible coinage alloys do not vary widely.

COUNTERFEITING POTENTIAL

Unless aluminum coins were to receive some special processing, the potential for counterfeiting would seem to be very great. Sheet aluminum is readily available and the manufacture of coin blanks would not be difficult at all. The metal is soft and would take impressions readily from counterfeit dies. If the dies were of high quality, the minting of aluminum counterfeits might become a problem of some proportions.

Aside from the threat of direct counterfeiting, aluminum blanks would probably pose a real problem for the vending machine industry. Rejectors might eventually have to be equipped with some sensing device by which blanks could be told from coins. This would undoubtedly prove to be difficult and expensive.

EASE AND CERTAINTY OF PRODUCTION

Aluminum is a very easy material to work and over the long run it probably would not present any difficult minting problems. The Mint has had no production experience working with aluminum, but experimentally it has been established that present techniques could be adapted readily to the fabrication of any material as soft as aluminum.

COST AND AVAILABILITY OF RAW MATERIALS

Aluminum is cheap with a domestic market price of 24½ cents per pound for unalloyed primary aluminum ingot. Mint requirements would be tiny in proportion to U.S. annual consumption of aluminum of some 3 million short tons.

Conclusion: Rejected as possible coinage alloy.

Reasons: Lack of public acceptability, vending machine, and counterfeiting problems.

Columbium

PUBLIC ACCEPTABILITY

Columbium has been proposed as a coinage material in the 50-cent piece and as a cladding material. The density of columbium is 8.57, just a little less than copper (8.96) and nickel (8.90). The color is gray, the ring is about the same as with silver, and the material is tarnish resistant. Wearing qualities should be appreciably better than those of silver coins. Public acceptability, as with any "exotic" material, is somewhat uncertain.

OPERATION IN VENDING MACHINES

Very little work has been done on the adaptation of vending machine rejectors that would be required with a pure columbium coin, or a columbium alloy. In theory, there would not appear to be any insuperable difficulties but practical experience is lacking. Columbium is fairly heavy and it is nonmagnetic. Its electrical resistivity is in the range of 12.5 to 16.0 microhms-cm, depending upon temperature. This compares with an average resistivity of 2.1 for 900 fine silver and 32.0 for cupronickel (the alloy in the 5-cent piece).

There have been experiments with powder metallurgy techniques in an effort to develop a columbium alloy which would work in existing vending machine rejectors without any alteration being required. However, at the time of writing, these efforts had not progressed much beyond the experimental stage and had not achieved the required degree of success under operating conditions.

COUNTERFEITING POTENTIAL

Columbium coins would be very difficult to imitate with any material of relatively low value.

EASE AND CERTAINTY OF PRODUCTION

The melting point of columbium is exceptionally high--4,474° F. to silver's 1,760°F. Columbium strip would have to be purchased from suppliers, or the Mint would have to acquire new equipment. It is said to be a very ductile material which does not work-harden when cold fabricated. The Mint should be able to make coins from purchased strip of columbium, although costs of fabrication would be somewhat greater.

COST AND AVAILABILITY OF RAW MATERIALS

While fairly acceptable from other points of view, the cost of columbium is prohibitive. A price of $20 to $35 an avoirdupois pound was initially mentioned to the Treasury but a price range of $36 to $50 is quoted in the American Metal Market. Even the $20 to $35 price is well above a current price of $18.81 for silver. It is conceivable that on a large guaranteed coinage demand unit costs might be reduced to, or below, $10 a pound. This would still be a very expensive coinage material.

There has been no U.S. mine production of columbium ore in recent years. About 60 percent of U.S. imports of columbium concentrate are from Canada; the rest are rather widely dispersed. Domestic stocks of concentrate and ingot are fairly sizable relative to demand for the metal but it is estimated by Battelle that it would take 2 to 3 years to expand production appreciably. Furthermore, coinage requirements would apparently be very large relative to current consumption of the metal and large relative to the national (strategic) stockpile.

Conclusion: Rejected as possible coinage alloy.

Reasons: High cost and uncertain supply outlook. Not accepted in present vending machines. Mint cannot fabricate with existing equipment.

75 Copper-25 Nickel (Cupronickel)

PUBLIC ACCEPTABILITY

Cupronickel is the alloy presently used in the U.S. 5-cent piece and the most widely used coinage material in the world. The weight is good with a density of about 8.6 in contrast to a density of 10.3 for 900 fine silver, and about 9.6 for 500 fine silver. A cupronickel 25-cent piece would weigh 5.37 grams in contrast to 5.83 grams for 500 fine silver, and 6.25 grams for the present 900 fine 25-cent piece. The color is very good. Cupronickel does lack the luster of coin silver when the silver is untarnished. Also, its ring is not quite so impressive as that of the existing silver coins. However, a cupronickel coin ages well and its physical wear characteristics are very good--appreciably better than those of silver.

Cupronickel coinage has been used for relatively high denomination coins in the United Kingdom and has circulated side by side with silver coinage. Some objection to the use of cupronickel here would be lodged by individuals and groups who, for one reason or another, favor coinage with high intrinsic value. However, this sort of objection would be encountered if any base alloy were proposed for use in the 10-, 25-, and 50-cent pieces. It should be countered by insistence that under modern conditions high intrinsic value in subsidiary coinage tends to interfere with, rather than facilitate, performance of the essential medium of exchange function.

A question arises as to the role of the present 5-cent piece in a cupronickel system. Continuation of the 5- and 10-cent pieces in their present size and diameter, which probably is desirable, would lead to the anomaly of a 5-cent piece larger than the 10-cent piece, but made from exactly the same material. Opinions will differ as to whether this is important, but it is possible that some other material should be used for the 5-cent piece if cupronickel were to be used in the subsidiary denominations.

OPERATION IN VENDING MACHINES

Cupronickel has a resistivity of 32.0 microhms-cm., which is well above the 2.1 resistivity of 900 fine silver. Because existing rejectors are constructed to accept cupronickel 5-cent pieces, no unusually difficult problems are encountered in making a rejector that will accept cupronickel subsidiary coinage along with silver subsidiary coinage. The National Rejector Company has built a prototype which accepts cupronickel and silver 10-, 25-, and 50-cent pieces--NRCO 8000 Series Model X. The estimated factory cost of this new rejector, not currently in production, is $20. There are now about 4.5 million NRCO rejectors in service of three different series--4900, 5800, and 8000 regular. Many of these could be modified, at the factory or at a branch service facility, to accept existing silver coins and a new cupronickel system at an estimated cost of perhaps $10 each.

It has been estimated by the rejector industry representative that the required changeover could be accomplished within 2 years. Possibly it could be made even more rapidly at some increase in expense.

The rejector industry has concentrated upon designing a mechanism that would accept cupronickel 5-, 10-, and 25-cent pieces. A rejector such as NRCO's Model X would also accept the existing 5-cent piece, but, as mentioned previously, it may seem desirable to use a different alloy for the 5-cent piece if cupronickel is used for subsidiary coinage. No work has been done on the additional modification that would be required if the rejector were to accept a new 5-cent piece and cupronickel 10-, 25-, and 50-cent pieces, along with existing coins. One possible way in which that additional rejector modification could be avoided would be to make the 5-cent piece in a cupronickel system from nickel-silver (discussed below). The resistivities and other properties of nickel-silver and cupronickel are close enough so that both old and new 5-cent pieces would be acceptable in rejectors. On most rejectors no modification would be required on the 5-cent channels.

A much more promising resolution of vending machine difficulties would be to use outer layers of cupronickel clad on a copper core for all of the subsidiary denominations. Such coins would work in unaltered vending machine rejectors. They are discussed subsequently under the heading of "Other Clad Coins."

COUNTERFEITING POTENTIAL

The direct counterfeiting potential with cupronickel coinage should be quite low. Despite its comparative cheapness, cupronickel is not readily available from commercial suppliers. There are vending machine problems with a proposed subsidiary cupronickel coinage, but they relate to the use of foreign coins, or expanded U.S. 5-cent coins. The problem, in the instance of vending machines, is not so much the potential use of blanks, for they would be relatively difficult to obtain.

The rejector industry representatives do anticipate that a problem would arise if the U.S. were to switch to cupronickel subsidiary coinage, because of the use in vending machines of low-value foreign coins made from cupronickel. They have furnished a lengthy list of these coins which are sufficiently close in size to the U.S. 25-cent piece to operate a rejector mechanism set for a U.S. cupronickel 25-cent piece.

In addition, there is a potential problem with a cupronickel system in that the 5-cent piece could be flattened in a hydraulic press or by some other means and used as a 25-cent piece. Whether or not this would occur on any significant scale is questionable, but it is a further minor difficulty with a cupronickel system. This particular difficulty would not be overcome by substituting a 5-cent piece made of nickel silver in the cupronickel series since the two alloys have similar electrical resistivity.

EASE AND CERTAINTY OF PRODUCTION

The Mint has had long experience with the fabrication and minting of cupronickel. This is an important consideration where large numbers of coins may have to be produced in a very short period of time. Cupronickel is a tougher material than silver and

is not quite so easy to mint. However, no unusual problems would be encountered and cupronickel must be rated very high in terms of ease and certainty of production.

COST AND AVAILABILITY OF RAW MATERIALS

Cupronickel is also very attractive from the standpoint of the cost and availability of raw materials. Copper at 33 cents a pound and nickel at 79 cents a pound--alloy cost 45 cents--would be used in place of silver at $18.81 a pound. Coinage at the projected fiscal 1965 rate would use approximately 5,355 short tons of copper and 1,785 short tons of nickel annually. Copper presents no serious supply problem on a long-run basis, although intermittent shortages and sharp price movements can be expected to occur at times. Coinage needs would be a very small fraction of total consumption. The annual amounts of nickel used would be very small relative to U.S. consumption of 124,500 short tons in 1963.

Conclusion: Acceptable as coinage alloy.

Copper-Zinc Alloy (98 Copper-2 Zinc)

This alloy is red in color and its use for higher denomination coins does not merit any extended discussion. Along with similar alloys such as 96 copper-4 nickel, it does have an electrical resistivity similar to that of silver and could be used in existing rejectors. Some rejectors, which have been set specifically to reject copper slugs and cut-down pennies, would require minor adjustment. Copper-zinc coins could be easily fabricated on existing and planned Mint equipment. Because of their red color, they would merit consideration chiefly as an emergency measure, if silver were not available for coinage, and necessary vending machine adjustments were not yet complete. It is also conceivable that such an alloy might be used for the 5-cent piece if cupronickel were used for subsidiary coinage.

Nickel (Pure)

PUBLIC ACCEPTABILITY

Pure nickel has a density of 8.90 approximately the same as cupronickel. It is whitish-gray in color and in mint condition is generally considered to be slightly more attractive than a cupronickel coin. Wearing qualities are excellent. Nickel is being more and more widely used as a coinage material although often a silver coin of higher denomination is retained in the series. This has been the case in Switzerland, Canada, France, the Netherlands, and Japan. South Africa has recently announced plans to replace its existing subsidiary coinage of 500 fine silver (reduced from 800 fine in 1951) with pure nickel coins, while retaining one high-denomination silver coin. Pure nickel coins would probably be readily accepted by the American public. The coins are very attractive and more closely resemble silver coinage than is the case with any of the base alloys, except nickel silver when it is in mint condition.

OPERATION IN VENDING MACHINES

Pure nickel is magnetic and existing rejector mechanisms are designed so as not to accept coins which are magnetic. It would be necessary entirely to redesign rejector mechanisms so as to be able to pass magnetic nickel coins but to reject magnetic iron slugs. While this probably could be done, it would be very difficult and could not be done quickly, particularly since practically all coin-operated mechanisms now depend upon the magnetic principle to some extent, and many less sophisticated mechanisms depend upon it entirely. The extent of the problem may be inferred from the fact that the International Nickel Company has directed its efforts to the development of a non-magnetic alloy (discussed below) rather than to the modification of vending machine rejectors in order to make them capable of accepting pure nickel coins.

COUNTERFEITING POTENTIAL

Pure nickel coins would be extremely difficult to counterfeit because of the metal's relatively high melting point (2651° F.) and its hardness. There is little basis upon which to assess the potential for the use of nickel blanks, or blanks with comparable electrical resistivity, in vending machines since it is not clear what sort of rejector could be designed to accept pure nickel coins. The electrical resistivity of pure nickel is 9.5 microhms-cm. No other commonly used coinage alloy has a resistivity very close to that value although many brasses and bronzes, available commercially, do have similar resistivities.

EASE AND CERTAINTY OF PRODUCTION

Production of pure nickel coins would pose a very difficult problem for the Mint. Existing brass mill equipment could not be used because of the high melting point of nickel. The new Mint would have to be specially designed and/or nickel strip would have to be purchased for use in existing Mint facilities. The minting of nickel coins would still be very difficult with existing equipment even if strip were purchased, but it could be accomplished.

COST AND AVAILABILITY OF RAW MATERIALS

Nickel costs 79 cents per pound. The International Nickel Company has estimated that at fiscal year 1965's projected rate of production of 10, 25, and 50-cent pieces about 15.7 million pounds of nickel would be required. These requirements would have to be met by imports from Canada or from the domestic stockpile. U.S. mine output comes exclusively from the Hanna Mining Company's properties in Oregon. In 1963, the nickel content of Hanna's production of ferronickel was about 21.4 million pounds but this ferronickel would not be suitable for mint requirements.

Conclusion: Rejected as possible coinage alloy.

Reasons: Vending machine problem associated with use of a magnetic alloy. Otherwise acceptable, although difficult to make with existing Mint equipment.

Nickel (Inco Alloy 95 Nickel-5 Silicon)

The International Nickel Company has developed an alloy of 95 nickel and 5 silicon which is nonmagnetic, thus removing, at least potentially, the major barrier to the use of nickel in slug rejectors of the present type. A further effort has been made to modify the alloy so that it will simulate the properties of 900 fine silver coinage and work in unaltered coin rejectors.

As one of their tests, existing rejectors roll the coin through a magnetic field. A coinage metal such as silver with very low electrical resistivity is slowed more in its travel, by eddy currents induced as it passes through the magnetic field, than is a material of higher electrical resistivity. Silver is a relatively "slow" coin, while cupronickel, for example, is a relatively "fast" coin. Having removed the magnetism of pure nickel coinage through the addition of 5 percent silicon, Inco technicians have sought to restore just such a sufficient degree of weak magnetism to the coin as to make it as "slow" as silver. In their most successful effort, the weak magnetism pulls the coin into contact with a piece of aluminum oxide tape which retards the rolling coin through physical friction. Without this retardation the 95 nickel-5 silicon coin would be too fast, since its electrical resistivity is higher than that of silver coins. The required magnetism has been sought at various times by adding a thin core of pure nickel, or a core of 80 percent nickel and 20 percent iron, to the coin. The 80 percent nickel and 20 percent iron core is now preferred since its magnetism does not vary within the ranges of temperature that would be encountered.

Despite this, early test results were not entirely satisfactory, and the feasibility of the Inco approach has never been demonstrated conclusively. According to the rejector

industry, on its initial tests the Inco coin was only successful in fooling rejectors about 70 percent of the time; 95 to 97 percent success was required in their view. Inco subsequently demonstrated that slight modification of existing rejectors--application of the small strip of special tape referred to above--is capable of achieving a higher success ratio, at least under controlled test conditions for a limited number of trials. However, in the judgment of the vending machine and coin rejector industries, even with the application of the special tape the Inco coin cannot achieve a satisfactory success ratio under actual operating conditions. Wearing of the tape and variability in the strength of the magnets in the rejector mechanisms could be expected to create difficult problems in actual practice. There was a comparable negative finding by Battelle on the ability of the Inco coin to work in existing vending machines.

Aside from the technical issue of use in vending machines, comment on the modified nickel coin can be relatively brief since many general comments applicable to pure nickel coinage are also applicable here.

PUBLIC ACCEPTABILITY

The public would seem likely to accept the modified coin about as readily as a pure nickel coin.

OPERATION IN VENDING MACHINES

Discussed above.

COUNTERFEITING POTENTIAL

This would be a very difficult coin to counterfeit, at least as difficult as a pure nickel coin, and probably more difficult. The use of blanks in vending machines would present about the same problem as with existing silver coins since the modified coin simulates silver's electrical resistivity. Some additional difficulty might arise if it were not possible to simulate the narrowed resistivity range of 2.0 to 2.5 microhms-cm. that some rejectors are using in order to reject copper blanks and foreign coins.

EASE AND CERTAINTY OF PRODUCTION

It is very doubtful whether the Mint could make the modified nickel alloy; certainly it would be an expensive undertaking requiring different equipment. The necessary facilities could probably be included in the new Philadelphia Mint. If the modified alloy were to be used it apparently would be necessary to buy annealed blanks from Inco, at least until the new Mint is on stream. It is possible that current and planned rates of subsidiary coin production could be achieved using the purchased blanks. Even when annealed the alloy would be harder than cupronickel, and this makes minting a more difficult task, but not an insurmountable one. The material is being patented; exclusive rights to the patent would be turned over to the U.S. Government, for use by the Mint or designated suppliers, in the event that the Mint were to decide to use the material for coinage.

COST AND AVAILABILITY

Inco has estimated that the coiled strip would cost $1.50 per pound; this includes a metal cost of about 80 cents per pound. The coinage requirements for nickel have been discussed above. At the fiscal 1965 rate, about 15.7 million pounds would be needed, roughly 6 percent of U.S. annual nickel consumption. The overall supply situation is probably adequate. It is true that nickel was regarded as scarce in the early 1950's, and it still is not in such assured supply as copper, for example.

The Bureau of Mines estimates known Canadian nickel reserves at 6 million tons and describes this as a very conservative appraisal. Canada is the principal Free World

supplier of nickel and has accounted for about 80 percent of Free World production in recent years, and has supplied almost all of U.S. import requirements. Free World production of nickel was some 270,000 tons in 1963; almost half of this was consumed in the United States. If Free World consumption continued at the 1963 rate, known Canadian reserves would be depleted in about 25 years. Very large nickel reserves exist in New Caledonia and Cuba; but these should be excluded in determining the adequacy of nickel supply.

Nickel prices have almost tripled during the postwar period. Market shortages do not now exist but it cannot be said with complete assurance that they could not arise within, say, 20 to 25 years. The possibility that nickel prices could rise during that period so far as to imperil the subsidiary coinage, as has been the case with silver, is extremely remote. In this sense, nickel coinage can properly be regarded as a "permanent" solution; it would offer much less seigniorage than cupronickel.

Conclusion: Acceptable coinage alloy if consistent operation in vending machines could be demonstrated under operating conditions. Could not be fabricated on existing Mint equipment but coins could be struck at the Mint from annealed blanks.

Nickel Silver (65 Copper-18 Nickel-17 Zinc)

PUBLIC ACCEPTABILITY

Also termed German silver, this alloy differs from cupronickel by the substitution of zinc for some nickel and copper. Proportions can vary but the 65 copper, 18 nickel, and 17 zinc alloy is probably best suited for coinage use. Because the alloy is fairly close in metallurgical composition and other characteristics to cupronickel, its advantages and disadvantages are perhaps best established by direct comparison with cupronickel, where that is possible. Nickel silver is slightly lower in weight than cupronickel because some zinc with a density of 7.1 is substituted for nickel and copper with densities of 8.9. When newly minted, the coin is very attractive and has a silverlike appearance, but it develops a yellowish cast as it tarnishes with age, while cupronickel keeps its grayish-white color indefinitely. Wearing qualities of nickel silver are also somewhat inferior to those of cupronickel; the ring of the two coins is similar. Nickel silver is not very widely used for coinage. Some current examples are Portugal, Philippines, and Taiwan.

In general, nickel silver must be rated a little below cupronickel in most of the characteristics that would be likely to influence public acceptability. The margin of superiority for cupronickel is not extremely wide but it is consistent. Public acceptability of nickel silver might conceivably be affected adversely by the fact that it is a rather cheap silver substitute with extensive household uses, e.g., it is the common base for silver-plated flatware.

OPERATION IN VENDING MACHINES

Very little work has been done on the use of nickel silver in vending machines. However, the electrical resistivities of nickel silver (29.0) and cupronickel (32.0) are close, both are nonmagnetic, and would have similar roll properties. Nickel silver coins of the right size will work in existing rejector apparatus set for the cupronickel 5-cent piece. As noted previously, this opens the possibility of making the 5-cent piece in a new system from nickel silver and making 10-, 25-, and 50-cent pieces from cupronickel. From the standpoint of minimizing the vending machine adjustment problem another possibility would be to leave the current 5-cent piece unchanged and to introduce nickel silver 10-, 25-, and 50-cent pieces. Either system would work in the prototype NRCO Model X rejector along with existing coinage. Either system, or ones exclusively of cupronickel or nickel silver, would have a 5-cent piece that could be flattened to work as a quarter in vending machines.

COUNTERFEITING POTENTIAL

Nickel silver would offer slightly more potential for counterfeiting than would cupronickel. Both are relatively cheap materials but nickel silver is much more readily available from a wide range of commercial suppliers. The same consideration suggests that the use of nickel silver blanks in vending machines would be more likely than cupronickel. Although the use of nickel silver blanks in the 5-cent slots of existing rejectors has not been brought to the Treasury's attention, it is possible that a problem might develop if a new system were to use nickel silver in the higher denominations.

EASE AND CERTAINTY OF PRODUCTION

The Mint has made nickel silver coins for foreign countries and the experience was satisfactory. The melting of the alloy materials produces zinc fumes which could be a problem where Mint facilities are located in downtown regions. The fumes can be removed by the installation and operation of electrostatic precipitators, or the copper and zinc can be prealloyed in a separate melting operation. The resulting increase in cost can be estimated at roughly 10 percent. Despite this complication, nickel silver undoubtedly could be fabricated and minted in large volume on existing Mint equipment.

COST AND AVAILABILITY OF RAW MATERIALS

Manufacturing costs would be somewhat higher on this alloy than on cupronickel although materials cost would be slightly lower since some zinc is substituted for copper and nickel. Zinc is only about one-sixth as expensive as nickel, and ordinarily about one-third to one-half as expensive as copper. The overall difference in cost between cupronickel and nickel silver alloys would not be large enough to influence the choice between them.

Conclusion: Acceptable as possible coinage alloy.

Plastic Coinage

Several exploratory letters have been written to the Treasury by firms engaged in the manufacture of plastics. One firm sent a sample plastic medallion to the Treasury, but the overall appearance of the medallion did not inspire confidence as to the degree of public acceptability plastic coinage would find. It is possible that in time some combination of powdered metal and plastics technology could be used to produce satisfactory coins. However, the Treasury has no reason to believe that such developments are imminent. The case for the introduction of plastic coins was argued by the Comptroller of the Royal Mint several years ago. At the time this aroused some interest in plastic as a coinage material. This interest seems now to have ebbed. There are no known instances of the use of plastic as a coinage material, and it must be rejected from consideration on the basis of the present technology. Much the same verdict must be given on glass coins.

Conclusion: Rejected--poor quality and probable public aversion to nonmetallic coins.

Stainless Steel

PUBLIC ACCEPTABILITY

Stainless steel is lighter than most of the conventional coinage materials with a density of about 7.8 to 8.0 depending upon its composition. Coins made of stainless steel are white in color and their wearing qualities are superior to those of any other coinage material, except possibly pure nickel coins. Because stainless steel is very hard, coins have to be made with less relief, i.e., the design and lettering are not raised as far from the coin background as in the case of coins made from softer alloys.

The overall appearance of stainless steel coins suffers as a consequence. The foreign use of stainless steel coins is limited to Italy (100 and 50 lire) and Turkey. Public acceptability of stainless steel coins in this country is conjectural.

Plain carbon steel can be clad with a relatively thin layer of another material, usually about 15 percent of the thickness on each side. Cladding materials currently being used in this way are nickel and cupronickel in Argentina, brass and copper in West Germany. The edges of these coins are unattractive and susceptible to rust. The coins do not merit serious consideration for use in this country.

OPERATION IN VENDING MACHINES

Vending machine test results on stainless steel have not been encouraging to date. Stainless steels containing 10 percent and more of nickel are nonmagnetic in their unworked state. But, a major difficulty is that so-called nonmagnetic stainless steels become magnetic when cold-worked, and the coins would then be rejected in vending machines. Three types of stainless steel, presumably nonmagnetic, were supplied for rejector tests. Blanks made from each of the three types of steel were refused by the rejectors. These blanks had been upset at the Mint before testing and even this small amount of fabrication was apparently sufficient to induce some magnetism. The actual stamping process might well have an even stronger effect upon stainless steel blanks. It may be that some stainless steel, suitable for coinage, can be found that will remain nonmagnetic.

Assuming that a stainless steel can be found that will remain nonmagnetic under deformation, the nature of the required adaptation of rejectors will then depend upon the electrical resistivity of the stainless steel. The National Rejector Company has done some work on the problem of building a rejector that would accept silver coins and stainless steel coins of relatively high resistivity (e.g., 75 microhms-cm.). It should be noted that a rejector such as the one NRCO is working on would continue to accept the cupronickel 5-cent piece. No work has been done, so far as is known, on the presumably more difficult problem of designing a rejector that would accept existing coinage, a stainless steel 5-cent piece, and cupronickel 10, 25, and 50-cent pieces.

COUNTERFEITING POTENTIAL

Actual duplication of a stainless steel coin would be a very difficult task because of the hardness of stainless steel. Although direct counterfeiting would probably not constitute a serious problem because coins would be so difficult to mint, the use of stainless steel blanks in vending machines would seem to pose a threat of some consequence. Material from which blanks could be made would be readily available. It might be possible to find a stainless steel for coinage purposes which had electrical resistivity unlike that of the more readily available types but this is by no means certain.

EASE AND CERTAINTY OF PRODUCTION

Stainless steel presents serious problems for the Mint. It would be necessary, pending the construction of necessary facilities, to purchase the stainless steel from outside suppliers in the form of strip. Even so, the methods of coin fabrication would be entirely different from those used in the past, or those that are presently contemplated for the new Mint. It is true that the Mint made some magnetic stainless steel coins for Costa Rica but only with great difficulty. Mint experience on that production established that entirely new fabrication techniques would be required for coins larger than the U.S. 25-cent piece.

Conclusion: Rejected as possible coinage alloy.

Reasons: Some question as to public acceptability, replacement of existing vending machine rejectors, and difficult production problems.

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Silver (500 Silver-500 Copper)

PUBLIC ACCEPTABILITY

Silver coins of 500 fineness would be slightly lighter than existing coins because the density of copper is less than that of silver. The present 50-cent piece weighs 12.50 grams; a silver 50-cent piece of 500 silver and 500 copper would weigh 11.66 grams. It would be possible to tell 500 fine coins from 900 fine coins simply by weighing the coins in question.

Newly minted 500 fine silver coins could be made to resemble existing silver coins by being given an acid bath at a final production stage. This bath etches away the copper from the surface of the coin, leaving a thin film of silver. With wear, now intensified by the use of coins in vending machines which test for size, the external film of silver is rubbed off. This exposes reddish and yellowish areas on the coin and gives it an unattractive mottled appearance.

Largely because of these poor wearing qualities, 500 silver-500 copper is not generally considered to be an acceptable coinage alloy. The last country using 500 silver-500 copper is South Africa which has recently announced its decision to replace the 500 alloy with pure nickel coins.

Public acceptability of a 500 silver-500 copper coin is highly questionable.

OPERATION IN VENDING MACHINES

A strong point with 500 silver-500 copper coinage is the very minor adjustment of vending machine rejectors that would be required. The slight change in weight and electrical resistivity from existing silver coinage would not affect the majority of vending machines at all. Some vending machine rejectors whose selectivity range has been made very narrow would probably require some adjustment. For all practical purposes, it can be said that the 500 silver-500 copper coinage would work in existing rejectors.

COUNTERFEITING POTENTIAL

There probably would be no serious increase in counterfeiting potential with the 500 silver-500 copper coinage, at first. As worn 500 fine coins began to make up the bulk of coins in circulation, some wider latitude for counterfeit coins would begin to emerge to the extent that the worn 500 fine coins would be less readily distinguished than the present coinage from cheap imitations made from base metals. The use of blanks in vending machines should be only slightly more serious with 500 fine silver than it is at present.

EASE AND CERTAINTY OF PRODUCTION

It is estimated that the use of an acid bath treatment to improve the initial appearance of the coins would increase current Mint operating costs by about 10 percent. In addition, new equipment and additional space would be required which the Mint does not have at present.

COST AND AVAILABILITY OF RAW MATERIALS

The reduction of silver content from 900 to 500 fineness would reduce the direct cost of coinage metal by more than 40 percent for a given level of silver prices. Questions of the availability of raw materials are complex and center upon the adequacy of Treasury silver stocks to meet future coinage demand, without recourse to market purchases. These questions are discussed subsequently.

Conclusion: Rejected.

Reasons: Very poor appearance when worn. A quaternary silver, discussed next, is preferred on the basis of wear characteristics. A clad silver coin, subsequently discussed, would have the desirable vending machine properties of 500 silver-500 copper.

Silver Alloy--United Kingdom (500 Silver-400 Copper-50 Nickel-50 Zinc)

PUBLIC ACCEPTABILITY

The United Kingdom and a large number of other countries have in the past used an alloy consisting of 500 silver, 400 copper, 50 nickel, and 50 zinc. Sweden coins an alloy of 400 silver, 500 copper, 50 nickel, and 50 zinc; Finland, one of 350 silver, 570 copper, and 80 zinc; and Mexico, one of 100 silver, 700 copper, 100 nickel, and 100 zinc. The addition of nickel and zinc to low silver content alloys reduces the rate of deterioration in appearance. When newly minted the coins, and even those of lower fineness than 500, are relatively attractive. However, the appearance of circulated coins would still leave much to be desired, despite the addition of nickel and zinc that helps to delay the appearance of the mottled surface that is characteristic of coins of low silver content. On technical and metallurgical grounds, the 500 quaternary alloy is not acceptable if coins are required to wear well and retain their appearance for 20 to 25 years. Consequently, it is clear that the alloy merits consideration only if a very high premium is placed upon the retention of some silver in the coinage. Even then, in the judgment of the Mint technical staff, the quaternary alloys would be a poor way to accomplish this end. Silver clad coins with high content silver as the outside layers would be preferable on the grounds of appearance and wear characteristics.

OPERATION IN VENDING MACHINES AND COUNTERFEITING POTENTIAL

The addition of nickel and zinc in the quaternary alloy raises the electrical resistivity of the hardened coin to about 6.8 microhms-cm. This means that the coins would not work in vending machines with the eddy-current rejector. The resistivity range of rejectors could probably be widened to accept the existing coinage and the quaternary alloy but this would be a major undertaking, involving major revamping or replacement. Furthermore, if this were done, vending machines would be much more vulnerable to a variety of foreign coins and blanks than they are at the present time. The potential for direct counterfeiting of this alloy would not differ greatly from that for 500 silver-500 copper.

EASE AND CERTAINTY OF PRODUCTION

A quaternary alloy is a much more difficult problem for the Mint but it could be made without drastic change in existing procedures and equipment. The most significant modification of current practice would be the double melting process required so that zinc could be added in alloy form. Approximately a 30-percent increase in melting equipment would be required.

COST AND AVAILABILITY OF RAW MATERIALS

As in the case of 500 silver-500 copper, the major uncertainty is the price and availability of silver in the event that Treasury stocks did not prove adequate to meet coinage and other requirements.

Conclusion: Barely acceptable as a coinage alloy.

Silver Clad Coins

Battelle has examined a wide range of multilayered coinage materials, including some with high-content silver alloys as the outside layers. The inner core on these coins could either be pure copper or a low-content silver-copper alloy with the overall fineness of the alloy varying according to the exact specifications of the outside layers and the inner core. If the present 900 fineness alloy were to be clad on a pure copper core, the resulting material would be approximately 400 in fineness. Much the same

overall fineness could be achieved by using 800 fineness silver as the outside cladding and substituting a low-content silver-copper alloy as the inner core. For example, the Mint has made experimental strikes from 800 fineness silver clad on a 215 fineness silver-copper core which gives an overall fineness of 400.

The requirement of a minimum thickness of cladding to insure reasonable wear characteristics precludes any marked reduction in overall silver content and for practical purposes an average fineness of 400 can be taken as broadly representative of the minimum silver content, acceptable from a technical and metallurgical standpoint, where high fineness silver is clad on a pure copper or a low-content silver core. Any fineness much lower than 800 in the outside cladding would not make an acceptable coin.[1]

PUBLIC ACCEPTABILITY

Silver-clad coins would be quite attractive in appearance if the outside cladding were at least 800 fineness. In such a case, the color would be the same as that of the present silver coinage except on the edges of the coins. When the core is composed of silver-copper alloy the edges of newly minted coins differ very slightly from the present coinage. Wear characteristics of silver-clad coins would be satisfactory if minimum thickness requirements were observed on the outside cladding.

OPERATION IN VENDING MACHINES

The high silver-copper clad on low silver-copper alloys would work in all vending machines without adjustment. If a pure copper core were used, most machines would need adjustment and pure copper slugs would then be accepted.

COUNTERFEITING POTENTIAL

Clad coins would be more difficult to counterfeit than the existing silver coinage.

EASE AND CERTAINTY OF PRODUCTION

The Mint has a substantial but limited capacity for the melting and rolling of silver-copper alloy strips but would probably have to purchase strip from outside suppliers. As a general proposition, it appears that the cladding of silver would present some difficulties where dependence had to be placed upon outside suppliers for a large volume of material. In any event, all bonding (cladding) operations would have to be performed in private plants.

COST AND AVAILABILITY OF RAW MATERIALS

As with coinage of 500 fineness, the crucial question is whether Treasury stocks of silver would be adequate to meet longrun coinage requirements, and, if not, what effect Treasury purchases of silver in the market would have upon price.

Conclusion: Acceptable coinage alloy from a technical and metallurgical point of view.

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[1] On the basis of their analysis of the overall silver situation, Battelle determined that it would probably be necessary to reduce the silver content of the coinage to about 15 percent, and even so the need might arise to abandon silver altogether as a coinage material sometime in the 1970's. Consequently, their primary recommendations were for base alloy coinage, but they also suggested that if any silver were to be retained in the subsidiary coinage, it should either be limited to a high-content half-dollar or spread very thinly through the subsidiary coinage. In the latter case, they suggested that a 400 fineness silver quaternary alloy used as outside cladding on a copper-alloy core "might possibly meet minimum standards of acceptable appearance." In the judgment of the Mint technical staff, the quaternary silver alloys are undesirable on technical and metallurgical grounds and the exterior silver cladding on any composite coin should not be reduced below 800.

Other Clad Coins: Cupronickel (or Nickel-Silver) Clad on a Copper Core

The multilayer principle recommended by Battelle can be applied to base alloy coinage. Coins with outer layers of cupronickel clad on a copper core will operate in existing vending machine rejectors along with the present silver coinage (probably nickel-silver would also work as outside cladding but tests have not been made). This resolution of the vending machine problem would allow the rapid introduction of new coins without the difficulty, expense, and inconvenience of modifying existing coin rejectors. On the other hand, the clad coins would be more expensive to produce than the straight cupronickel alloy and strip will have to be purchased from outside suppliers.

PUBLIC ACCEPTABILITY

These cupronickel clad coins would be only slightly lighter in weight than the existing coinage. The color of the coins with cupronickel cladding is very good. Because of the copper core, a reddened edge is exposed in the blanking process. Milling of the coins improves their appearance. Wear tests conducted by Battelle and by the Mint technical staff point to an expected average life of 20 to 30 years. The coins are expected to retain an attractive appearance throughout their life in circulation.

OPERATION IN VENDING MACHINES

As recommended by Battelle, the Mint and the rejector industry have conducted extensive testing of the operation of cupronickel clad coins in existing vending machines. This testing has demonstrated that when produced according to specifications (which are not intolerably narrow) these coins work in unaltered vending machine rejectors.

COUNTERFEITING POTENTIAL

The reddened edge of these coins and the difficult production process for the clad material from which they are made should insure against counterfeiting on any substantial scale. Vending machines set for silver coins will accept these clad coins and in time, the sensitivity of rejectors could even be narrowed slightly from their present settings if desired.

EASE AND CERTAINTY OF PRODUCTION

The Mint has made sizable production runs using the cupronickel clad material and has not encountered any difficulties of consequence. Given adequate supplies of the clad strip, high levels of production on the new coins could be reached quickly.

COST AND AVAILABILITY OF RAW MATERIALS

The availability of the cupronickel clad strip from outside suppliers has been under intensive investigation by the Mint. This investigation is continuing but enough is known at this time to insure that adequate supplies of the strip will be available to support the full-scale production effort on the new coins that will be necessary during any transition to a new coinage system. Cost estimates are not yet entirely firm but it appears that the processing cost on the strip material will be in the neighborhood of $1 per pound, perhaps less as experience is gained with large-scale production.

Conclusion: Acceptable coinage material.

Titanium

Titanium has been suggested to the Treasury as a coinage material but does not appear to be suitable. A major shortcoming is the alloy's light weight. No work is known to have been done on the rejector problem, nor is there any experience with mint fabrication of the metal. The melting point of titanium is too high to permit the use of ordinary brass mill equipment.

Conclusion: Rejected.

Zirconium-Hafnium

Zirconium-hafnium has been suggested to the Treasury as a possible alloy from which 50-cent pieces might be made. However, the cost of the alloy would appear to be prohibitive, wholly aside from other considerations. Zirconium strip was quoted to the Treasury at about $8 per pound--the 1963 Minerals Yearbook quotes $10 to $14 per pound. However, the addition of hafnium, recommended to enable the detection of counterfeit coins, would raise the price sharply. Hafnium is quoted at $138 a pound. One company thought that a zirconium 88-hafnium 12 alloy could be provided at a cost about equal to silver with some chance that the resulting volume of production might lower the cost to 50 percent of silver. Under the circumstances, neither zirconium nor zirconium-hafnium appear to be eligible coin alloys.

Conclusion: Rejected.

Summary

For summary of the material in Section IV, see the tables in the Summary at the beginning of the document.

V. PROBLEMS WITH A CHANGEOVER TO REDUCED CONTENT SILVER COINAGE

The discussion of technical and metallurgical considerations has reduced the potentially acceptable coinage materials to six. These are: cupronickel (75 copper-25 nickel), nickel silver (65 copper-18 nickel-17 zinc, or slightly different proportions), cupronickel or nickel silver clad on a copper core, the INCO alloy (95 nickel, 5 silicon with a magnetic core), the United Kingdom silver alloy (500 silver, 400 copper, 50 nickel and 50 zinc), and silver clad alloys (overall fineness about 400). The present section discusses the feasibility of a changeover to silver coinage of reduced content; a section to follow will discuss similar problems for the base alloys.

Special Problems With the Silver Alloys

The major questions not yet discussed with respect to the two reduced content silver alloys--the United Kingdom quaternary and silver clad--are whether Treasury silver stocks would be large enough to achieve two objectives: (a) Hold the spot market price of silver below $1.29+ [1] by means of redemptions and/or sales of silver to the market during a period of transition, and (b) meet Treasury coinage requirements after the period of transition and thereby minimize the danger that the longrun market price of silver would again imperil the subsidiary coinage.

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[1] It is occasionally suggested that the line be held at $1.38+, instead of $1.29+ since silver dollars are not likely to stay in circulation anyway. It is also suggested that some such rise in price might be induced by making those who want silver collect their own silver certificates; otherwise it is clear that the law would have to be altered so that the redemption right did not continue to place an effective ceiling at $1.29+. In any event, the slight narrowing of excess market demand that the 9-cent price increase might conceivably encourage would surely be outweighed by the immediate stimulus that would be given to large private speculative purchases of silver, spot and forward. The judgment of anyone who had earlier gone long on silver at $1.29+ would be vindicated. Although some profit taking might result, the net effect would undoubtedly be to encourage much larger speculative positions in anticipation of the next price increase. If the Treasury could assure the market that the $1.38+ line would be held indefinitely, a move to $1.38+ might be regarded as advantageous. It is very hard to see how the market could be sure that the new ceiling would be held after the earlier one had been abandoned.

The first objective of holding the market price during the transition period is absolutely essential to protect the existing coinage. If the market price were to break loose, much of the existing coinage would quickly go out of circulation and there would be a risk of serious disruption to commerce. The second objective of retaining large Treasury stocks of silver after the transition is perhaps not quite so vital, but it would be difficult to recommend reduced content coinage if it were uncertain that Treasury stocks of silver would meet coinage needs for a good many years after the transition period.

The approach employed here will be to work through arithmetic examples of the possible effect upon Treasury silver stocks of two alternative ways in which the transition to reduced content silver coinage might be attempted. These examples are not intended as definite forecasts of what would necessarily happen.

Forecasting the future behavior of silver markets is extremely hazardous. This, itself, cannot fail to be a major factor in determining the eventual decision on coinage alloys. However, despite the wide margins of uncertainty, it is believed that the examples presented here provide some insight into the feasibility of a transition to silver coinage of reduced content. While every effort has been made to choose assumptions that seemed inherently plausible and consistent with the available data, inevitably the choices may be subject to question. Therefore, the assumptions that have been made will be discussed in some detail, and the components of the projected changes in silver stocks will be separated as clearly as possible.

The Mint Coinage Estimates

The basic coinage estimates in Table 1 were supplied by the Mint. The columns for 500 fineness coinage reflect an assumption that, because of the time required to obtain necessary legislation for a change in coinage alloys, the change to 500 fineness coinage would not occur until January 1, 1966. The estimates of total coinage requirements are based upon an assumption that the crash coinage program will have been concluded by the end of fiscal 1966, after which time the Arthur D. Little trend estimates of coinage requirements will be valid. Fiscal 1964 coinage is actual, while the estimates for fiscal 1965 and 1966 are based upon the latest budget estimates.

TABLE 1.--Estimated Use of Silver Bullion for Coinage at 900 and 500 Fineness

[In millions of fine troy ounces]

Fiscal year	Estimated silver needed for coinage during year	
	900 fine coinage	500 fine coinage
1964	144.0	144.0
1965	272.2	272.2
1966	330.0	256.4
1967	119.9	66.0
1968	111.9	61.6
1969	116.3	64.0
1970	120.2	66.2
1971	125.3	69.0
1972	130.0	71.6
1973	135.4	74.6

Source: Bureau of the Mint.

Other tables in this section use the Mint coinage estimates, adjusted to a calendar year basis, and the figures for calendar 1964 will differ slightly from the actual amounts of silver that were used. Additional assumptions regarding redemptions, transitional and replacement coinage requirements, and recovery of old coinage have been made in the course of the present study and underlie the arithmetic of some of its tables.

Treasury Recovery and Replacement of the Existing Coinage

It will be useful to begin with a brief description of the way in which the Treasury might attempt a transition to reduce content silver coinage. The Treasury would have to plan to recover as much as it could of the 900 fineness coinage, meanwhile producing new lower content coins at a rate sufficient to insure an adequate supply of total coinage at all times. Throughout this process, the price of silver would have to be held below the melting point of the 900 fineness coinage in order to assist the recovery of old coin. It would not be sufficient merely to prohibit the melting and export of coins since hoarding could also prevent the Treasury from making substantial recoveries. Indeed, controls over the melting of coins are redundant so long as the market price of silver can be held and they are likely to be ineffective if the market price cannot be held. As discussed later, it may nevertheless be desirable for the Treasury to obtain standby authority for controls over the melting, hoarding, and export of coin and bullion.

Attempting to call in the old coinage and have it exchanged for the new coinage does not appear to be practical or desirable. It would be too difficult, indeed impossible with present Mint facilities, to produce and accumulate a substitute set of coins while also meeting current coinage requirements.

Table 2 summarizes a hypothetical situation in which the Treasury attempts recovery of the existing coinage through ordinary channels in a transition to 500 fineness silver coinage--the United Kingdom alloy with 400 copper, 50 nickel, and 50 zinc. Column (1) of Table 2 presents an adaptation of the Mint coinage projections of Table 1. In Table 2, coinage estimates have been placed on a calendar year basis by successive averaging of Table 1's fiscal year figures, and it is assumed that 500 fineness coinage would not begin until January 1, 1967, because of the need to modify existing rejector mechanisms.

It will be recalled that the addition of nickel and zinc to the alloy raises its electrical resistivity out of the resistivity range of the present silver coins. It is possible that the vending machine adaptation could be accomplished more rapidly than is assumed in Table 2. In such a case, the introduction of the new coins might even be brought forward to January 1, 1966. The essential conclusions to which Table 2 points would not be greatly modified as a result.

It is possible to conceive of even earlier introduction of the new coins. This would cause some disruption because the new coins would not work in all vending machines. As long as the new coins were a fairly small part of all coins in active circulation, the situation might be tolerable. However, the new coins would require a slightly different production process, and it does not appear that it would be possible to start production much before early 1966 under the best of circumstances.

The treatment of silver dollars in Table 2 and all of the subsequent tables in this section is the same and should be explained at this point. The 45 million authorized for this fiscal year have not been produced, and it is possible that they will not be. However, this will not reduce the overall amount of silver used by the Mint. The chief limitation on current production of subsidiary coinage is the amount of slab annealing capacity in the Mint. It is understood that silver not used in coining silver dollars would be used in subsidiary coinage, up to the limit imposed by annealing capacity, during the remainder of the crash coinage program. Therefore, the amount of silver originally included for silver dollars is appropriately left in the tables during the crash coinage program.

Columns (2), (3), and (6) of Table 2 all relate to the recovery and replacement of the existing coinage. Estimates of the silver content of subsidiary coinage that would be in circulation at the time of the transition are necessarily approximate; but the Mint estimates that something like 1,600 million ounces of silver is probably outstanding in

TABLE 2.--Projected Behavior of Treasury Silver Stock Through Calendar Year 1972 Where Coinage of 500 Fineness Begins Jan. 1, 1967, 900 Fine Coinage Is Partially Recovered and the Market Price of Silver Is Held at $1.29 + During a 4-Year Transition Period

[Millions of fine troy ounces]

Calendar years	Potential amounts of silver used in coinage				Potential amounts of silver used in redeeming silver certificates or in making outright sales to the market	Treasury recoveries of 900 fineness coinage	Treasury silver stock at end of period
	Mint projection of ordinary requirements	Increments required to replace Treasury recoveries of 900 fineness coinage	Increments required to replace portion of coinage not recovered	Total coinage required			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1964.....	-208.1	.....	.....	-208.1	-150.0	.....	1,200.0
1965.....	-290.9	.....	.....	-290.9	-100.0	.....	809.1
1966.....	-225.0	.....	.....	-225.0	-75.0	.....	509.1
1967.....	-64.4	-222.2	-83.3	-369.9	-75.0	+400.0	464.2
1968.....	-63.4	-166.7	-83.3	-313.4	-75.0	+300.0	375.8
1969.....	-65.7	-111.1	-83.3	-260.1	-100.0	+200.0	215.7
1970.....	-68.2	-55.5	-83.3	-207.0	-150.0	+100.0	(-)
1971.....	-70.9	.....	.....	-70.9	.....	.....	(-)
1972.....	-73.7	.....	.....	-73.7	.....	.....	(-)

NOTE.--Column (2) equals 5/9 of column (6); column (3) equals 5/9 of total nonrecoveries of 600, divided equally among the 4 years.

the form of subsidiary coinage. In a recent press release, the American Mining Congress has mentioned a figure, apparently based upon Circulation Statement estimates, of 1,400 million ounces in subsidiary coinage, and 400 million in silver dollars, for a total of 1,800 million ounces, of which they feel foreign experience suggests that some two-thirds, or 1,200 million ounces, could eventually be recovered by the Treasury.[1] It would seem unwise to count on recovering any 900-fineness silver dollars, and the Mint figure of 1,600 million ounces of subsidiary coinage will be taken as representative of the size of the pool from which recoveries might be made.

How much of the old coinage really could be recovered by the Treasury is very uncertain. It has been suggested that, on the basis of foreign experience, eventually as much as two-thirds of the old coinage could be recovered. However, the attempt to recover our existing coinage would come at a time when severe coin shortages have

[1] On the basis of a statistical sampling of the age distribution of coins in circulation, Arthur D. Little Inc., estimated the value of silver subsidiary coinage in circulation on January 1, 1963, at $1,117 million, a silver content of about 900 million fine ounces. (See Hearings on S. 874 before the Subcommittee on Financial Institutions of the Senate Committee on Banking and Currency, March 26, 1963, pp. 117-120.) On January 1, 1963, the Circulation Statement showed a value of $1,739 million, a silver content of about 1,400 million ounces. The Mint estimates used in this section imply a loss rate falling between that in the A. D. Little study and that used in the Circulation Statement.

just been overcome and would have to proceed with the market price of silver at its monetary ceiling. Hence, the foreign experience of substantial recoveries may well be irrelevant.

A question also exists as to the probable time profile of the recovery of the old coinage since it obviously would not "pay" to hold the price of silver indefinitely while only a trickle of recoveries was being made. Current figures on the flow of coin to and from the Reserve banks are not of much aid in this connection because they are distorted by the coin shortage and consequent changes in the circuit flow of coin. This changing pattern is reflected in Chart I which shows coin payments and inventories of the Federal Reserve banks and their receipts of coin from the Mint and the member banks since 1961. The success of the Mint crash coinage program in rebuilding coin inventories during early 1965 is clearly apparent. However, in the present context, it is the reflow of silver subsidiary coinage that is pertinent. This is shown separately in Chart II. The statistics for fiscal 1961 and 1962 do indicate relatively large annual gross flows of subsidiary silver coin back to the Federal Reserve banks in normal periods. However, these data are seriously defective for the purpose at hand, not only because of the constricted flows now occurring, but also because there is no way of knowing to what extent the larger flows in earlier years simply reflected a continual recycling between the Reserve banks, the member banks, and some coin users of a relatively small fraction of the total outstanding coinage.

Column (6) of Table 2 shows total Treasury recoveries of 1,000 million ounces over a 4-year period, with recoveries declining steadily. Total recoveries are placed at five-eighths, rather than two-thirds, of the amount assumed to be in circulation because only 4 years are allowed for the recovery period, instead of the longer period to which the estimate of two-thirds recovery must be taken to refer. Even so, the estimate of recoveries is very generous, and to recover this amount of coin in 4 years it is doubtful whether the Treasury could depend solely upon routine recovery through the Federal Reserve banks even if there were no coin shortage. The cooperation of commercial banks and coin-collecting agencies probably would have to be sought. It should be emphasized very strongly that unless the coin shortage had been entirely broken by the time recovery of the old coinage was attempted, nothing like this amount of coinage could possibly be recovered. The estimated scale of recovery is included in Table 2 and later tables not because it is inherently plausible, but simply to work out the implications of attempting a transition to reduced content silver coinage under favorable circumstances.

The gross recovery of the existing coinage by the Treasury is not a net addition to Treasury silver stocks because of the need to replace the higher content coin withdrawn from circulation. Additionally, the Treasury probably should plan to replace the higher content coinage which is not recovered, since it would have to be assumed that much of it had been hoarded and would no longer be available for transaction purposes. The estimates of coin in circulation possibly include a certain amount of coin that has been lost. Although the Mint estimates do attempt to correct for this, the correction may not be entirely adequate. Hence, complete replacement of the coinage recorded as being in circulation would not necessarily be essential. The table is constructed on the assumption that complete replacement is attempted. The effect of relaxing this assumption will be noted subsequently.

Column (2) shows the amounts of 500 fineness coinage required to match recoveries of 900 fineness coinage, and column (3) shows the estimated amounts required to offset nonrecoveries. On the assumption of total recoveries of 1,000 million ounces from a stock of 1,600 million ounces, there are 600 million ounces of the old coinage to be replaced at five-ninths of the original fineness. The amount is allocated in column (3) evenly among the 4 years. The sum of columns (1), (2), and (3) gives the total coinage requirements which the Treasury should plan to meet.

In addition, some silver would have to be used to hold the market price of silver during the transition period. Column (5) shows the amounts of redemptions or outright sales to the market that might be required. It should be noted in this connection that to revoke the redemption right would not free the Treasury from the need to sell silver to

Chart I

Federal Reserve Bank Subsidiary and Minor Coin Payments, Inventories, Receipts from the Mint, and Member Banks, 1961-1965
(in millions of pieces)

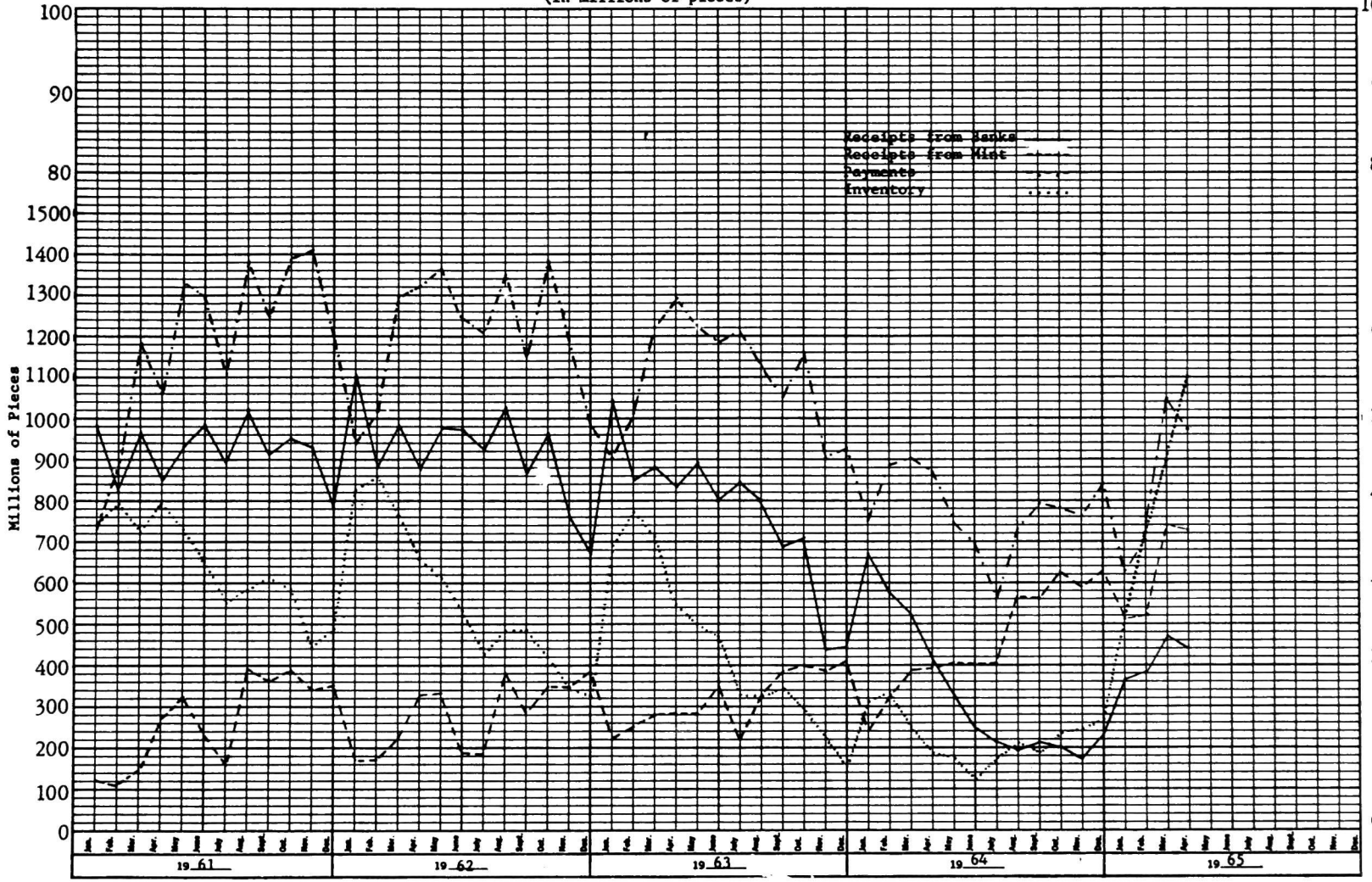
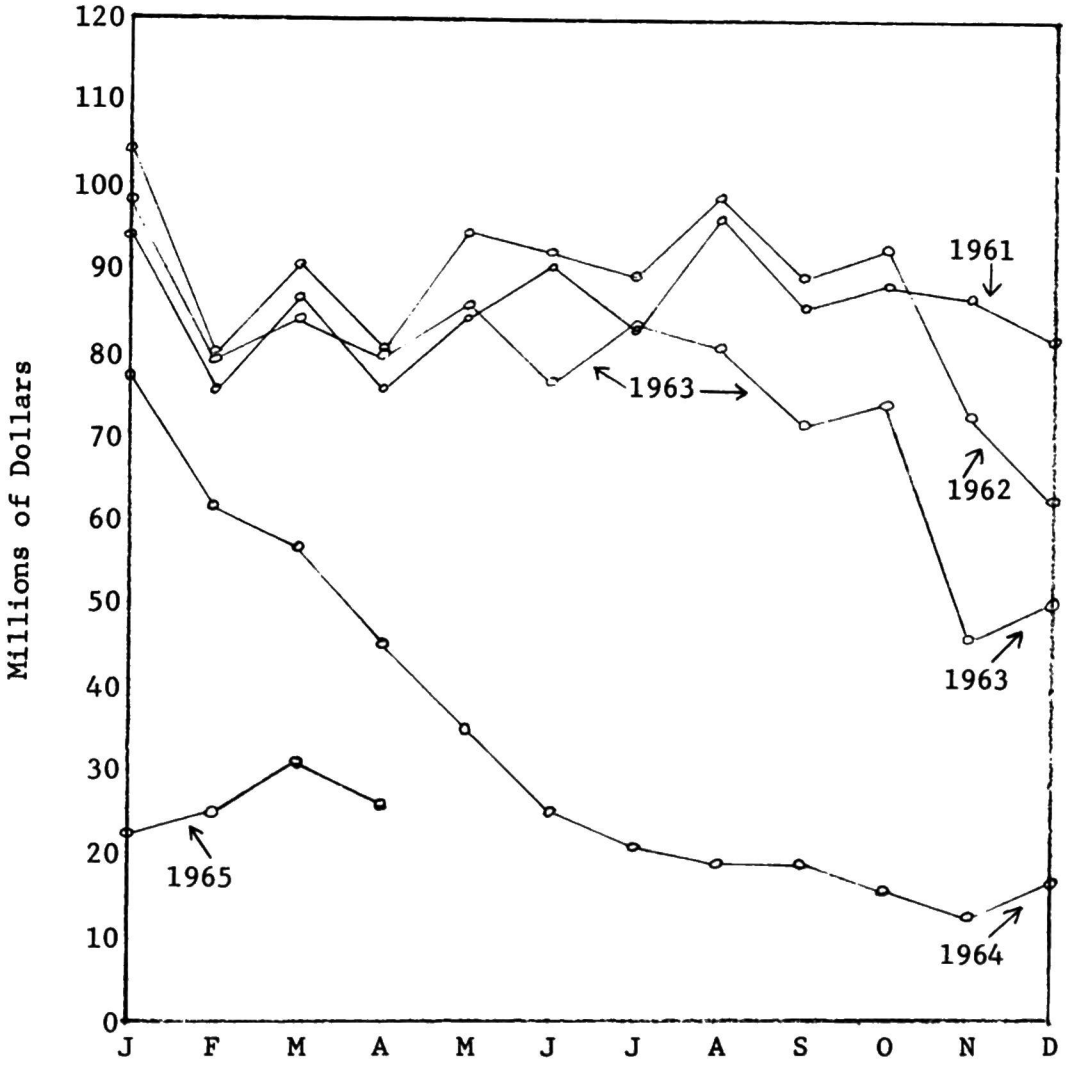


Chart II

Receipts of Silver Subsidiary Coins by the Federal Reserve Banks from Member Banks and Others, Exclusive of Receipts of Coin from the Mint, Monthly, 1961-1965



the market. Protection of the existing coinage requires that the market price of silver be stabilized; this requires sales of silver to the market equal to excess demand at the stabilized price; whether or not certificates are retired is a separate, although important, question.

The amounts shown in column (5) for market stabilization are necessarily fairly approximate, although they do not seem unreasonably high in the light of recent experience. Bullion exchanges against silver certificates in 1964 were close to 150 million ounces. It is assumed that excess demand would decline to 100 million ounces in 1965, reach a "normal" level of about 75 million ounces by 1966, and remain there through 1968. As the transition period neared completion, the market would come to expect an

increase in the price of silver and some speculative demand would be added to ordinary requirements. Therefore, sales to the market are increased to 100 million ounces in 1969 and to 150 million ounces in 1970.

Such a pattern of Treasury sales does not make allowance for any strong feedback from the sharply falling silver stocks in column (7) to the redemptions in column (5). Yet, as the stock of silver fell, there could be an acceleration of redemption demands. Very heavy speculative pressure could develop in the case of any transition to silver coinage of reduced content. The rate of redemptions in late 1964, during a mild speculative flurry, should remain as a sobering reminder of the potential scale that speculation in silver can quickly take.

The decline in Treasury silver stocks on the assumptions embodied in Table 2 would be rapid. Despite the recovery of a large amount of 900 fineness coinage, stocks would be entirely exhausted before 1970. The overall result is not very sensitive to moderate changes in the assumptions that underlie it, although the exact point at which Treasury stocks would run out is shifted in time by most changes in assumptions.

On the assumptions of Table 2, about 300 million ounces of silver are used in replacing the coinage that is not recovered. It could be argued that this need not be done because some unrecovered coin will have been recorded in circulation when it actually was lost. This may well be true and implies that not all of the unrecovered coin need be replaced. However, to argue that none of it need be replaced is to assume that the coinage stock just prior to the transition would be in excess of public requirements so that some increase in hoarding could be tolerated. Certainly there is no present evidence that the stock of silver coinage is excessive relative to the demand for it. It is very difficult to know how much, if at all, the more than 300 million ounces of silver scheduled to be used in replacing unrecovered coinage could safely be reduced. Therefore, the table carries the full amount.

It could also be argued that the time pattern of recovery of old coin might be more rapid than has been assumed here. This would permit a shorter transition period and possibly reduce the overall amounts of silver used in stabilizing the market price. The problem here is in knowing just what degree of shortening of the time pattern of recovery would be a practical possibility. This is explored subsequently with the aid of an example based upon slightly different assumptions.

In summary, if it were decided to try to replace the existing coinage, the likelihood of successfully negotiating a transition to subsidiary silver coinage of 500 fineness does not appear to be very great at all. On the assumptions used here, the Treasury would be back in the market before the transition was even complete, but the Treasury would now be buying silver to meet its coinage requirements, rather than selling to protect the existing coinage. The total exhaustion of Treasury silver stocks before the transition was even completed would not necessarily occur on all assumptions. With a shorter period of transition, instituted somewhat sooner, the savings in the sales or redemptions required to peg the market price of silver could be sufficient to leave the Treasury with some silver after the transition. On any reasonable set of assumptions, however, it does not appear that the Treasury would be likely to have very much silver left.

The general conclusion remains, therefore, that it would appear to be impractical and extremely hazardous to attempt to replace the existing subsidiary coinage with 500 fineness silver.

Recovery and Replacement With 400 Fineness Coinage

Table 2-A presents the comparable situation where a transition is attempted to subsidiary silver coinage of 400 fineness; for example, 800 fineness silver clad on a low-content silver-copper core. The picture is somewhat improved relative to 500 fineness coinage, although the decline in Treasury silver stocks is still very rapid. The decline in Treasury silver is not quite so precipitous for two reasons. First, new coinage at the 400 fineness rather than 500 takes only four-fifths as much silver. Second, coins made from silver clad on a copper core would work in existing vending machines. Hence, it is assumed that the production of new coins, and recovery of old

TABLE 2-A.--Projected Behavior of Treasury Silver Stock Through Calendar Year 1972 Where Coinage of 400 Fineness Begins Jan. 1, 1966, 900 Fine Coinage Is Partially Recovered and the Market Price of Silver Is Held at $1.29 + During a 4-Year Transition Period

[Millions of fine troy ounces]

Calendar years	Potential amounts of silver used in coinage				Potential amounts of silver used in redeeming silver certificates or in making outright sales to the market	Treasury recoveries of 900 fineness coinage	Treasury silver stock at end of period
	Mint projection of ordinary requirements	Increments required to replace Treasury recoveries of 900 fineness coinage	Increments required to replace portion of coinage not recovered	Total coinage required			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1964.....	-208.1	.....	.....	-208.1	-150.0	.....	1,200.0
1965.....	-290.9	.....	.....	-290.9	-100.0	.....	809.1
1966.....	-102.5	-177.8	-66.7	-347.0	-75.0	+400.0	787.1
1967.....	-52.8	-133.3	-66.7	-252.8	-75.0	+300.0	759.3
1968.....	-52.0	-88.9	-66.7	-207.6	-100.0	+200.0	651.7
1969.....	-53.9	-44.4	-66.7	-165.0	-150.0	+100.0	436.7
1970.....	-55.9	.....	.....	-55.9	.....	.....	380.8
1971.....	-58.1	.....	.....	-58.1	.....	.....	322.7
1972.....	-60.4	.....	.....	-60.4	.....	.....	262.3

NOTE.--Column (2) equals 4/9 of column (6); column (3) equals 4/9 of total non-recoveries of 600, divided equally among the 4 years.

coins, could begin on January 1, 1966. This shortens the transition period and reduces the amount of silver that must be used to stabilize the market price of silver at the melting point of the old coinage. The transition could not begin much sooner than January 1, 1966, because of the probable leadtime required for the production of required amounts of the clad strip. Other assumptions are the same as those discussed for the transition to 500 fineness and do not require additional comment now, other than to reiterate the earlier warning that recovery of any substantial part of the existing coinage in present circumstances seems extremely doubtful.

However, accepting the hypothesis of substantial recoveries upon which Table 2-A is based, there is some room for difference of opinion whether or not it would be possible to negotiate the transition and replace the existing coinage with 400 fineness coinage. The arithmetic of Table 2-A implies that the transition might be made. Certainly, no very large margin of safety would exist, particularly since the steady decline in Treasury silver quite possibly would give rise to the need for even larger sales to the market than are allowed for in column (5) of Table 2-A. In any event, the amounts of silver available to the Treasury for use in coinage after the transition would be small, particularly if any allowance for strategic needs were included. On the basis of the projections of Table 2-A, Treasury silver would be gone by 1976 or 1977. After that time, the Treasury would have to buy silver in the market. This would greatly increase the chance that the market price of silver would again eventually be driven to the melting point of subsidiary coinage. It is true that the new melting point in excess of $3 would provide more leeway for price-induced adjustments in market supply and demand.

A Different Approach

Tables 2 and 2-A are necessarily based upon fairly rigid assumptions and these affect the pattern of decline in Treasury stocks. It would be possible to vary some of these assumptions and note the effect that this would have on the result. There may also be some value in a slightly different approach. Instead of assuming a certain pattern of recoveries of the old coinage and observing the net effect upon the Treasury silver stock, the example can be turned around in order to show what pattern of recoveries would actually be required to hold the silver stock at any given amount. This is not only convenient in that it allows one to see more clearly what rate of recovery of the old coinage would be required for a successful transition; it also involves a minimum of assumptions, since recoveries of coinage can be treated as a residual.

It will be assumed that replacement of the entire subsidiary coinage is attempted within a 2-year period to minimize the drain on Treasury stocks from holding down the market price of silver, and to reduce the likelihood of coin shortages in the transition period. The rates of coin production required for this rapid replacement would not be possible with existing Mint facilities even if silver strip were purchased. This limitation is ignored in the examples that follow although, in practice, it would be a matter of overriding significance.

The rate at which old coins could be recovered is extremely uncertain and in Tables 3 and 3-A no attempt is made to allocate the recoveries among particular years. This means that the extreme right-hand column of these tables no longer purports to give the actual Treasury silver stock but simply registers what the stock would be without allowance for recoveries of old coin.

TABLE 3.--Example of the Replacement of the Existing Coinage With Coinage to 500 Fineness During a 2-Year Period; No Allowance Made for Recovery of the Old Coinage

[In millions of fine troy ounces]

Calendar years	Potential amounts of silver used in coinage			Potential amounts of silver used in redeeming silver certificates or in making outright sales to the market	Treasury silver stock at end of period without any allowance for recovery of old coin
	Mint projection of ordinary requirements	To replace 900 fineness coin	Total coinage required		
	(1)	(2)	(3)	(4)	(5)
1964	-208.1	.....	-208.1	-150.0	1,200.0
1965	-290.9	.....	-290.9	-100.0	809.1
1966	-125.0	-444.4	-569.4	-75.0	164.7
1967	-64.4	-444.4	-508.8	-100.0	-444.1
1968	-63.4	.....	-63.4	.....	.....
1969	-65.7	.....	-65.7	.....	.....
1970	-68.2	.....	-68.2	.....	.....
1971	-70.9	.....	-70.9	.....	.....
1972	-73.7	.....	-73.7	.....	.....

NOTE.--Column (2) is 5/9 of the 1,600 million ounces of subsidiary coin assumed in circulation, divided equally between the 2 years.

TABLE 3-A.--Example of the Replacement of the Existing Coinage With Coinage of 400 Fineness During a 2-Year Period, No Allowance Made for Recovery of the Old Coinage

[In millions of fine troy ounces]

Calendar years	Potential amounts of silver used in coinage			Potential amounts of silver used in redeeming silver certificates or in making outright sales to the market	Treasury silver stock at end of period without any allowance for recovery of old coin
	Mint projection of ordinary requirements	To replace 900 fineness coin	Total coinage required		
	(1)	(2)	(3)	(4)	(5)
1964.....	-208.1	.....	-208.1	-150.0	1,200.0
1965.....	-290.9	.....	-290.9	-100.0	809.1
1966.....	-102.5	-355.6	-458.1	-75.0	276.0
1967.....	-52.8	-355.6	-408.4	-100.0	-232.4
1968.....	-52.0	.....	-52.0	.....	.....
1969.....	-53.9	.....	-53.9	.....	.....
1970.....	-55.9	.....	-55.9	.....	.....
1971.....	-58.1	.....	-58.1	.....	.....
1972.....	-60.4	.....	-60.4	.....	.....

NOTE.--Column (2) is 4/9 of the 1,600 million ounces of subsidiary coin assumed in circulation, divided equally between the 2 years.

Table 3 shows the situation for a 2-year replacement of the existing subsidiary coinage with coinage of 500 fineness, beginning January 1, 1966. Table 3 suggests that fully 500 million ounces of silver would have to be recovered by the end of 1967 to prevent Treasury stocks from falling to zero. If it were somehow possible in the space of the 2-year transition period to recover the entire 1,000 million ounces used in the earlier examples, Treasury stocks would still be reduced to less than 600 million ounces at the end of the transition.

The parallel situation with respect to 400 fineness coinage is presented in the accompanying Table 3-A. This example is based upon the same assumptions as those of Table 3 except for the lower fineness of the new coins. In this case, it would be necessary to recover about 250 million ounces by the end of 1967 to prevent Treasury stocks from falling to zero. The recovery of 1,000 million ounces of silver during the transition period would leave the Treasury with a stock of about 750 million ounces at the end of the transition. However, it is not at all clear how recoveries on this scale could actually be accomplished within a 2-year period.

The example does show that a successful transition to reduced content silver coinage, if possible at all, would require a very short transition coupled with a high rate of recovery of the old coin. In interpreting these examples, it should be kept in mind that the production of the new coins has been set arbitrarily at required rates, without reference to the fact that such production would exceed Mint capacity. Furthermore, no attention has been paid to the very real possibility of an accelerating speculative demand for silver as Treasury stocks declined. It is one thing to construct an example in which Treasury

silver stocks fall and are then reconstituted by recoveries of old coin, and quite another thing to estimate just how destructive of confidence a sizable fall in Treasury silver could be during an admittedly hazardous transition to silver coinage of lower content.

Conclusions

1. The examples that have been presented do not exhaust all the possible ways in which a transition to reduced content silver coinage might be attempted. It is believed that they do cover the more promising alternatives open to the Treasury. The general conclusion must be unmistakable. The transition to silver coinage of reduced content would be an extremely risky undertaking, and Treasury silver stocks would probably be depleted within a relatively short period of time. If there is a partial and limited exception to this overall conclusion, it arises with 400 fineness where a high proportion of the existing coinage is recovered at a rapid rate.

2. Even there the risks would have to be judged intolerably great unless there were clear evidence, at the time a decision was reached, that the coin shortage had ended and subsidiary silver coinage was temporarily redundant.[1] No one could be sure in any case that the price of silver would not be driven again to the melting point of subsidiary coinage; this might not occur within the immediate future. In general, analysis of the special problem of the transition to reduced content silver coinage suggests that attention can appropriately be concentrated from this point in the study upon the base alloy alternatives.

3. However, there may be special reasons for continuing to produce a single silver coin which would circulate alongside the new base alloy coins. This issue is discussed briefly in an appendix to this section.

Appendix: Notes on the Retention of a Silver 50-Cent Piece

There may be advantages in retaining a single circulating silver coin. It seems reasonably certain that a clad silver 50-cent piece of 400 fineness could be continued in our coinage system for a good number of years, perhaps indefinitely. Furthermore, if for some reason it did become impossible to continue silver in this limited role, a shift to a base-alloy 50-cent piece could be effected without serious difficulty or disruptive effect.

The amounts of silver which might be used in a clad silver 50-cent piece can be estimated approximately. Between 1957 and 1961, production of 50-cent pieces ranged between 25 and 30 million pieces annually. Since then production has increased sharply, rising to 92 million pieces in 1963 and to 206 million pieces in 1964, when hoarding of Kennedy 50-cent pieces was severe. The more recent levels are, of course, abnormally high. A more reasonable figure might be an annual production of 100 million pieces. This would still be about twice the number of pieces projected by Arthur D. Little for 1968, and it might even be preferable to start with a lower amount initially.

The important consideration, in the present context, is that the production of 100 million 50-cent pieces from the 400 fineness silver alloy would use only some 15 million ounces of silver, about 5 percent of the current rate. This amount would clearly fall within permissible limits of silver usage, particularly since with a transition to base alloy coinage this amount of silver might very possibly be recovered by the Treasury from the existing coinage.

The advantage in retaining a silver 50-cent piece is the extension of a continuous tradition of circulating silver coinage. Of course, sentiment and tradition must not be allowed to obstruct the transition to a secure coinage system, adequate to the needs of the present. However, by eliminating silver from the dime and quarter, a major drain on Treasury silver stocks would have been removed, and the retention of a silver 50-cent piece should be possible.

[1] This is clearly not the case at the present time.

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The retention of one or two silver coins is common practice internationally. Some examples are Japan, France, Italy, the Federal Republic of Germany, the Netherlands, Belgium, and Greece. In continuing with the silver dollar at its existing fineness and a clad silver 50-cent piece of 400 fineness, our own coinage system would come more nearly into corresponding with present practice abroad. As it stands, our own consumption of silver in coinage dwarfs that of the rest of the world and threatens to dislocate silver markets and lead to severe shortages for industrial use.

In suggesting the possible retention of a silver 50-cent piece, it must be stressed that the uncertainties of the future silver situation preclude any definite commitment as to the amounts of 50-cent pieces that would be produced. Also, during early stages of any transition to a new coinage system, the Mint should be concentrating heavily upon the production of the new base-alloy coins. Production of the 400 fine 50-cent pieces should only be phased in gradually as capacity became available and silver supplies were clearly adequate for the purpose. Finally, at the risk of some repetition, it should be emphasized that the use of any silver whatsoever in the 10- and 25-cent pieces (which are crucial to the needs of commerce in a way that the 50-cent piece is not) is ruled out for the reasons developed earlier.

The feasibility of retaining a 400 fineness silver half dollar should be examined exhaustively by the Treasury before making its legislative recommendations. These notes are only intended to raise the possibility of keeping a silver 50-cent piece, not to provide the full justification that such a course of action would require.

VI. FURTHER CONSIDERATION OF THE BASE METAL ALLOYS[1]

The previous section has concluded that the transition to a reduced content silver alloy used throughout the subsidiary coinage would be extremely risky and that Treasury stocks of silver would probably be depleted during or soon after the transition period. This negative conclusion applies without reservation in the case of the 500 alloy, and it does not appear that the outlook is much more promising in the case of the 400 alloy. None of the silver alloys of lower fineness than 400 meet minimum standards of acceptability. As noted previously, in the judgment of the Mint technical staff, the exterior silver cladding on any composite coin should not be reduced below 800, and this precludes reducing the overall fineness much below 400. Therefore, the silver alloys are eliminated as the basic subsidiary coinage material. The possibility remains of using very limited amounts of silver in a clad 50-cent piece, but the bulk of future subsidiary coinage production must be nonsilver. The present section will consider the advantages and disadvantages of the base alloys that remain and discuss the ways in which the transition from the present silver coinage to a new system largely of base alloy coinage could best be attempted.

Relative Merits of the Remaining Alloys

There are four remaining alloys: Cupronickel, nickel silver, cupronickel or nickel silver clad on a copper core, and the Inco coin. No final choice will be made from among them at this stage, but their respective advantages and disadvantages will be summarized and a tentative judgment established. At an early stage of this study, criteria were developed against which it was suggested that a future coin program might be judged. It will be helpful now to compare the extent to which the remaining alloys do successfully meet the different criteria.

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[1] This chapter was written before the Mint had completed its intensive investigation of the clad coinage materials with respect to production feasibility and an assured supply of the bonded strip. Consequently, it does not fully reflect information available to the Mint and Treasury at the time the eventual coinage decision was made. This fact should be borne in mind in reading the present chapter and in interpreting the study's final conclusions and recommendations.

Medium of Exchange Function and Permanence of the Solution

Any of these base alloys would appear to meet the essential requirement of no interruption to the essential medium of exchange function, although specific changeover problems with the alloys remain to be discussed. Any of the alloys would also appear to meet the requirement that there be a minimal chance of any serious disruption to the new coinage system within the next 20 to 25 years.

Assured Access to Raw Materials

On the question of assured access to raw materials, the Inco coin does present potential problems. As noted earlier, nickel does not seem likely to present a really critical overall supply situation. But the fact remains that U.S. production of ferronickel is unsuitable for coinage, and U.S. coinage requirements would have to be met from the existing stockpile of nickel and/or Canadian production. In addition to the overall nickel supply picture, the special nature of the production process with the Inco coin means that for a considerable period of time the Mint would be largely dependent upon a single commercial source of supply for the alloy itself. In order to achieve a rapid transition to high level of production, it would apparently also be necessary to have annealing and blanking operations carried on by Inco at its Huntington, West Virginia, plant.

Provision could possibly be made subsequently to carry on all or some of these operations in the new Philadelphia Mint or perhaps to look to a later transition to a pure nickel coin and plan the new Philadelphia Mint facilities accordingly. All of this adds uncertainties and complications at a time when planning for future Mint operations is difficult enough. These considerations and those of raw material supply should not entirely rule out the Inco coin, but they do suggest that it must offer some clear advantages over the other alloys to compensate for its less than ideal position from the point of view of supply.

Public Acceptability

Public acceptability of a new coinage system was viewed as resting upon a number of factors among which were demonstrated necessity of the need for a change to the new system, physical characteristics of the new coins, minimum of inconvenience to the public, and absence of extreme hardship to a particular group or industry. The first of these factors, the need for the change, applies equally with all of the alloys. The physical characteristics of different coinage materials were discussed in some detail in Section IV when these four base alloys were selected from a larger number of potential alloys.

Physical Characteristics of the Coins

Aside from questions of operation in vending machines, it can be argued that on the basis of their physical characteristics the coins should be ranked: Inco, cupronickel or nickel silver, and the clad coins. Such a ranking would be based upon the belief that nickel is a slightly more desirable coinage metal than cupronickel or nickel silver and that clad coins are generally not quite so desirable as conventional alloys. However, extensive Mint testing of the clad materials has revealed that their wear properties and other physical characteristics are in no way inferior to homogeneous alloys made from the outside cladding material. The reddened edge of the clad coins is a matter of appearance on which opinions might possibly differ. So long as the coins are durable, attractive, and perform the medium of exchange function, the reddened edge would not appear to be a matter of very great importance.

Operation in Vending Machines

Public acceptability will also depend upon the new coins working in vending machines. The strong point claimed for the Inco coin is its ability to work in existing vending machine rejectors. In some machines, the application of a small piece of tape has improved performance. As noted previously, the claims made for the Inco coin have never

been demonstrated convincingly, despite repeated tests. There is reason to believe that all of the problems have not yet been overcome, and may never be. The case for the Inco coin does rest primarily upon its consistently successful operation in vending machines under actual operating conditions. Consequently, the failure of the Inco coin to demonstrate its compatibility with the existing silver coinage in vending machines is very nearly a decisive objection to its use. Inco claims that an entirely new type of rejector mechanism, based upon electronic principles, might be designed around their coin. No such equipment exists, and even if it did, it would not meet the immediate problem.

The cupronickel clad coins have, on the other hand, conclusively demonstrated their ability to work alongside the existing silver coins in the 10-, 25-, and 50-cent channels of existing vending machines. Similarly, the silver-copper alloy clad on a low-content silver core, which has been suggested for use in the 50-cent piece, would work in vending machines with no alterations required. Nickel silver clad on a copper core has not been tested in vending machines, but on the basis of its physical characteristics it would work. A possibility, in the case of the base-alloy-clad materials, would be to use one or the other of them as a transitional coin while vending machine rejectors were being modified or replaced to accept ordinary cupronickel or nickel silver coins.

The relative importance of compatibility of the new coinage and the present coinage in vending machines will be discussed further in the context of changeover problems. To this point, major emphasis has been placed upon the inconvenience to the public if new coins will not work in vending machines and the possibly disruptive effects upon the vending machine and coin rejector industries. In addition, large companies whose products are nationally distributed through vending machines would understandably be concerned in such a case. These are very important considerations that should be weighed carefully before reaching any final decision--particularly the inconvenience to the public and possible disruption of commerce. It should also be pointed out that under conceivable circumstances the effort to insure that new coins would work immediately in every vending machine could come into conflict with the more important objective of insuring an adequate supply of coins at all times. This could be the case if the compatible coinage material were not available quickly in needed volume. Since this is a matter which the Mint is investigating intensively, it need not be considered further here.

Absence of Hardship

The absence of serious hardship to any single group or industry is a reasonable objective, whichever one of the base alloys is selected for the subsidiary coinage material. As noted above, this suggests the desirability, if not the absolute necessity, of finding a coin which will work in existing vending machines, or possibly offering some assistance to the vending machine industry if such a coin is not used. The needs of the silver users will be met if silver is removed from the coinage--except for the relatively small overall requirements if silver clad is used in the 50-cent piece--and the price of silver is held at the present level during a fairly lengthy transition period. Silver producers might reasonably be protected by a proposal that the Treasury would stand ready to buy newly mined domestic silver--say at $1.25+--for a period of time. In the absence of such a purchase program, producers might fear the market-depressing impact of the liquidation of speculative stocks of silver, accumulated in the mistakened belief that the price of silver was sure to rise above $1.29+.

Ease and Certainty of Production

Ease and certainty of high levels of coin production are extremely important; they could become a vital consideration in the case of a quick changeover. It is clear that cupronickel has many advantages here because of long Mint experience with the material and dependable commercial sources of cupronickel strip. Nickel silver is also a relatively easy material for the Mint to work with; as noted earlier the addition of zinc does complicate melting procedures to some extent. But, nickel silver strip should be readily available from commercial suppliers.

Both the Inco coin and the clad coins offer potential difficulties, although in the case of clad coins the difficulties quite possibly can be resolved. The Inco coin will be hard on dies and may require heavier presses. This assumes that annealed blanks would be supplied by Inco, but certainty of supply cannot be absolutely assured in such an event. Unless the Mint could build up very large inventories of the blanks, which would hardly be possible at first, there would be the threat that a strike at Inco, a failure in quality control, or some other temporary interruption to the steady flow of acceptable blanks could disrupt Mint production schedules. With the clad coins, there is little question of the Mint's ability to work the material. But, assurance of an adequate supply of the clad strip is uncertain on the basis of what was known at the time this report was written. This uncertainty will be resolved by intensive Mint investigations currently underway.

Minimization of Cost of Coinage

The minimization of the cost of coinage is a sensible objective only at an acceptable level of coinage quality. Cupronickel would probably offer the most seigniorage. Nickel silver should run a close second with some increase in cost because of the need for special procedures where zinc is alloyed with copper and nickel. The exact cost per pound of clad strip has not yet been determined. Approximate information is available, and suggests that the cost of clad cupronickel strip would initially be in the range of $1 to $1.50 per pound.

Cupronickel alloy costs about 45 cents a pound and only a further 5 cents, or so, need be added in the case of the homogeneous alloy for melting and rolling operations performed in the Mint. Where the strip is purchased from outside suppliers, the comparable cost would be about 65 cents per pound. The cost of cupronickel clad on a copper core would fall in the range of $1 to $1.50 per pound, assuming the same 45-cent cost of alloy. The Inco strip would probably cost about $1.50 per pound. In view of the relatively large amount of seigniorage with any of these materials and the general importance of the coinage, it could be argued that alloy cost should not be given very much weight in the final decision. It probably should receive some consideration.

One type of cost calculation which may be relevant is the extra cost of clad strip, or the Inco coin, over straight cupronickel or nickel silver. Since the clad coins are chiefly attractive because they will work in existing vending machines, their extra cost, if they are used permanently, should be contrasted with the once-and-for-all cost of altering vending machine rejectors. Where clad coins were used only during a transition period, the extra cost could be viewed as necessary to achieve speedy introduction of the new coins. But, if clad coins are used permanently, cost more than conventional alloys, and are superior in no respect other than use in vending machines, a question arises whether eventual modification of rejectors to accept conventional alloys might not prove desirable.

With the clad coins, the increment paid (in the first instance by the Mint and ultimately by the public) in lieu of altering vending machines is probably on the order of 50 cents to $1 per pound of coinage material, and about $1 in the case of the Inco coin. The extra cost in the case of cupronickel-clad coins might be $10 to $15 million annually at high rates of coin production, and reduced proportionately at lower rates of production. This extra continuing cost contrasts with a one-time vending machine conversion cost that might range from $50 to $100 million if a straight cupronickel or nickel silver coin were to be used. The use of either of these coinage materials would also, in the opinion of the vending machine industry, involve intolerable continuing costs because the selectivity of their rejectors would be so greatly impaired that they would accept a wide variety of slugs and foreign coins. In addition, there would be losses because of "downtime" while rejectors were being modified. These losses are difficult to quantify, but could be considerable.

Cost comparisons of the sort described here while of some relevance could not be a decisive factor, even if plausible magnitudes could be assigned to them. They cannot measure the inconvenience to the public and the attendant disruption to commerce that might follow a decision to introduce large amounts of coin into circulation which would not be compatible with the present coinage in vending machines.

Balance of Payments Cost

Alternative base alloy programs would not have an appreciably different effect upon the balance of payments, except for the Inco coin. There, unless nickel were used from the stockpile, imports of nickel from Canada would increase, possibly by $10 to $20 million annually.

Other possible effects upon the U.S. international position are less tangible and very difficult to estimate. Advocates of silver in the coinage will stress the importance of its retention and cite the return to some silver in coinage by Western European countries. The retention of the present silver dollar and the use of the 400 fineness clad alloy in the 50-cent piece would seem to meet the requirements of prestige.

Summary: The Relative Merits of the Base Alloys

The choice between cupronickel and nickel silver on the one hand and between the Inco coin and clad coins on the other is best considered separately. Cupronickel and nickel silver are "permanent" coinage alloys; they will not work as subsidiary coinage in existing vending machines. The Inco and clad coins can be regarded as "transitional" coins which will work in vending machines while rejectors are being altered for a permanent coinage of pure nickel, cupronickel, or nickel silver; or equally well, they may be regarded as permanent coins if it is determined that modification of vending machine rejectors is not desirable. It will be assumed, simply for the purpose of discussion, that eventual modification of rejector mechanisms may be contemplated.

Assuming that vending machine rejectors were to be modified eventually, the choice of permanent coinage materials lies primarily between cupronickel and nickel silver. The transition to pure nickel coinage appears to be impractically difficult since, as indicated in Section IV, it would mean the replacement of practically every coin testing device currently in use. As between cupronickel and nickel silver, the differences are not great, although in most respects cupronickel is a slightly superior coinage material. Some people feel that nickel-silver makes a slightly better looking coin, i.e., more like silver, when newly minted. But, this is probably more than offset by its tendency to yellow with age and its general inferiority to cupronickel from the Mint standpoint. The upgrading of the 5-cent coin material that would occur with cupronickel would, perhaps, not be an ideal solution, nor is it an altogether attractive prospect to have 5- and 10-cent pieces of present size made from the same material. However, all things considered, the preference here would be slightly in favor of subsidiary coinage made from cupronickel, with the present 5-cent piece unchanged. The alternative of leaving the present 5-cent piece unchanged and using nickel silver for the subsidiary coinage would also be acceptable.

The cupronickel or nickel silver clad on a copper core has the great advantage of avoiding the need for modification of vending machines. The Inco coin does not work acceptably and even if it did it would be superior to the clads only on the basis of appearance. The clad coin is to be preferred since it would lead logically and easily to a permanent coinage of cupronickel, or nickel silver, or, as seems equally desirable, could be retained as the permanent coinage material.

Changeover Problems with the Base Alloys

While the announcement of a plan to switch to a base alloy for subsidiary coinage is not likely to cause intensified hoarding of silver coins by the public, the Mint must be prepared to offset any conceivable scale of withdrawals. Similar considerations would apply in the case of reduced content silver coinage, and it will be recalled that some of the arithmetic examples in Section V allowed for complete replacement of the coinage in circulation at the time of the changeover, whether or not the old coins could be recovered. Most of those not recovered were assumed to have been hoarded. A crucial difference is that the prospect of a sharp increase in silver prices would disappear, and the major threat to a smooth transition would be removed.

However, the public may want to hold relatively large amounts of silver coins; new ones because they are the last of their kind, old ones because of enhanced numismatic value, real or imagined. This could mean that a large part of the production of 1964 silver coins might fairly rapidly, if temporarily, be withdrawn from circulation along with an appreciable amount of older coins. The effective countermeasure is a very high rate of production of the new coins and their introduction in large volume. If a silver 50-cent piece is continued in production, the withdrawal of silver coins may well be minimized.

Possible Need To Replace Existing Coinage

The net effect of these considerations is that, while side-by-side circulation of the new and old coins is altogether likely, there are residual uncertainties and the prudent course is to be prepared to replace the coinage fairly rapidly, if required. The "replacement problem" with a base alloy is very difficult from the case of a transition to silver coinage of reduced content. In that case, the situation was complicated by the need to recover as much as possible of the existing coinage and turn it out again in the form of lower content coins. With the changeover to base alloy coinage, the problem is inherently a much simpler one of rapidly achieving a rate of production sufficient to offset withdrawals from circulation. Because the rate of withdrawal of the old silver coins is difficult to estimate in advance with accuracy, the Treasury must plan to replace much of the existing coinage and have the capability to do it within a relatively short period of time. If the coin shortage should ease by early next year, the changeover problem should be a relatively simple one. At the present time, planning should go forward on the less favorable assumption that there will still be a coin shortage at the period of peak demand in the second half of 1965.

Possible Interim Expansion of 5-Cent Production

Assuming for the sake of discussion that legislation providing for a new base alloy coinage were passed by late spring or early summer, only a limited amount of the new coins could be produced by the end of the calendar year, and their introduction should probably be delayed until 1966. At the same time, the public might possibly be making some net withdrawals of silver coin from circulation. This could contribute to a tight coinage situation next year at about this time (December). One step that can be taken even before the legislative consideration of the Treasury proposals is to plan for extra production of 5-cent pieces beyond the amounts scheduled under the current crash coinage program. The logic of such a procedure would be that whatever the eventual decision on the subsidiary coinage material, extra 5-cent pieces would be a valuable addition to the circulating coinage during the difficult initial stages to the changeover.[1]

If it were considered certain that silver would not be continued in the coinage, there might even be something to be said for a reduction in the rate of silver coinage after the beginning of the year. To the extent that this allowed increases in the rate of coinage of 5-cent pieces, coins which would stay in circulation would be increased at the expense of coins which possibly might not to the same degree. There are, however, difficulties with such an approach. A much larger number of 1- and 5-cent pieces must be produced to carry on a given dollar amount of commercial transactions. Furthermore, such a shift might cause some disruption in Mint production schedules. For these reasons, it probably is better to plan to continue to produce silver coins at fairly high levels up to the time that a switchover is made to a new subsidiary coinage alloy.

This would not, however, preclude some intensification of the production effort next year on 5-cent pieces, at the expense of 1-cent pieces. It is understood that the Mint will have considerable flexibility in this respect as new presses already on order are

[1] As is now amply clear (May 1965), the Mint's crash coinage program has been eminently successful in overcoming the shortage of 1-cent and 5-cent pieces and has built up the sort of backlog referred to in the text.

delivered. A further but more far-reaching effort along these lines would be the establishment of additional temporary facilities which could be used to produce cupronickel 5-cent pieces from purchased strip and rapidly shifted to the production of subsidiary coinage at a later time in the year.

Possibilities of this sort have been canvassed thoroughly on earlier occasions when planning the current crash coinage program. Great progress has been made along these lines. Approximately 50 coin stamping presses and additional blank annealing and cleaning lines are on order, and it is understood that further 10 coin stamping presses are about to be contracted for. However, the changeover to a new coinage alloy may mean that even higher levels of coin producing capacity will be required until the new Philadelphia Mint comes on stream. If so, there probably is a need to reexamine the possibility of seeking authorization to obtain additional space where supplementary minting of coins from purchased strip could take place. This might involve the installation of coin-stamping presses in the present San Francisco building, or in temporary facilities elsewhere, or both. In any event, "outside" operations should remain under Mint control and jurisdiction.[1]

Dimensions of the Changeover Problem

Some rough idea of the production effort that might be required to insure an efficient changeover to base alloy coinage can be gained by reference to the volume of subsidiary coin estimated to be in circulation at the time of the changeover. Table 1 presents approximate estimates of the number of pieces of subsidiary coin that will be in circulation at the end of calendar year 1965 and their face value. These estimates supplied by the Mint are lower than those that would be carried in the Circulation Statement, but higher than those implied by the A.D. Little estimates for January 1963 based upon the age distribution of a selective sampling of coins by the Federal Reserve banks. Further internal studies of the amount of coin in circulation should probably be made by the Treasury, but the present estimates are adequate for the purpose at hand.

One dimension of the changeover problem is simply the total amount of base alloy coins that would have to be produced in order to replace silver coins now in circulation. There is every reason to believe that there will be extensive side-by-side circulation of silver and base alloy coins. However, to be entirely secure, plans should be made for the full replacement of the existing coinage. Another dimension of the changeover problem is the peakload production that will be required in early stages of the changeover when withdrawals of old coin would possibly present a problem. Complete replacement of the more than 12 billion pieces of outstanding subsidiary coinage with base-alloy coinage would probably take about 3 years. This assumes that 1- and 5-cent production would be continued at roughly the rates now scheduled for fiscal 1966 and that the remainder of Mint facilities would be shifted as rapidly as possible to the production of base-alloy coins with the maximum feasible reliance upon the purchase of strip. Replacement could be accomplished even more rapidly, if existing and planned capacity were to be expanded.

Full replacement of the existing coinage is hardly likely to be obligatory within 3 years, but this does set an approximate upper limit on the overall production task. What does seem likely to be required is the ability to reach peak rates of production very quickly in order to offset any net withdrawals of old coin in initial stages of the transition. This does tend somewhat to increase the attractiveness of cupronickel as the subsidiary coinage material since the Mint is thoroughly familiar with its processing, no period of experimentation would be required, and dependence upon outside suppliers would be minimal.

Purely for the sake of illustration it may be useful to consider the timing of a shift to cupronickel subsidiary coinage. At the time of writing, it is not possible to evaluate a similar changeover to cupronickel clad coin, but the Mint is examining the problem in

[1] The Treasury's proposed legislation includes authorization to resume the minting of coins at the San Francisco Mint.

TABLE 1.--Estimated Subsidiary Coin in Circulation at End of Calendar 1965

	Pieces (in millions)	Value (in millions of dollars)
50-cent	1,233	$616
25-cent	3,317	829
10-cent	7,844	784
	12,394	2,229

Source: Bureau of the Mint.

depth and detail. In the case of straight cupronickel, if the Mint were able to commence full-scale production of subsidiary coins by July 1 of next year, it might be possible to produce as many as 1.9 billion pieces by the end of the calendar year. The maximum annual production rate would be 3.8 billion pieces of cupronickel subsidiary coin with existing production facilities and approximately the existing distribution among 1-cent, 5-cent, and subsidiary coin production. If this maximum rate could be quickly achieved, a little more than 15 percent of the outstanding amount of subsidiary coinage could be replaced in the first 6 months. If the coin shortage eases early next year, this rate of replacement of subsidiary coin should be entirely adequate. Still, there is much to be said for an immediate effort to provide an even larger temporary productive capacity, and if there is continuing evidence next year of a coin shortage, some action will be obligatory. The leadtimes for expansion in coin-producing capacity are long, and deliveries of needed equipment and materials are sometimes uncertain. However, the Mint's efforts under the crash coinage program have been prodigious, and, if required, they undoubtedly can expand their capacity even further.

Vending Machines and the Changeover

The possible need for very intensive production of the new coins is complicated by the vending machine problem. Where the new coinage material did not work in present rejectors, there would be two extreme alternative courses of action. In one the vending machine constraint would be accepted and coin production would be adapted accordingly. Production of silver coins would be continued at high rates while vending machines were being modified and parallel production of the new coins was begun, but the introduction of new coins would be delayed until vending machines were fixed. The objections to such a program are obvious. Even if vending machines could be altered in less than 2 years, the drain on silver stocks during that time could be very great. Furthermore, it would be extremely difficult to arrange for the parallel production efforts on old and new coins without running the risks of a divided effort and inadequate production of both.

The other alternative would be to commence production of the new coins as soon and as rapidly as possible and place them in circulation without awaiting the modification of vending machines. This would have the advantage of not continuing the production of silver coins at a time when many of them would go out of circulation as soon as they were issued. The obvious disadvantage would be the fact that new coins would not work in unaltered vending machines. While this should, in fact, tend to keep some additional amounts of old coin in use, it could hardly fail to disrupt machine merchandising and greatly inconvenience the public. In early stages of the transition, new coins would still be a small fraction of the total amount of coin outstanding. If vending machines could be altered rapidly, and their operators would have some incentive to do so, the changeover might be achieved without dire results. Whether such a program could gain legislative approval, or should be recommended, is another question entirely which will not be examined here.

The Transitional Coins

The obvious attractiveness of the clad and Inco coins, is the potential they offer for avoiding the vending machine problem. Introduction of the new coins into circulation could proceed as rapidly as they could be produced. The critical factor then tends to become the leadtime required to obtain adequate amounts of the Mint input--clad strip or annealed Inco blanks. While successful resolution of vending machine difficulties is highly desirable, it will be necessary to guard against attaching too much importance to that single objective. The supply of the material for the transitional coin must be completely assured. Otherwise, there is a danger that a high rate of production could not be sustained. This could potentially even be more serious in its overall effects than the difficulty with vending machines that would result if ordinary cupronickel coins were used.

Inco apparently has the capacity to make the required amounts of strip but the Mint would need annealed blanks at least initially. Even if the Inco coin were satisfactory in other respects, assurance would be needed that adequate amounts of blanks would be forthcoming, and that they could be struck on existing Mint equipment. Similar considerations apply in the case of clad strip upon which the details of assured sources of supply were not available at the time of writing. Battelle has recommended that the Mint initiate an exhaustive investigation on this crucial point and just such an investigation is underway.

Melting, Hoarding, and Export Controls

Brief comment will be made on the role that melting, hoarding, and export controls might play during the changeover to a base alloy, although full examination and analysis of the problem will not be attempted here. It may be desirable to obtain standby authority for the Secretary of the Treasury to institute controls over the hoarding, melting, and exporting of silver in the event he determines certain conditions occur. But, with the possible exception of export controls, the usefulness of such controls as part of an orderly changeover appears questionable; rather, their function would appear to be that of emergency maneuvers to be taken only if the possibility of holding the silver price through sales from our own stock during the critical changeover period is seriously threatened. If the changeover is started soon to a base alloy, this threat will undoubtedly be avoided.

The purpose to be served by controls over the melting of coin if the Treasury is able and willing to hold down the price of silver is questionable, since there would then be no incentive to melt coins. Furthermore, the prohibition of melting at the same time as the price of silver is being held could foster the misconception that the price was shortly going to be allowed to rise, and stimulate speculation in bullion.

Melting controls might be obligatory in a "last ditch" effort to maintain coin in circulation where the Treasury had tried to hold the price of silver, but then ran out of silver which could be sold in the market. In general, this would not even seem to be a remote possibility where the transition is to a base alloy, rather than to a reduced content silver alloy. Moreover, while melting controls could be required under some circumstances, too much should not be expected from their application, since a prohibition on melting could not effectively prevent hoarding under those circumstances.

Controls over the hoarding of coin, while perhaps conceivable in theory, would be extremely difficult to enforce effectively. It is hard to see just how controls could be designed which would discriminate successfully between prohibited hoarding and the accumulation of coin in the ordinary course of business, and in coin collections. Possibly, penalties for coin hoarding could be devised that would limit large accumulations by professional speculators, and such controls might play some part in effecting the recovery of old silver coin in the transition to silver coinage of reduced content. Even this seems doubtful, however, since a legal apparatus effective in dissipating large hoards would seem almost certain to encourage even more widespread "family" accumulations. While the question deserves fuller discussion and analysis than it will be given here, there does not seem to be much value in controls on the hoarding of coin. Controls on the hoarding of bullion might conceivably be more effective.

There is a stronger case for export controls during a changeover period. Certainly, they would be an essential backstop to any controls over the melting or hoarding of coin. But if these controls are not used because the Treasury is holding the market price of silver, the case for export controls on silver is much less clear.

The only situation in which we would want to prohibit the export of silver bullion would be during a period when there was heavy foreign speculative demand, which added to the drains on Treasury stock--as was the case temporarily in the latter months of 1964. However, one result of applying export controls would be a partial separation of the U.S. market from the world market, and there would be some increase in world prices above the pegged U.S. price. As a consequence, some U.S. domestic demand for silver, previously met from imports, would now be met from Treasury stocks, a cheaper source of supply. By frustrating the foreign demand for Treasury silver, it could be argued that some net saving would arise. It should be recognized that silver users would probably regard the separation of U.S. and world markets as a threat to their assured sources of supply. If so, export controls might stimulate silver users to make precautionary purchases of Treasury silver in advance of their current requirements. The fact that, aside from speculative demands, the United States is a natural importer greatly increases the possibility of this response to a higher world price.

VII. CONCLUSIONS AND RECOMMENDATIONS

1. Cupronickel is the best permanent material for a new subsidiary coinage, ignoring the vending machine problem. A close second choice would be nickel silver for 10-, 25-, and 50-cent pieces.

2. Either cupronickel or nickel silver coins would require "factory" adjustment of sophisticated vending machine rejectors, entailing significant costs and transitional inconvenience. This may not be adjudged intolerable, in view of their advantages in other respects. However, since extensive experiments confirm that cupronickel (and probably nickel silver) clad on a copper core operates successfully in unaltered vending machine rejectors, preferable options are available. A clad coin can be used during a transition period, or permanently.

3. Information on the wear properties of clad coins is altogether encouraging, and they undoubtedly meet all the requirements for permanent use in the coinage. If desired, they could, with equal facility, serve as a transitional coin while further study and research on the adaptation of vending machines was being conducted. An overriding requirement with clad coins is the production feasibility of the strip and the assurance of an adequate supply for processing in the Mint.

4. Because of a number of unresolved questions, the Inco coin comes into the picture only if an assured supply of clad strip cannot be obtained. In any event, the Inco coin would have to have demonstrated conclusively that it would work in vending machines with minimal adjustments, that it could be struck successfully in large volume on existing Mint equipment, and that adequate supplies of strip or annealed blanks would be available.

5. Subsidiary silver coinage of reduced content, such as silver-copper alloys clad on a low-content silver-copper core, suffers both from difficult transitional problems and incomplete assurance that the subsidiary coinage would not be imperiled again within a fairly short period of time. The danger of a complete breakdown during the transition period cannot be ruled out, and the use of silver throughout the subsidiary coinage should not be viewed as an eligible option. If any silver is to be retained in the subsidiary coinage system, it should be limited to the silver dollar and to a clad 50-cent piece of 400 fineness. In any event, the retention of the monetary value of the silver dollar at its present fineness is absolutely essential to a successful transition.

6. During the transition to a new coinage system, it will be obligatory to hold the market price of silver at its current level in order to protect the existing coinage. Since this will remove the incentive to melt the existing coinage, controls over melting would probably not serve any useful purpose. Effective controls on the hoarding of coin appear

impractical. Controls on the export of silver coin and bullion may serve a useful purpose during the transition period. There is something to be said for having standby authority to invoke controls. A prompt transition to base-alloy coinage would make the actual use of controls unnecessary.

7. New coins should be placed in circulation through normal channels. Every effort should be made as soon as possible to prepare for extremely high rates of production of the new coins. This should include an interim expansion in the production of 5-cent pieces (which would provide substitutes for silver coin and subsequently release Mint capacity for the new coins) and arrangements for additional temporary production space. If this were to be outside of existing Mint facilities, it should remain under Mint control.

EXHIBIT 6

REMARKS OF THE PRESIDENT AT THE SIGNING CEREMONY OF THE COINAGE ACT OF 1965, THE WHITE HOUSE, JULY 23, 1965.

Distinguished members of Congress, ladies and gentlemen:

We gather here today for a very rare and historic occasion in our Nation's history.

When I have signed this bill before me, we will have made the first fundamental change in our coinage in 173 years. The Coinage Act of 1965 supersedes the Act of 1792. And that Act had the title: An Act Establishing a Mint and Regulating the Coinage of the United States.

Since that time our coinage of dimes, and quarters, and half dollars, and dollars have contained 90 percent silver. Today, except for the silver dollar, we are establishing a new coinage to take its place beside the old.

The new dimes and the new quarters will contain no silver. They will be composites, with faces of the same alloy used in our five cent piece that is bonded to a core of pure copper. They will show a copper edge.

Our new half dollar will continue our silver tradition. Eighty percent silver on the outside and 19 percent silver inside. It will be nearly indistinguishable in appearance from our present half dollar.

All these new coins will be the same size and will bear the same designs as do their present counterparts. And they will fit all the parking meters and all the coin machines and will have the same monetary value as the present ones.

Now, all of you know these changes are necessary for a very simple reason--silver is a scarce material. Our uses of silver are growing as our population and our economy grows. The hard fact is that silver consumption is more than double new silver production each year. So, in the face of this world-wide shortage of silver, and our rapidly growing need for coins, the only really prudent course was to reduce our dependence upon silver for making our coins.

If we had not done so, we would have risked chronic coin shortages in the very near future.

There is no change in the penny and the nickel. There is no change in the silver dollar, although we have no present plans for silver dollar production.

Some have asked whether silver coins will disappear. The answer is very definitely--No.

Our present silver coins won't disappear and they won't even become rarities. We estimate that there are now 12 billion--I repeat, more than 12 billion silver dimes and quarters and half dollars that are now outstanding. We will make another billion before we halt production. And they will be used side-by-side with our new coins.

Since the life of a silver coin is about 25 years, we expect our traditional silver coins to be with us in large numbers for a long, long time.

If anybody has any idea of hoarding our silver coins, let me say this. Treasury has a lot of silver on hand, and it can be, and it will be used to keep the price of silver in line with its value in our present silver coin. There will be no profit in holding them out of circulation for the value of their silver content.

The new coins are not going to have a scarcity value either. The mint is geared to get into production quickly and to do it on a massive scale. We can expect to produce not less than 3-1/2 billions of the new coins in the next year, and, if necessary, twice that amount in the following twelve months.

So, we have come here this morning to this, the first House of the land, this beautiful Rose Garden, to congratulate all of these men and women that make up our fine Congress, who made this legislation possible--the committees of both Houses, the leadership in both Houses, both parties, and Secretary Fowler and all of his associates in the Treasury.

I commend the new coinage to the Nation's banks and businesses and to the public. I think it will serve us well.

Now, I will sign this bill to make the first change in our coinage system since the 18th Century. To those members of Congress, who are here on this very historic occasion, I want to assure you that in making this change from the 18th Century we have no idea of returning to it.

We are going to keep our eyes on the stars and our feet on the ground.

EXHIBIT 7

Public Law 89-81
89th Congress, S. 2080
July 23, 1965

AN ACT

To provide for the coinage of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Coinage Act of 1965". Coinage Act of 1965.

TITLE I--AUTHORIZATION OF ADDITIONAL COINAGE

Sec. 101. (a) The Secretary may coin and issue pursuant to this section half dollars or 50-cent pieces, quarter dollars or 25-cent pieces, and dimes or 10-cent pieces in such quantities as he may determine to be necessary to meet the needs of the public. Any coin minted under authority of this section shall be a clad coin the weight of whose cladding is not less than 30 per centum of the weight of the entire coin, and which meets the following additional specifications: Specifications.

(1) The half dollar shall have--

(A) a diameter of 1.205 inches;

(B) a cladding of an alloy of 800 parts of silver and 200 parts of copper; and

(C) a core of an alloy of silver and copper such that the whole coin weighs 11.5 grams and contains 4.6 grams of silver and 6.9 grams of copper.

(2) The quarter dollar shall have--

(A) a diameter of 0.955 inch;

(B) a cladding of an alloy of 75 per centum copper and 25 per centum nickel; and

(C) a core of copper such that the weight of the whole coin is 5.67 grams.

(3) The dime shall have--

(A) a diameter of 0.705 inch;

(B) a cladding of an alloy of 75 per centum copper and 25 per centum nickel; and

(C) a core of copper such that the weight of the whole coin is 2.268 grams.

(b) Half dollars, quarter dollars, and dimes may be minted from 900 fine coin silver only until such date as the Secretary of the Treasury determines that adequate supplies of the coins authorized by this Act are available, and in no event later than five years after the date of enactment of this Act.

79 STAT. 254.
79 STAT. 255.

Silver dollars, restriction.

(c) No standard silver dollars may be minted during the five-year period which begins on the date of enactment of this Act.

Legal tender.

Sec. 102. All coins and currencies of the United States (including Federal Reserve notes and circulating notes of Federal Reserve banks and national banking associations), regardless of when coined or issued, shall be legal tender for all debts, public and private, public charges, taxes, duties, and dues.

Contract authority.

Sec. 103. (a) In order to acquire equipment, manufacturing facilities, patents, patent rights, technical knowledge and assistance, metallic strip, and other materials necessary to produce rapidly an adequate supply of the coins authorized by section 101 of this Act, the Secretary may enter into contracts upon such terms and conditions as he may deem appropriate and in the public interest.

(b) During such period as he may deem necessary, but in no event later than five years after the date of enactment of this Act, the Secretary may exercise the authority conferred by subsection (a) of this section without regard to any other provisions of law governing procurement or public contracts.

Silver, purchase.

Sec. 104. The Secretary shall purchase at a price of $1.25 per fine troy ounce any silver mined after the date of enactment of this Act from natural deposits in the United States or any place subject to the jurisdiction thereof and tendered to a United States mint or assay office within one year after the month in which the ore from which it is derived was mined.

Exportation, etc., of coins.

Sec. 105. (a) Whenever in the judgment of the Secretary such action is necessary to protect the coinage of the United States, he is authorized under such rules and regulations as he may prescribe to prohibit, curtail, or regulate the exportation, melting, or treating of any coin of the United States.

Penalty.

(b) Whoever knowingly violates any order, rule, regulation, or license issued pursuant to subsection (a) of this section shall be fined not more than $10,000, or imprisoned not more than five years, or both.

Forfeiture of coins.

Sec. 106. (a) There shall be forfeited to the United States any coins exported, melted, or treated in violation of any order, rule, regulation, or license issued under section 105(a), and any metal resulting from such melting or treating.

(b) The powers of the Secretary and his delegates, and the judicial and other remedies available to the United States, for the enforcement of forfeitures of property subject to forfeiture pursuant to subsection (a) of this section shall be the same as those provided in part II of subchapter C of chapter 75 of the Internal Revenue Code of 1954 for the enforcement of forfeitures of property subject to forfeiture under any provision of such Code.

68A Stat. 869.
26 USC 7321-7329.

Sec. 107. The Secretary may issue such rules and regulations as he may deem necessary to carry out the provisions of this Act.

Sec. 108. For the purposes of this title-- Definitions.

(1) The term "Secretary" means the Secretary of the Treasury.

(2) The term "clad coin" means a coin composed of three layers of metal, the two outer layers being of identical composition and metallurgically bonded to an inner layer.

(3) The term "cladding" means the outer layers of a clad coin.

(4) The term "core" means the inner layer of a clad coin.

(5) A specification given otherwise than as a limit shall be maintained within such reasonable manufacturing tolerances as the Secretary may specify.

(6) Specifications given for an alloy are by weight.

79 STAT. 255.
79 STAT. 256.

TITLE II--AMENDMENTS TO EXISTING LAW

Sec. 201. The first sentence of section 3558 of the Revised Statutes (31 U.S.C. 283) is amended to read: "The business of the United States assay office in San Francisco shall be in all respects similar to that of the assay office of New York except that until the Secretary of the Treasury determines that the mints of the United States are adequate for the production of ample supplies of coins, its facilities may be used for the production of coins." San Francisco assay office, minting of coins.

Sec. 202. Section 4 of the Act of August 20, 1963 (Public Law 88-102; 31 U.S.C. 294), is amended by changing "$30,000,000" to read "$45,000,000". 77 Stat. 129.

Sec. 203. (a) Section 3 of the Act of December 18, 1942 (56 Stat. 1065; 31 U.S.C. 317c), is amended by striking "minor" each place it appears.

(b) Section 9 of the Act of March 14, 1900 (31 Stat. 48; 31 U.S.C. 320), is repealed. Repeal.

Sec. 204. (a) Section 3517 of the Revised Statutes (31 U.S.C. 324) is amended to read:

"Sec. 3517. Upon one side of all coins of the United States there shall be an impression emblematic of liberty, with an inscription of the word 'Liberty', and upon the reverse side shall be the figure or representation of an eagle, with the inscriptions 'United States of America' and 'E Pluribus Unum' and a designation of the value of the coin; but on the dime, 5-, and 1-cent piece, the figure of the eagle shall be omitted. The motto 'In God we trust' shall be inscribed on all coins. Any coins minted after the enactment of the Coinage Act of 1965 from 900 fine coin silver shall be inscribed with the year 1964. All other coins shall be inscribed with the year of the coinage or issuance unless the Secretary of the Treasury, in order to prevent or alleviate a shortage of coins of any denomination, directs that coins of that denomination continue to be inscribed with the last preceding year inscribed on coins of that denomination, except that coins produced under authority of sections 101 (a)(1), 101(a)(2), and 101(a) (3) of the Coinage Act of 1965 shall not be dated earlier than 1965. No mint mark may be inscribed on any coins during the five-year period beginning on the date of enactment of the Coinage Act of 1965, except that coins struck at the Denver mint as authorized by law prior to such date may continue to be inscribed with that mint mark." Inscriptions on coins.

(b) The Act of September 3, 1964 (Public Law 88-580; 31 U.S.C. 324 note), is repealed. Repeal. 78 Stat. 908.

Sec. 205. The first sentence of section 3526 of the Revised Statutes (31 U.S.C. 335) is amended to read: "In order to procure bullion for coinage or to carry out the purposes of section 104 of the Coinage Act of 1965, the Secretary of the Treasury may purchase silver bullion with the bullion fund."

Sec. 206. (a) Section 3528 of the Revised Statutes (31 U.S.C. 340) is amended to read:

Coinage metal fund.

"Sec. 3528. The Secretary of the Treasury may use the coinage metal fund for the purchase of metal for coinage. The gain arising from the coinage of metals purchased out of such fund into coin of a nominal value exceeding the cost of such metals shall be credited to the coinage profit fund. The coinage profit fund shall be charged with the wastage incurred in such coinage, with the cost of distributing such coins, and with such sums as shall from time to time be transferred therefrom to the general fund of the Treasury."

(b) The effect of the amendment made by subsection (a) of this section shall be to redesignate the minor coinage metal fund established under section 3528 of the Revised Statutes as the coinage metal fund, and not to authorize the creation of a new fund.

79 STAT. 256.
79 STAT. 257.

Wastage allowance.

Sec. 207. The second sentence of section 3542 of the Revised Statutes (31 U.S.C. 355) is amended by changing ", in the case of the superintendent of melting and refining department, one-thousandth of the whole amount of gold, and one and one-half thousandths of the whole amount of silver delivered to him since the last annual settlement, and in the case of the superintendent of coining department, one-thousandth of the whole amount of silver, and one-half thousandth of the whole amount of gold that has been delivered to him by the superintendent" to read "such limitations as the Secretary shall establish".

Repeal.

Sec. 208. Section 3550 of the Revised Statutes (31 U.S.C. 366) is repealed.

Silver excess.
77 Stat. 54.

Sec. 209. The second sentence of section 2 of the Act of June 4, 1963 (Public Law 88-36; 31 U.S.C. 405a-1), is amended to read: "The Secretary of the Treasury is authorized to use for coinage, or to sell on such terms and conditions as he may deem appropriate, at a price not less than the monetary value of $1.292929292 per fine troy ounce, any silver of the United States in excess of that required to be held as reserves against outstanding silver certificates."

Repeal.
48 Stat. 113.

Sec. 210. The last sentence of section 43(b)(1) of the Act of May 12, 1933 (Public Law 10, 73d Congress; 31 U.S.C. 462), is repealed.

62 Stat. 708.

Sec. 211. (a) Section 485 of title 18 of the United States Code is amended to read:

"§485. Coins or bars

"Whoever falsely makes, forges, or counterfeits any coin or bar in resemblance or similitude of any coin of a denomination higher than 5 cents or any gold or silver bar coined or stamped at any mint or assay office of the United States, or in resemblance or similitude of any foreign gold or silver coin current in the United States or in actual use and circulation as money within the United States; or

"Whoever passes, utters, publishes, sells, possesses, or brings into the United States any false, forged, or counterfeit coin or bar, knowing the same to be false, forged, or counterfeit, with intent to defraud any body politic or corporate, or any person, or attempts the commission of any offense described in this paragraph--

Penalty.

"Shall be fined not more than $5,000 or imprisoned not more than fifteen years, or both."

(b) The table of sections at the beginning of chapter 25 of such title is amended by striking

"485. Gold or silver coins or bars."

and inserting

"485. Coins or bars."

Sec. 212. (a) Chapter 17 of title 18 of the United States Code is amended by adding at the end: 18 USC 331-336.

"§337. Coins as security for loans

"Whoever lends or borrows money or credit upon the security of such coins of the United States as the Secretary of the Treasury may from time to time designate by proclamation published in the Federal Register, during any period designated in such a proclamation, shall be fined not more than $10,000 or imprisoned not more than one year, or both." Publication in Federal Register.

(b) The table of sections at the beginning of such chapter is amended by adding at the end:

"337. Coins as security for loans."

(c) The amendments made by this section shall apply only with respect to loans made, renewed, or increased on or after the 31st day after the date of enactment of this Act.

79 STAT. 257.

TITLE III--JOINT COMMISSION ON THE COINAGE

79 STAT. 258.

Sec. 301. The President is hereby authorized to establish a Joint Commission on the Coinage to be composed of the Secretary of the Treasury as Chairman; the Secretary of Commerce; the Director of the Bureau of the Budget; the Director of the Mint; the chairman and ranking minority member of the Senate Banking and Currency Committee, and four Members of the Senate, not members of such committee, to be appointed by the President of the Senate; the chairman and ranking minority member of the House Banking and Currency Committee, and four Members of the House of Representatives, not members of such committee, to be appointed by the Speaker; and eight public members to be appointed by the President, none of whom shall be associated or identified with or representative of any industry, group, business, or association directly interested as such in the composition, characteristics, or production of the coinage of the United States. Membership. 79 STAT. 258. Restriction.

Sec. 302. No public official or Member of Congress serving as a member of the Joint Commission shall continue to serve as such after he has ceased to hold the office by virtue of which he became a member of the Joint Commission. Any vacancy on the Joint Commission shall be filled by the choosing of a successor member in the same manner as his predecessor. Vacancies.

Sec. 303. The Joint Commission shall study the progress made in the implementation of the coinage program established by this Act, and shall review from time to time such matters as the needs of the economy for coins, the standards for the coinage, technological developments in metallurgy and coin-selector devices, the Duties.

availability of various metals, renewed minting of the silver dollar, the time when and circumstances under which the United States should cease to maintain the price of silver, and other considerations relevant to the maintenance of an adequate and stable coinage system. It shall, from time to time, give its advice and recommendations with respect to these matters to the President, the Secretary of the Treasury, and the Congress.

Appropriation.

Sec. 304. There are authorized to be appropriated to remain available until expended, such amounts as may be necessary to carry out the purposes of this title.

Approved July 23, 1965.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 509 accompanying H. R. 8926 (Comm. on Banking & Currency).
SENATE REPORT No. 317 (Comm. on Banking & Currency).
CONGRESSIONAL RECORD, Vol. 111 (1965):
June 23: Considered in Senate.
June 24: Considered and passed Senate.
July 13: H.R. 8926 considered in House.
July 14: Considered and passed House, amended, in lieu of H.R. 8926.
July 15: Senate concurred in House amendments.

EXHIBIT 8

TREASURY DEPARTMENT ORDER NO. 205, DELEGATION OF AUTHORITY TO PROCURE FOR THE MINTING OF CLAD COINS.

July 26, 1965.

By virtue of the authority vested in me as Secretary of the Treasury, including the authority in Reorganization Plan No. 26 of 1950, there is hereby delegated to Miss Eva Adams, Director of the Mint, without limitation, all the authority vested in the Secretary of the Treasury under section 103 of the Act of July 23, 1965, Pub. L. 89-81, relating to the procurement of equipment, manufacturing facilities, patents, patent rights, technical knowledge and assistance, metallic strip, and other materials necessary to produce rapidly an adequate supply of clad coins.

[SEAL]

Henry H. Fowler,
Secretary of the Treasury.

[F.R. Doc. 65-8646; Filed, Aug. 16, 1965; 8:48 a.m.]

EXHIBIT 9

TREASURY DEPARTMENT ORDER NO. 205-1, DELEGATION OF AUTHORITY TO PURCHASE METAL FOR COINAGE.

July 26, 1965.

By virtue of the authority vested in me as Secretary of the Treasury, including the authority in Reorganization Plan No. 26 of 1950, there is hereby delegated to the Director of the Mint, without limitation, all the authority vested in the Secretary of the Treasury under Rev. Stat. section 3528 as amended (31 U.S.C. 340) to purchase metal for coinage from the coinage metal fund, and all the authority vested in the Secretary under 41 U.S.C. 252(c) which may be delegated pursuant to 41 U.S.C. 257.

[SEAL]

Henry H. Fowler,
Secretary of the Treasury.

[F.R. Doc. 65-8647; Filed, Aug. 16, 1965; 8:48 a.m.]

EXHIBIT 10

TREASURY DEPARTMENT PRESS RELEASE, JULY 28, 1965, TREASURY ANNOUNCES CONTRACTS FOR MATERIALS TO START NEW COIN PRODUCTION NEXT WEEK.

The Treasury today announced the signing of procurement contracts expected to permit production of the new dimes and quarters, authorized in the Coinage Act of 1965, to begin late next week.

The contracts signed today were the first three of a group of contracts for the material required for production of the new dimes and quarters.

The new coins will be issued late this year and early in 1966.

The new dimes and quarters will have faces of the same copper-nickel alloy used in the current five cent piece, bonded to a core of pure copper. They will be manufactured from strips of the three layers of metal, bonded together and rolled to the required thickness.

Mint Director Eva Adams said:

"We are announcing today the signing of the first of several planned contracts with suppliers for the composite metal strip required for the new dimes and quarters.

"Negotiations are underway with other potential suppliers of cupronickel clad strip and also for supply of the silver-copper alloy strip required for the new half dollar.

"The Mint expects to get into production of the new 25 cent piece before the end of next week. This quick start was made possible by advance contingency planning by the Mint, and by advance preparations undertaken at their own risk by potential suppliers.

"We intend to make some 3-1/2 billion pieces of the new subsidiary coinage in the first year of production, and double that amount, if needed, in the second year. We will begin with the new quarter, and follow with the new dime and half dollar.

"Both the Philadelphia and Denver Mints will produce the new dimes and quarters, but the new half dollar will be made initially at Denver. The San Francisco Mint facilities will be used in the beginning for one cent and five cent pieces. This will release much of the Denver and Philadelphia equipment for production of the new coins while still continuing the production of current silver coins at the existing high rates of output. All Mint coinage facilities will continue on a 24 hour a day basis.

"Full production of the current silver coinage will continue meanwhile, until the new coins become available in sufficient quantities to meet all demands. We have some 12 billion silver coins in circulation now and we will add to that amount during the coming

year. The silver coinage will continue to circulate, side by side with the new coinage indefinitely into the future.

"We plan to place the new quarter in circulation late this year, and the new dime before mid-1966. Plans for the new half dollar, which will be 40 percent silver, are not yet complete, but output will begin at the Denver Mint as soon as supplies of silver clad strip become available. Until the Secretary of the Treasury determines that supplies of the new coins are adequate, none will bear mint marks."

Miss Adams announced signing of the following contracts:

--An initial contract with Metals and Controls, Inc., Attleboro, Massachusetts a subsidiary of Texas Instruments, Inc. of Dallas, Texas, approximately $30 million, for production at Attleboro.

--An initial contract with E. I. du Pont de Nemours and Company, of Wilmington, Delaware, approximately $3 million, for production primarily at Pompton Lakes, New Jersey.

--An initial contract with the Olin Mathieson Company of East Alton, Illinois, approximately $9 million for production at East Alton.

When facilities for producing clad metal strip at the new Mint to be built at Philadelphia come into being in 1968, clad strip required for the new coins will be produced there. Facilities for production of clad strip are also planned for the present Denver Mint. Procurement of strip outside the Mint will continue until the necessary Mint equipment becomes available.

The contracts announced today will provide the Mint with about 85 million pounds of cupronickel-on-copper strip.

Average costs of cladding the metal strip procured under these and other contracts under negotiation will fall within the range of 40 cents to 70 cents per pound estimated by the Treasury in its presentation to Congress on the coinage bill.

EXHIBIT 11

TREASURY DEPARTMENT PRESS RELEASE AUGUST 11, 1965, TREASURY ANNOUNCES ADDITIONAL CONTRACTS FOR COINAGE MATERIAL.

The Treasury today announced signature of the first contracts for procurement of materials for the new silver half dollar, approved in the Coinage Act of 1965. A further contract for procurement of materials for the new quarter and dime has also been completed.

Production of the new half dollar, which will be the silver standard bearer of the new fractional coinage, will be started at the Denver Mint this fall. The new 50-cent piece will be a composite coin, with faces of 80 percent silver and 20 percent copper, bonded to a core of 21 percent silver and 79 percent copper.

Two contracts have been signed for the purchase of the silver-copper on copper-silver alloy for this coin. They were:

--A contract for approximately $8 million with Engelhard Industries, Inc., of Newark, New Jersey, for production at plants in Newark and in Plainville, Massachusetts.

--A contract for approximately $3 million with Handy and Harman, of New York City, for production in its plant at Fairfield, Connecticut.

A $3 million contract for the supply of the composite metal strip needed for the new quarter and dime has been signed with Composite Metal Products, Inc., of Eighty-four, Pennsylvania. The new 10 cent and 25 cent pieces will have faces of the same 75 percent copper, 25 percent nickel alloy from which the 5 cent piece is made, bonded to a core of pure copper. On July 27 the Treasury announced the signing of three contracts for this material, amounting to approximately $42 million.

Production of the new quarters will begin this month at the Philadelphia Mint. The new coins will be issued late this year, or early in 1966, according to the need for coins.

When facilities for producing clad metal strip at the new Mint to be built at Philadelphia come into being the composite materials for the new coins will be produced there. Facilities for production of clad strip are to be added in the Denver Mint. Procurement of materials for the new coins will continue outside the Mint until facilities for its production become available.

EXHIBIT 12

TREASURY DEPARTMENT PRESS RELEASE, AUGUST 23, 1965, STATEMENT OF ROBERT A. WALLACE, ASSISTANT SECRETARY OF THE TREASURY, AT THE FIRST STRIKING OF COINS FROM THE NEW COINAGE MATERIAL U.S. MINT, PHILADELPHIA, PENNSYLVANIA.

The start of coin production from new coinage materials authorized by Congress this summer is a source of great satisfaction to the Treasury Department. It represents the result of a two year effort to develop and obtain the authorization of a satisfactory substitute for silver in the dime and quarter.

Had Congress not authorized the new material, Treasury stocks of silver would have been exhausted in less than three years. The elimination of silver in the dime and quarter, and the reduction of the silver content of the half dollar will make our silver supplies for coinage sufficient for the foreseeable future.

The new coins will have precisely the same purchasing power as current coins. They will work in all existing coin operated devices. From an esthetic point of view, the new dimes and quarters will be just as attractive and durable as the old.

The new half dollar, which will continue to contain silver, will be nearly indistinguishable from existing coins of this denomination.

All new coins will bear the date 1965.

The first of the new coins minted will be the quarter. Aside from the one-cent and five cent pieces, this is the key coin for commerce. By the end of December we expect to produce a half billion of these new quarters, a year's supply. These will be released through the banking system late this year or early in 1966. Production of the new dime and half dollar will begin late this year. Both coins are expected to be released before mid 1966.

Despite the large production of new quarters we are actually increasing the output of current quarters and dimes by 25 percent. Mint and Federal Reserve Bank inventories of these coins are nearly double the levels of a year ago. Nevertheless, the Treasury is continuing to increase their production in order to reduce any potential possibility of shortages in the future.

The Treasury is deeply grateful to the Congress for its quick action in the program, to the Bureau of the Mint for its help in the development of the new materials, especially to Mint employees for production records beyond our most optimistic expectations, and to our suppliers for their understanding of our problem and ability to produce the new material quickly.

EXHIBIT 13

TREASURY DEPARTMENT PRESS RELEASE, AUGUST 23, 1965, STATEMENT OF DIRECTOR OF THE MINT MISS EVA ADAMS AT THE FIRST STRIKING OF COINS FROM THE NEW COINAGE MATERIAL U.S. MINT, PHILADELPHIA, PENNSYLVANIA.

Production of the new quarter, authorized by the Coinage Act of 1965, started today at the Philadelphia Mint.

The new quarter will have the face of the same copper-nickel alloy used in the current five-cent piece and will be bonded to a core of pure copper. It will be manufactured from strips of three layers of metal, bonded together and rolled to the required thickness.

Production of the new fifty-cent piece of silver-copper clad on silver-copper is scheduled for sometime in November, at the Denver Mint. It will continue to be made of silver and copper, but will become a composite coin with the silver content reduced from 90 percent to 40 percent.

The ten-cent piece will be the last of the new alloy denominations to enter production. Having the same composition as the new quarter, the dime is scheduled to be struck in December. The new coins will all bear the 1965 date.

Reactivation of minting operations at the San Francisco Assay Office has been set for September 1, 1965. The one-cent piece to be struck there will constitute the first coins produced at the Assay Office since 1955 when coining operations were discontinued.

None of the new coins will be released to the public until a sizable supply is on hand for distribution. Meantime, the Mint is continuing production of the present coinage alloy, as authorized by the Coinage Act of 1965.

EXHIBIT 14

PRESIDENTIAL ANNOUNCEMENT CONCERNING THE DISTRIBUTION OF THE NEW QUARTER, OCTOBER 30, 1965.

President Johnson announced today that circulation of the new 25 cent piece authorized by the Coinage Act of 1965 will begin Monday, November 1.

The new--nonsilver--quarter dollar will be added to the circulation of the traditional 90 percent silver quarter. Both the old and the new quarters are to circulate together.

Approximately 230 million pieces of the new quarter will be distributed during the week beginning November 1. Initial distribution will be backed by production that will rise from 28 million to 60 million pieces a week during November, and will be still higher thereafter.

The number of new quarters ready for initial distribution is 10 times current inventories of 25 cent pieces available for use. The supply of quarters will be augmented by continued production of silver 25 cent pieces.

Introduction of the nonsilver quarter will make the first basic change in the Nation's coinage since the United States monetary system was established in 1792. All coins above 5 cents value since then have contained 90 percent silver.

The new quarters will be placed into use in the way that coins normally move into circulation, by distribution, on the basis of needs for coins, through the 36 Federal Reserve Banks and branch banks to commercial banks, and from commercial banks to individuals and businesses. As the new coinage is to circulate interchangeably with silver coins, deliveries of quarters to commercial banks, now and in the future, will consist of both the nonsilver and the silver coins.

The Mint has allocated initial supplies of the new quarters to the Reserve Banks on the basis of the population of the areas served by each Reserve Bank or branch bank. Plans

call for deliveries of further supplies of the new coin from the Mint to Reserve Banks to continue on this basis.

Faster than anticipated production of the new quarters permitted their introduction about a month earlier than previously expected. The initial 230 million of the new coins being distributed by the Federal Reserve Banks was made in 70 days following the beginning of production on August 23. This initial supply is equal to a third of the record output of 714 million quarters produced in the full 12 months of fiscal year 1965, which ended last June. Production of the new quarters will rise to a quarter of a billion pieces a month hereafter.

The new quarter dollar is a three-layered coin. The outer faces are the same alloy used for the 5 cent piece--75 percent copper and 25 percent nickel. The cupronickel faces are bonded to a core of pure copper, giving the new coin a copper colored edge.

The new 25 cent piece is full legal tender, equal in all monetary respects to the silver quarter. It was engineered to work in all coin operated devices set to operate with silver coins.

The new quarter is the same size as the silver quarters, and bears the same design. The head of George Washington appears on one side with the date, and the words "Liberty" and "In God We Trust"; on the other side, an eagle with spread wings, clutching a bundle of arrows, above crossed olive branches, and the words, "Quarter Dollar," "United States of America," and "E Pluribus Unum."

All United States silver coins now being produced are dated 1964. The new coins will be dated 1965 until all shortages disappear.

NOTE: The announcement was released at Austin, Tex.

EXHIBIT 15

TREASURY DEPARTMENT PRESS RELEASE, OCTOBER 30, 1965, FOR RELEASE OCTOBER 31, 1965, BACKGROUND TO WHITE HOUSE ANNOUNCEMENT THAT CIRCULATION OF THE NEW 25 CENT PIECE WILL BEGIN ON NOVEMBER 1.

The new quarter was placed in circulation when a massive initial supply was available, backed up by a very large production stream.

The Mint will be able to provide approximately half a billion additional pieces of the new coin for circulation within two months of the initial distribution.

The traditional silver dimes, quarters and half dollars are to circulate side-by-side, interchangeably, with the new coinage.

The silver coinage will not be withdrawn. On the contrary, production of silver coins is continuing at high rates, and at least 13 billion pieces of silver coins will be in circulation before production is ended. Much of this circulating silver coinage will have been made in the last three years of greatly increased output, and these coins can continue in use for the normal 25 year life of a silver coin.

The Treasury still has very large stocks of silver--nearly 900 million ounces--and is authorized by the Coinage Act of 1965 to use these stocks to keep the price of silver below the point at which it would become profitable to melt the silver coinage for its silver content.

The Coinage Act of 1965 gives the Treasury authority to forbid the melting or export of United States coins. This authority has not been exercised.

The new dime, to go into circulation early in 1966, will be made of the same alloy as the new quarter.

The new half dollar will be faced with layers of 80 percent silver and 20 percent copper, bonded to a core of approximately 79 percent copper and 21 percent silver, giving an overall 40 percent silver composition.

Like the new quarter, the new dime and half dollar will also have the same designs as the silver coins they succeed. All the new coins will be the same size as their silver counterparts. The dime and quarter are 9.3 percent lighter and the half dollar is 8 percent lighter.

The 90 percent silver dollar remains without change as a part of the United States coinage, but the Coinage Act of 1965 forbids production of silver dollars for five years.

Pennies and nickels are unchanged.

The non-silver dimes and quarters, and the low silver content half dollar, were adopted in the Coinage Act of 1965 due to a world silver shortage. In 1964, new silver production was less than half as much as total annual silver usage in the free world. Most other nations have removed most or all the silver from their coinage in recent years.

The United States was able to continue making 90 percent silver dimes, quarters, and half dollars because the silver could be supplied from stocks owned by the Treasury. The changeover became necessary in the United States when, early this year, the Treasury's silver stock became equal to less than a three year supply at current expanded rates of demand for coinage.

EXHIBIT 16

TREASURY DEPARTMENT PRESS RELEASE, SEPTEMBER 1, 1965, STATEMENT BY DIRECTOR OF THE MINT MISS EVA ADAMS AT CEREMONIES REACTIVATING MINTING OPERATIONS AT THE SAN FRANCISCO ASSAY OFFICE.

Reactivation of minting operations at the San Francisco Assay Office, authorized by the Coinage Act of 1965, began today, September 1, 1965. The one-cent pieces to be struck here will constitute the first coins produced at the Assay Office since 1955, when coining operations were discontinued. Four new stamping presses are to be in operation. Later, five-cent pieces will also be struck at the San Francisco Office.

Production of the new quarter started August 23 at the Philadelphia Mint. The new quarter has the face of the same copper-nickel alloy used in the current five-cent piece and is bonded to a core of pure copper. It is manufactured from strips of three layers of metal, bonded together and rolled to the required thickness.

Production of the new fifty-cent piece of silver copper clad on silver copper is scheduled for later in the year, at the Denver Mint. It will continue to be made of silver and copper, but will become a composite coin with the silver content reduced from 90 percent to 40 percent.

The ten-cent piece will be the last of the new alloy denominations to enter production. Having the same composition as the new quarter, the dime is scheduled to be struck later this year.

The new coins all bear the 1965 date. None of them will be released to the public until a sizable supply is on hand for distribution. Meantime, the Mint is continuing production of the present coinage alloy, as authorized by the Coinage Act of 1965.

The newly minted pennies from San Francisco, however, like those made in Denver and Philadelphia, will go immediately into circulation. The penny and the nickel are not changed in composition by the new legislation.

EXHIBIT 17

TREASURY DEPARTMENT PRESS RELEASE, SEPTEMBER 16, 1965, FOR RELEASE SEPTEMBER 17, 1965, GROUNDBREAKING FOR A NEW MINT AT PHILADELPHIA.

Ground will be broken today (Friday, September 17, 11:30 a.m. E.D.T.) in Philadelphia for the world's biggest and most modern Mint, by Joseph W. Barr, the Under Secretary of the Treasury. Others participating will include James H. J. Tate, Mayor of Philadelphia, Robert A. Wallace, Assistant Secretary of the Treasury, Miss Eva B. Adams, Director of the Mint and Michael H. Sura, Superintendent of the Philadelphia Mint.

The new $37 million plant will take the place of the present Philadelphia Mint, now 64 years old.

EXHIBIT 18

TREASURY DEPARTMENT PRESS RELEASE, SEPTEMBER 17, 1965, REMARKS OF THE HONORABLE JOSEPH W. BARR, THE UNDER SECRETARY OF THE TREASURY, AT GROUNDBREAKING FOR A NEW MINT AT PHILADELPHIA.

Mr. Chairman, Mayor Tate, Members of the Congress, Commissioner Cohen, Miss Adams, Mr. Sura and other friends gathered here, I very much hope that you will believe that I do much more than express a well worn convention when I tell you that I am delighted to be here to share with you a propitious event. The facts are that this is a delightful and propitious occasion, and that I take a very real pleasure in being with you to share in it.

Because getting started on the building of this new Mint is a matter of such importance to the City of Philadelphia, and to the nation at large, I want to draw attention to some, at least, of the people present here today who have made it possible for us to get started at this early date.

I will begin with Mayor James Tate, because without his work on its behalf, we could not be here today to break ground for the new Mint. At the time in 1963 when Mayor Tate set aside this site for a new Mint, as part of the redevelopment of downtown Philadelphia, the urgency that has since increasingly overtaken it, in the form of a coin shortage, was only beginning to be felt. However, the existing 64-year-old Mint was getting no younger, and Philadelphia wanted to get on with its renewal program. After 1963, as the coin shortage worsened, increased Mint capacity became a pressing national need.

Secretary Wallace, Mint Director Adams, and the Superintendents of the Philadelphia and the Denver Mints--Mr. Sura, Superintendent of the Philadelphia Mint is here with us--turned to, and, with the Mint's fine staff in Washington, in the Philadelphia and Denver Mints, and in the San Francisco Assay Office have done what can only be described as a heroic job. They succeeded in pushing existing Mint production capacity beyond all previous estimates in meeting, as they have, the mounting demand for coins to keep our growing and changing economy going smoothly at the retail level.

But despite these ingenious and massive accomplishments, our existing coin making capacity is definitely not adequate to satisfy the demand for coins on an efficient and economical basis.

It was for these reasons that the Philadelphia Redevelopment Authority re-drew the boundaries of the Independence Mall Urban Renewal Area late in 1963 to move this site on which we stand today to the immediate action stage.

This involved relocation of some 70 businesses, which Mayor Tate managed with skill and energy to get relocated so that this site could be cleared, as it was, by the middle of August this year.

Another hard worker in this vineyard has been Representative Byrne, in whose district we stand. I served with him in the Congress, as I did with Congressmen Barret, Nix and Toll, also of the Philadelphia delegation. I did not have the pleasure of serving in the Congress with Representative Green, but I know from my experience in the Executive Branch that he and the rest of the Philadelphia delegation in the House, stand out for the hard work and the zeal with which they look out for this city's interests.

Let me add just one more, and very well deserved, word of thanks. This is to the Old Philadelphia Development Corporation, headed by Mr. William Day, which is developing the Mall. Much that we are doing today had its roots in the efforts of Mr. Day and of the Old Philadelphia Development Corporation, and I would not want this role to be forgotten.

The new Mint that will go up on this site is scheduled for coin production by mid-1967. It is going to cost 37 million dollars. It will be the world's foremost Mint: the world's biggest and the world's most productive.

The new Philadelphia Mint will be the fourth Mint in this city, which was the site of the Nation's first Mint.

The first Philadelphia Mint, in turn, was the first building erected in the United States for public use, under authority of the federal government.

The site for the first United States Mint, at Seventh Street near Arch--only a few hundred feet from where we will break ground today for the fourth Mint structure in Philadelphia--also had to be cleared, but under somewhat different conditions. On July 19, 1792, destruction began on an old distillery building which was then located on the site chosen for the first Philadelphia Mint. Some of the junk of the old distillery was sold for one dollar, which the Mint Director, David Rittenhouse, directed should be laid out for punch for the bricklayers and other workmen.

After forty years at the original location, the Mint came uptown to a newly erected building at the northwest corner of Chestnut and Juniper. The cornerstone for this was laid July 4, 1829, but it was not finished and occupied until 1833.

By the end of the 19th Century the Nation again needed a bigger Mint at Philadelphia. So the Philadelphia Mint now to be replaced was begun in 1898 and completed in September, 1901.

The new Philadelphia Mint is a prime example of what President Johnson is demanding throughout the government: more service, and better service to a growing country, at lower cost. That is a big order--most of President Johnson's orders are on the big side. But the new Mint will demonstrate, as is constantly being demonstrated, that the President's insistence upon these hard accomplishments sets tasks that are difficult, but not impossible. We are achieving more and better service, meeting the growing demands of a growing population and of a growing economy, at lower costs, and this Mint will be an outstanding example.

We are using ingenuity to try to make the Mint, when it enters operations, the last word in coin production. To do this, Secretary Wallace and Mint Director Adams, who are responsible for planning the new Mint, have approved orders for the building of an entirely new type of coin press, capable--if it works as it is expected to work--of turning out the fantastic number of 10,000 pennies a minute: not an hour, or a day, but a minute. That compares with production of 300 a minute, the best existing machines can do.

No one knows yet, for sure, whether these presses will immediately perform up to expectations, or whether they will require a development period. But we are planning for them on a contingency basis. At the same time, Mr. Wallace and Miss Adams have developed parallel plans for the installation of other facilities to yield the required coin production, if the new type of penny coin presses cannot be brought into use immediately.

This is merely one example of many new features of the Mint that is now to be built in this city. It will be capable of doubling the capacity of the present Mint, without a bigger payroll. It will produce at 15 to 20 per cent less cost per unit of output. It will allow an unimpeded production flow, through a first floor production space 50 feet high and 600 feet long, with almost as much additional space on other floors for laboratories, offices, die making, coin storage and other supporting activities.

The new Mint will be able to produce the three layer metal strip needed for our new dimes, quarters and half dollars, as well as the bronze alloy strip metal needed for

pennies and the cupronickel strip needed for five cent pieces. The material for our new coins must be bought outside the Mint until this plant comes into production. The new Philadelphia Mint will be capable of making coins of all denominations, from the melting, casting, and rolling of coinage alloy to production of the finished coin.

At the new Mint, ingots that are 17 feet long and that weigh 5,400 pounds will be cast, compared to the present capability for casting ingots five feet long, weighing 400 pounds. The new Mint's strip making machines will roll these ingots to finished coin thickness five times as fast as at present. It will be fully mechanized for the handling and storage of materials. The coins produced by the new Mint will be weighed automatically, and automatically inspected. The new Mint's capacity will be such that it can serve the coin needs of the whole country east of the Mississippi, making a considerable saving in the costs now incurred in moving coin materials, coin blanks and coins to and from the Philadelphia and Denver Mints and the San Francisco Assay Office.

A good deal more could be said, for the new Mint will be a treasure house of advanced production and handling techniques, and will have a good many other features besides: for instance, all of its operations will be visible from the visitors' gallery. But I want, in closing, to mention another Treasury activity in Philadelphia.

In North Philadelphia the Internal Revenue Service recently put into operation an Automatic Data Processing Center, for the better and lower cost handling of tax returns, built at a cost of 3 million dollars.

Among other things, this ADP center serves the purpose of insuring that the honest citizen has to pay the government no more than his own fair share of the tax burden. This installation, one of seven of its kind in the country, is playing a vital role in strengthening federal tax administration.

At peak employment during the height of the income tax filing period, the center employs as many as 2500 people.

At the Philadelphia ADP Center the returns of 15 million taxpayers in a region including Pennsylvania, Delaware, New Jersey, Maryland, Virginia, and the District of Columbia are processed. These returns represent $16 billion in federal taxes. At the service center information from the returns is transcribed into punched cards, converted to magnetic tape, and forwarded to the national computer center in Martinsburg, West Virginia where it is included in a master file of all taxpayers throughout the country. Resulting tapes sent from Martinsburg to Philadelphia are the source of the refund checks or bills which taxpayers receive.

This system will not be fully installed until 1967, but results of it even as it now stands more than justify the expenditures for building costs, acquisition of computers and payroll expenses.

As the system comes into operation, it relieves Internal Revenue's district offices from paper handling burdens and permits them to concentrate more effectively on taxpayer services and informational activities.

The breaking of ground for this new Mint starts the building of a great new government facility that will serve the nation at high efficiency and low cost, to produce one of the basic needs of a vigorous and growing nation such as ours: an abundant coinage.

This new Mint stands as a symbol of your government's interest and heavy participation in the rebuilding and beautification of this fine old city. The building that will house the new Mint has been designed carefully to fit in with the artistic spirit of the redevelopment of Independence Mall, where all the fathers of our country tread time and again, and where Benjamin Franklin was a daily figure during so much of his life.

This is a partnership in city improvement that is part and parcel of the Great Society to which President Johnson has put his hand. And this new Mint is the kind of lower cost, higher efficiency government service facility that, in step with similar advances in the private sector, is making the Great Society a practical thing: it raises the standards of service and abundance to the higher levels that must be typical of a Great Society, while it makes the savings that permit the building of the Great Society on a sound financial structure.

EXHIBIT 19

TREASURY DEPARTMENT ORDER NO. 205-2, DELEGATION OF AUTHORITY TO PURCHASE SILVER BULLION.

By virtue of the authority vested in the Secretary of the Treasury by Reorganization Plan No. 26 of 1950, and by virtue of the authority vested in me as Assistant Secretary of the Treasury by Treasury Department Order No. 190 (Revision 2), there is hereby delegated to the Director of the Mint, and to the superintendents and officers in charge of the mints and assay offices of the United States, the authority vested in the Secretary of the Treasury under section 3526 of the Revised Statutes, as amended by section 205 of Public Law 89-81, relating to the purchase by the Secretary of the Treasury of silver bullion with the bullion fund.

The Director, and the superintendents and officers in charge, may redelegate the authority hereby delegated to them.

Dated: August 18, 1965.

[SEAL]

Robert A. Wallace,
Assistant Secretary
of the Treasury.

[F.R. Doc. 65-8926; Filed, Aug. 23, 1965; 8:48 a.m.]

EXHIBIT 20

Public Law 89-251
89th Congress, H. R. 10748
October 9, 1965

AN ACT

79 STAT. 972.

To authorize the transfer of copper from the national stockpile to the Bureau of the Mint.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Administrator of General Services is hereby authorized to transfer to the Bureau of the Mint approximately one hundred ten thousand short tons of copper now held in the national stockpile. Such transfer may be made without regard to the provision of section 3 (e) of the Strategic and Critical Materials Stock Piling Act (50 U.S.C. 98b (e)) that no disposition of materials held in the national stockpile shall be made prior to the expiration of six months after the publication in the Federal Register and the transmission to the Congress and to the Armed Services Committee of each House thereof of the notice of the proposed disposition required by said section 3 (e).

Copper. Transfer to Bureau of the Mint.

60 Stat. 597.

Publication in Federal Register.

Approved October 9, 1965, 6:35 a.m.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 966 (Comm. on Armed Services).
SENATE REPORT No. 775 (Comm. on Armed Services).
CONGRESSIONAL RECORD, Vol. III (1965):
Sept. 20: Considered and passed House.
Sept. 24: Considered and passed Senate.

EXHIBIT 21

TREASURY DEPARTMENT PRESS RELEASE, OCTOBER 28, 1965, FOWLER MEDAL ADDED TO MINT SERIES.

The Bureau of the Mint today placed on sale a portrait medal of Secretary of the Treasury Henry H. Fowler.

The medal is the latest in a series honoring Presidents, other public officials, heroes and outstanding citizens, and recording events of national historic significance, that have been issued by the Mint since 1860. The medal is of Mint bronze, three inches in diameter.

The obverse, or front, of the Fowler medal shows a front view portrait of the Secretary executed by Frank Gasparro, Chief Sculptor of the Mint. "Henry H. Fowler" is inscribed above the portrait and around the border.

The reverse, or back, notes the Treasury Secretary's place and date of birth and traces the main events of his service in the Federal government, where half of Mr. Fowler's career to date has been spent. While not in government, he practiced law in Washington, D.C. in the years 1933 and 1934, 1946 to 1951, and 1953 to 1961.

In the center of the reverse side of the medal is the seal of the Treasury, surrounded by the inscription, "Henry H. Fowler, Secretary of the Treasury, April 1, 1965," the date he took office.

Around the border, clockwise from the top, are governmental seals and inscriptions noting earlier periods of public service. At the top is the Great Seal of the United States, followed by the inscription, "Und. Secretary of Treasury 1961-1964." Next, clockwise, is the seal of the Secretary's native state, Virginia, where Mr. Fowler attended school and college, with the inscription "Roanoke, Va., Sept. 5th 1908," the place and date of his birth.

Other parts of the reverse design note Mr. Fowler's service with the Tennessee Valley Authority, 1934-1939; the Department of Justice 1939-1941; the Federal Power Commission, 1940-41; Office of Production Management, War Production Board and Foreign Economic Administration 1941-1945; the Department of Commerce, where Mr. Fowler was Administrator of the National Production Authority in 1952; Defense Production Administration and Office of Defense Mobilization, both of which he headed in 1952-1953, and the National Security Council, 1952-1953.

The reverse of the medal is the work of Edgar Z. Steever of the Engraving Department of the Philadelphia Mint.

The medal may be purchased from the Superintendent, United States Mint, Philadelphia, Pennsylvania, over the counter or through the mail, for $3.00. The price includes shipping costs.

Medals have been made for each Secretary of the Treasury since 1897, with the exception of D. F. Houston, who served a brief term in 1920-1921.

EXHIBIT 22

ANNUAL ASSAY COMMISSION MEETING FOR 1965.

On February 10, 1965, the Annual Assay Commission, appointed by the President of the United States, examined and tested the weights and finenesses of silver coins manufactured during the calendar year 1964. This historical trial of the coins, required by section 3547, as amended, of the Revised Statutes of the United States, is the official test by private citizens to assure the public that coins have been manufactured in accordance with law.

From the total 1,394,717,350 subsidiary silver coins manufactured during 1964, there were 139,719 coins reserved for the annual trial. A representative sample of coins was

selected and tested by the Committees on Counting, Assaying, and Weighing. The Committees reported that the coins met fully the prescribed legal standards, and that the trial was entirely satisfactory.

The ex-officio members of the 1965 Assay Commission included the Honorable Thomas J. Clary, Chief Judge of the District Court for the Eastern District of Pennsylvania, Philadelphia, Pennsylvania; the Honorable James J. Saxon, Comptroller of the Currency, Washington, D.C.; and Mr. Paul J. Maguire, Assayer, United States Assay Office at New York City.

Other members of the Commission were as follows:

Mrs. Catherine E. Bullowa, Philadelphia, Pennsylvania
Mrs. Carolyn Carter, Washington, D.C.
Mr. Melvin Fuld, Baltimore, Maryland
Mrs. Miriam L. Gilmore, Weslaco, Texas
Mr. William C. Hatcher, Kinston, North Carolina
Mr. Ray M. Janda, Kansas City, Missouri
Mr. Malcolm W. Jensen, Potomac, Maryland
Dr. J. Hewitt Judd, Omaha, Nebraska
Mr. Alex Kaptik, Philadelphia, Pennsylvania
Mr. Norman H. Kirby, Cape Girardeau, Missouri
Mr. Martin F. Kortjohn, New York, New York
Mrs. Betty C. Lefman, Kansas City, Missouri
Mr. Joseph J. Litvany, Glen Ridge, New Jersey
Mr. Philip J. More, Evanston, Illinois
General M. Stanley Newton, Brattleboro, Vermont
Mr. Charles J. Ricard, Northbrook, Illinois
Mr. Edward C. Rochette, Iola, Wisconsin
Mr. Leon Rosenblum, Fair Lawn, New Jersey
Mr. Ben Stack, New York, New York
Mr. John Martin Sullivan, Jr., Santa Barbara, California
Dr. Moddie Taylor, Washington, D.C.

EXHIBIT 23

TREASURY DEPARTMENT ORDER NO. 205-3, DELEGATION OF AUTHORITY TO PURCHASE CERTAIN EQUIPMENT AND FACILITIES.

December 2, 1965.

By virtue of the authority vested in the Secretary of the Treasury, including the authority in Reorganization Plan No. 26 of 1950, and by virtue of the authority vested in me as Assistant Secretary of the Treasury by Treasury Department Order No. 190 (Revision 3), there is hereby delegated to the Director of the Mint, without limitation, all the authority vested in the Secretary by the Act of August 20, 1963, Pub. L. 88-102, § 1, 77 Stat. 129 (31 U.S.C. 291) to furnish and equip the buildings described therein with all the necessary coinage and other special equipment and facilities. Any action heretofore taken by the Director of the Mint which involved the exercise of authority hereby granted is affirmed and ratified.

[SEAL]

Robert A. Wallace,
Assistant Secretary of the Treasury.

[F.R. Doc. 65-13170; Filed, Dec. 8, 1965; 8:46 a.m.]

EXHIBIT 24

TREASURY DEPARTMENT PRESS RELEASE, DECEMBER 28, 1965, FOR RELEASE DECEMBER 29, 1965, ONE AND FIVE CENT COINS TO BE DATED 1965.

Assistant Treasury Secretary Robert A. Wallace announced that, beginning today, one-cent and five-cent coins will be dated 1965 instead of 1964.

The 1964 date has been used on pennies and nickels thus far this year to avoid worsening shortages of these coins, now largely overcome. This will permit coins of these denominations to bear the same date as the new dimes, quarters and half dollars, authorized by the Coinage Act of 1965.

Penny and nickel inventories are sufficient to permit this move. However, supplies of dimes, quarters and half dollars are not yet adequate to change the 1965 date to 1966.

Coins of all denominations will resume normal dating when there are enough in the pipelines to assure protection against shortages.

EXHIBIT 25

TREASURY DEPARTMENT PRESS RELEASE, DECEMBER 28, 1965 FOR RELEASE DECEMBER 29, 1965, FIRST STRIKING OF HALF DOLLARS FROM NEW COINAGE MATERIAL AT THE U.S. MINT AT DENVER ON THURSDAY.

Production of the new half dollar, authorized by the Coinage Act of 1965, will start on Thursday, December 30, at 10:00 a.m. at the Denver Mint.

The new half dollar will continue to bear the Kennedy design approved by the Congress two years ago. Coin designs are retained for 25 years unless the Congress directs an earlier change.

The new half dollar will contain 40 percent silver compared to the traditional 90 percent silver half dollars. However, in appearance the new coin will be nearly identical to the old half dollar as it will have outer layers of 80 percent silver. The core will be 21 percent silver--lowering total silver content to 40 percent.

All of the new half dollars will bear the date 1965 until the shortage of this denomination has been overcome. Some 390 million 90 percent silver Kennedy half dollars made during 1964 and 1965 all bear the date 1964.

The new half dollars will be placed in circulation early next year. They will be shipped to the Federal Reserve Banks and branch banks and will be used by them in their regular weekly coin shipments to supplement the supply of circulating half dollars, through the medium of commercial banks, throughout the country.

This was the procedure followed in issuing the first of the three new coins--the 25-cent piece--authorized by the Coinage Act of 1965. Production of the new quarter, which has cupronickel faces bonded to a core of pure copper, began August 23, 1965 and circulation began November, 1965. In the past two months, over 400 million of the new quarters have been placed in circulation. The Philadelphia Mint has begun minting of the new, non-silver dime--also with cupronickel faces clad on a core of pure copper. Circulation of this coin is also expected to begin early in the new year.

The new dimes, quarters and half dollars are three layer, "clad" coins because this construction permits duplication in a non-silver coin, or a coin with low silver content, of the electrical properties of coins of 90 percent silver. This allows the new coins and the old; 90 percent silver coins, to be used interchangeably in coin operated devices.

The switch to coins of lower silver content, or none, was made necessary by a growing world silver shortage.

The silver coinage will continue to circulate, side-by-side with the new coinage.

The Coinage Act of 1965, which became law on July 23, 1965, made no change in the penny, the nickel or the silver dollar. There are no plans at present for minting of silver dollars.

Like the Kennedy half dollars dated 1964, those dated 1965 will not bear a mintmark. The Coinage Act of 1965 specifies that no mintmarks will be authorized until five years from the date of initial issuance.

REPORT OF THE DIRECTOR OF THE MINT ON THE WORLD'S MONETARY STOCKS OF GOLD, SILVER, AND COINS IN 1964

219-995 O - 66 - 14

The World's Monetary Stocks of Gold, Silver, and Coins in 1964

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SOURCES OF DATA

Annual data are secured directly from foreign governments by the United States Mint on special Interrogatories sent through diplomatic channels of the United States Department of State to foreign service officers stationed abroad. From the basic data reported on the Interrogatories the Mint compiles the series of world tables listed in the contents. Supplemental information is also obtained from official documents and publications of government mints, central banks, treasuries, and other monetary agencies; international monetary institutions; and bullion dealers and trade organizations concerned with gold and silver.

Statistics on world production of gold and silver are provided by the Bureau of Mines, United States Department of the Interior.

Grateful acknowledgment is made to the individual contributors.

Eva Adams
Director of the Mint

List of Government Coinage Mints of the World

Country	Name of Mint	Location
United States.....	Office of Director of the Mint[1].....	Treasury Department, Washington, D.C. 20220.
Do.....	Philadelphia Mint.....	16th and Spring Garden Sts., Philadelphia, Pennsylvania 19130.
Do.....	Denver Mint.....	Colfax and Delaware Sts., Denver, Colorado 80204.
Do.....	San Francisco Assay Office (Minting operations, Sept. 1, 1965).	155 Hermann St., San Francisco, California 94102.
	Mint institutions with other operations:	
Do.....	Fort Knox Bullion Depository (Gold storage, etc.).	
Do.....	New York Assay Office (Electrolytic refining of gold & silver, etc.).	
Do.....	West Point Bullion Depository (Silver storage, etc.).	
Afghanistan.....	Royal Afghan Mint.....	Kabul.
Argentina.....	Casa de Moneda de la Nacion.....	Avenida Antartida, Buenos Aires.
Australia.....	Royal Mint, Melbourne Branch.....	280 William St., Melbourne, C.1, Victoria.
Do.....	Royal Mint, Perth Branch.....	Hay St., Perth, Western Australia.
Do.....	Royal Australian Mint.....	Canberra.
Austria.....	Osterreichisches Hauptmünzamt.....	Vienna III, Am Heumarkt 1.
Belgium.....	Administration des Monnaies.....	95, Rue Hotel des Monnaies, Bruxelles 6.
Bolivia.....	Casa de la Moneda de Potosi.....	Potosi.
Brazil.....	Casa da Moeda.....	Praca da Republica, 173, Rio de Janeiro.
Canada.....	Royal Canadian Mint.....	320 Sussex Drive, Ottawa 2, Ontario.
Chile.....	Casa de Moneda de Chile.....	Quinta Normal, Santiago.
China, Republic of.	Central Mint of China.....	44 Chiu Chuan Street, Taipei, Taiwan.
Colombia.....	Casa de Moneda.....	Calle 11, No. 4-93, Bogota.
Denmark.....	Den Kongelige Mønt.....	Amager Boulevard 115, Copenhagen, S.
Egypt.....	Minting House.....	Abbassia, Cairo.
Finland.....	Suomen Rahapaja.....	Kanavakatu 4, Helsinki.
France.....	Monnaie de Paris.....	11, Quai de Conti, Paris 6.
Do.....	Atelier Annexe de Beaumont-le-Roger.....	Department of Eure.
Germany, Fed. Rep..	Bayerisches Hauptmünzamt.....	Munchen, Hofgraben 4.
Do.....	Staatliche Münze.....	Stuttgart, Neckarstrasse 19.
Do.....	Staatliche Münze.....	Karlsruhe, Stephanienstrasse 28.
Do.....	Hamburgische Münze.....	Hamburg 1, Nordkanalstrasse 50.
Guatemala.....	Casa Nacional de Moneda.....	6a. Calle No. 4-28, Zona 1, Guatemala City.
India.....	Indian Government Mint.....	Bombay.
Do.....	....do.....	Alipore (Suburb of Calcutta).
Do.....	....do.....	Hyderabad (Deccan).
Iran.....	Imperial Iranian Mint.....	Tehran.
Israel.....	Israel Mint.....	Hakirya, Tel-Aviv.
Italy.....	La Zecca.....	Via Principe Umberto, 4, Rome.
Japan.....	Mint Bureau.....	1 Shinkawasakicho, Kita-ku, Osaka.
Do.....	Tokyo Branch.....	3277, 1 chome, Nishisugamo, Toshimaku, Tokyo-to, Tokyo.
Do.....	Hiroshima Branch.....	Itsukamachi, Saheki-gun, Hiroshima Prefecture.
Do.....	Kumamoto Sub-branch (Refining, etc.).....	Shinminami, Sendanbata-cho Kumamoto City, Kumamoto Prefecture.
Mexico.....	Casa de Moneda.....	Calle del Apartado No. 13, Mexico, D. F.
Nepal.....	His Majesty's Mint, Dharahara.....	Kathmandu.
Netherlands.....	's Rijks Munt.....	Leidseweg 90, Utrecht.
Nigeria.....	Nigerian Security Printing and Minting Company, Ltd.	Victoria Island, Lagos.
Norway.....	Den Kongelige Mynt.....	Kongsberg.
Pakistan.....	Pakistan Mint.....	Baghban Pura, Lahore (Punjab).
Peru.....	Casa Nacional de Moneda.....	Junin 791, Lima.
Portugal.....	Casa da Moeda.....	Avenida Dr. Antonio Jose de Almeida, Lisbon 1.
South Africa, Republic of.....	South African Mint.....	P.O. Box 464, 103 Visagie St., Pretoria.
Spain.....	Fabrica Nacional de Moneda y Timbre.....	Jorge Juan 106, Madrid 9.
Sudan.....	Sudan Mint.....	P.O. Box 43, Khartoum South.
Sweden.....	Kungl. Mynt-och justeringsverket.....	Box 22055, Stockholm 22.
Switzerland.....	Swiss Federal Mint.....	28, Bernastrasse, Bern 3003.
Thailand (Siam)....	Royal Mint.....	No. 4 Chao Fah Road, Bangkok.
Turkey.....	Darphane ve Damga Pulu Matbaasi Sultanahmet.	Istanbül (New Mint under construction).
United Kingdom.....	Royal Mint.....	London, E. C. 3, England. (See also Australia).

[1]Functions of Bureau of the Mint are: Manufacture, distribution, and redemption of domestic coins; receipt, processing, custody, disbursement, and movement of gold and silver; manufacture of national medals including special medals authorized by Congress and medals for U.S. Government agencies; manufacture of foreign coins; assays of ores for the public; and other technical services.

Summary--Coinage of Nations during the calendar year 1964[1]

Country	Number of coins minted	Gross weight of coins--in short tons
United States of America	5,595,585,400	23,768.9
Africa, East	26,202,000	197.6
Africa, Equatorial	7,000,000	30.9
Africa, West--Monetary Union of	15,000,000	36.4
Argentina	78,976,445	455.6
Australia	158,485,200	1,227.4
Austria	74,839,981	280.2
Belgium	91,910,000	313.7
Bermuda	470,000	11.7
British Honduras	615,000	2.6
Burma	62,162,500	317.5
Canada	665,402,790	2,791.3
Caribbean Territories, Eastern Group	6,917,500	42.9
Ceylon	71,300,000	281.0
Chile	68,138,000	391.3
China, Republic of (Taiwan)	54,200,000	258.0
Colombia	112,525,350	506.1
Comoro Archipelago	3,200,000	10.2
Congo, Dem. Rep. of the (Leopoldville)	3,000,000	12.6
Cyprus	12,500	.1
Denmark	146,884,055	779.0
Ecuador	40,000,000	203.9
Egypt (United Arab Republic)	29,635,016	139.6
Ethiopia	16,752,000	85.2
Fiji	672,000	4.7
Finland	78,208,000	233.5
France	527,987,000	2,687.6
French Somaliland	62,500	.2
Germany, Federal Republic	691,246,856	2,577.6
Ghana	42,250,000	170.7
Greece	22,132,000	51.4
Guatemala	6,710,457	22.7
Hong Kong	24,900,000	135.9
Iceland	4,800,000	13.9
India	1,541,320,000	4,294.0
Iran (year ended Mar. 20, 1964)	34,442,415	137.3
Iraq	4,000,000	29.8
Ireland, Republic	32,960,000	282.5
Israel	29,608,728	68.4
Italy	74,980,000	604.2
Jamaica	1,920,000	11.1
Japan	2,698,200,000	6,970.3
Jersey	2,400,000	21.5
Jordan	6,018,000	47.0
Kuwait	2,940,000	10.5
Libya	2,305,000	12.6
Luxembourg	80,050	1.3
Malawi	8,447,000	74.1
Malaysia	106,960,000	353.6
Mauritius	2,200,000	12.5
Mexico	184,807,500	1,356.4
Morocco	23,685,500	93.1
Muscat	479,000	10.2
Nepal	30,409,773	102.4
Netherlands	171,800,000	503.2
Netherlands Antilles	500,000	8.8
New Zealand	45,480,000	348.3
Nicaragua	9,000,000	36.4
Nigeria	146,437,200	1,002.9
Norway	54,027,000	304.6
Pakistan	230,350,130	763.5
Peru	50,032,511	250.6
Philippines	63,400,000	246.3
Portugal	48,748,000	200.1
Portuguese Timor	600,000	4.6
Reunion	5,250,000	30.1
Rhodesia	51,008,192	448.9
Rwanda	13,000,000	105.8
Seychelles	100,000	.5
Sierra Leone	85,000,000	483.8
South Africa, Republic of	31,099,197	258.3
South Arabian Federation	30,000,000	138.2
Spain	262,790,223	926.5
Sudan	6,500,000	33.0
Surinam	3,600,000	11.5
Sweden	126,164,500	497.0
Switzerland	82,905,000	332.3
Syrian Arab Republic	21,000,000	67.2
Thailand	80,230,000	442.7
Turkey	52,079,600	244.9
United Kingdom	441,152,068	3,131.9
Vatican City	2,216,400	14.5
Viet-Nam	67,800,000	338.3
Yemen Arab Republic	9,792,552	98.3
Zambia	10,789,000	79.9
Total (85 countries reported)	15,719,197,089	63,887.6

[1] For details see tables for individual countries and table on consumption of metals.

Note:--Summary of Coinage of Nations during the calendar year 1963 should be revised to include Italy 67,320,000 pieces and 544.3 short tons; Norway 51,173,000 pieces and 243.2 short tons; and Vatican City 1,266,000 pieces and 11.8 short tons. The grand total for the 74 countries is revised from 12,156,467,729 pieces to 12,276,226,729 pieces; and 49,342.7 short tons to 50,142.0 short tons.

Consumption of metals in 1964 Coinage of Nations--in short tons
(Calculations based on data in individual country tables. One short ton contains 907,184.86 grams.)

Country	Total gross weight	Gold	Silver	Nickel	Copper	Zinc	Tin	Aluminum	Magnesium	Iron	Steel	Other
United States of America	23,768.9	.....	6,966.0	1,103.3	15,118.8	580.8	.....	.....	.....	.....	.....	.....
Africa, East	197.6	.....	.....	4.3	187.9	4.5	0.9	.....	.....	.....	.....	.....
Africa, Equatorial	30.9	.....	.....	.....	28.1	.....	.....	2.8	.....	.....	.....	.....
Africa, West--Monetary Union of	36.4	.....	.....	.....	20.1	.....	.....	15.6	0.7	.....	.....	.....
Argentina	455.6	.....	.....	45.6	.....	.....	.....	.....	.....	.....	410.0	.....
Australia	1,227.4	.....	15.8	1.6	1,172.5	31.5	6.0	.....	.....	.....	.....	.....
Austria	280.2	.....	101.9	.....	108.0	19.3	.....	50.4	.6	.....	.....	.....
Belgium	313.7	.....	.....	60.0	226.5	25.7	1.5	.....	.....	.....	.....	.....
Bermuda	11.7	.....	5.8	.6	4.7	.6	.....	.....	.....	.....	.....	.....
British Honduras	2.6	.....	.....	.3	2.2	.1	(1)	.....	.....	.....	.....	.....
Burma	317.5	.....	.....	79.4	238.1	.....	.....	.....	.....	.....	.....	.....
Canada	2,791.3	.....	536.0	390.4	1,830.3	26.0	8.6	.....	.....	.....	.....	.....
Caribbean Territories, Eastern Group	42.9	.....	.....	1.9	38.6	2.2	.2	.....	.....	.....	.....	.....
Ceylon	281.0	.....	.....	52.5	200.3	11.3	.....	16.4	.5	.....	.....	.....
Chile	391.3	.....	.....	.....	286.5	.....	.....	101.1	.....	.....	.....	3.7
China, Republic of (Taiwan)	258.0	.....	.....	42.2	128.8	63.2	.....	23.6	.2	.....	.....	.....
Colombia	506.1	.....	.....	116.9	389.2	(1)	.....	.....	.....	.....	.....	.....
Comoro Archipelago	10.2	.....	.....	.1	3.8	.....	.....	6.0	.3	.....	.....	.....
Congo, Dem. Rep. of the (Leopoldville)	12.6	.....	.....	.....	.....	.....	.....	12.2	.4	.....	.....	.....
Cyprus	.1	.....	.....	(1)	.1	(1)	(1)	(1)	(1)	.....	.....	.....
Denmark	779.0	.....	[2] 5.4	48.3	546.0	162.4	16.9	.....	.....	.....	.....	.....
Ecuador	203.9	.....	.....	20.4	.....	.....	.....	.....	.....	.....	183.5	.....
Egypt (United Arab Republic)	139.6	[2] 0.2	[2] 9.1	.....	120.2	.....	.....	10.1	.....	.....	.....	.....
Ethiopia	85.2	.....	.....	.....	80.9	4.3	.....	.....	.....	.....	.....	.....
Fiji	4.7	.....	.....	.8	3.6	.3	.....	.....	.....	.....	.....	.....
Finland	233.5	.....	24.7	1.3	195.8	8.1	.5	3.1	.....	.....	.....	.....
France	2,687.6	.....	366.6	566.9	1,167.4	.....	.....	71.5	.....	.....	[3] 515.2	.....
French Somaliland	.2	.....	.....	.....	.....	.....	.....	.2	(1)	.....	.....	.....
Germany, Federal Republic	2,577.6	.....	59.2	145.3	976.2	16.9	15.4	.....	.....	1,364.6	.....	.....
Ghana	170.7	.....	.....	42.7	128.0	.....	.....	.....	.....	.....	.....	.....
Greece	51.4	.....	23.0	.....	4.6	.....	.....	22.6	1.2	.....	.....	.....
Guatemala	22.7	.....	4.1	.....	13.5	5.1	.....	.....	.....	.....	.....	.....
Hong Kong	135.9	.....	.....	13.7	105.3	16.9	.....	.....	.....	.....	.....	.....
Iceland	13.9	.....	.....	2.2	11.6	.1	(1)	.....	.....	.....	.....	.....
India	4,294.0	.....	.....	1,254.0	2,657.4	198.2	.....	177.5	6.9	.....	.....	.....
Iran (year ended Mar. 20, 1964)	137.3	.5	.....	33.6	103.0	.....	.....	.2	.....	.....	.....	.....
Iraq	29.8	.....	.....	7.5	22.3	.....	.....	.....	.....	.....	.....	.....
Ireland, Republic of	282.5	.....	.....	42.3	236.8	2.8	.6	.....	.....	.....	.....	.....
Israel	68.4	[2] .1	[2] .4	8.1	32.9	.....	.....	26.1	.8	.....	.....	.....
Italy	604.2	.....	49.4	.....	9.7	.....	.....	.....	.....	.....	[3] 545.1	.....
Jamaica	11.1	.....	.....	.1	8.8	2.2	.....	.....	.....	.....	.....	.....
Japan	6,970.3	.....	[2] 591.6	381.4	3,446.0	680.2	35.6	1,835.5	.....	.....	.....	.....

See footnotes at end of table.

Consumption of metals in 1964 Coinage of Nations--in short tons--Continued

Country	Total gross weight	Gold	Silver	Nickel	Copper	Zinc	Tin	Aluminum	Magnesium	Iron	Steel	Other
Jersey	21.5	.....	.....	0.1	19.2	2.1	0.1	.....	.....	.....	.....	.....
Jordan	47.0	.....	.....	2.1	43.7	1.0	.2	.....	.....	.....	.....	.....
Kuwait	10.5	.....	.....	1.1	8.1	1.3	.....	.....	.....	.....	.....	.....
Libya	12.6	.....	.....	1.6	10.8	.2	(1)	.....	.....	.....	.....	.....
Luxembourg	1.3	[4] 0.2	0.9	.....	.2	.....	.....	.....	.....	.....	.....	.....
Malawi	74.1	.....	.....	14.8	44.5	14.8	.....	.....	.....	.....	.....	.....
Malaysia	353.6	.....	.....	77.7	274.6	1.1	.2	.....	.....	.....	.....	.....
Mauritius	12.5	.....	.....	1.3	11.0	.2	(1)	.....	.....	.....	.....	.....
Mexico	1,356.4	.....	27.5	137.4	1,099.3	92.2	.....	.....	.....	.....	.....	.....
Morocco	93.1	.....	14.3	.....	63.9	.....	.....	14.5	0.4	.....	.....	.....
Muscat	10.2	.....	5.1	.5	4.1	.5	.....	.....	.....	.....	.....	.....
Nepal	102.4	.....	(2)	.5	86.0	15.9	.....	(1)	.....	.....	.....	.....
Netherlands	503.2	.....	79.7	150.5	260.9	2.4	9.7	.....	.....	.....	.....	.....
Netherlands Antilles (Curacao)	8.8	.....	6.3	.....	2.5	.....	.....	.....	.....	.....	.....	.....
New Zealand	348.3	.....	.....	35.7	306.4	5.2	1.0	.....	.....	.....	.....	.....
Nicaragua	36.4	.....	.....	9.1	27.3	.....	.....	.....	.....	.....	.....	.....
Nigeria	1,002.9	.....	.....	.9	956.6	40.8	4.6	.....	.....	.....	.....	.....
Norway	304.6	.....	[2] 27.9	40.9	230.3	1.1	4.4	.....	.....	.....	.....	.....
Pakistan	763.5	.....	.....	107.6	606.7	48.0	1.2	.....	.....	.....	.....	.....
Peru	250.6	[5] .8	.....	.....	174.6	75.2	.....	.....	.....	.....	.....	.....
Philippines	246.3	.....	.....	8.2	190.2	47.9	.....	.....	.....	.....	.....	.....
Portugal	200.1	.....	.....	35.4	152.0	11.8	.9	.....	.....	.....	.....	.....
Portuguese Timor	4.6	.....	3.0	.....	1.6	.....	.....	.....	.....	.....	.....	.....
Reunion	30.1	.....	.....	18.9	9.1	.....	.....	2.0	.1	.....	.....	.....
Rhodesia	448.9	.....	.....	112.2	336.7	.....	.....	.....	.....	.....	.....	.....
Rwanda	105.8	.....	.....	19.8	84.7	.5	.8	.....	.....	.....	.....	.....
Seychelles	.5	.....	.....	.1	.4	(1)	(1)	.....	.....	.....	.....	.....
Sierra Leone	483.8	.....	.....	56.9	419.2	6.4	1.3	.....	.....	.....	.....	.....
South Africa, Republic of	258.3	1.7	41.2	.....	171.9	42.6	.9	.....	.....	.....	.....	.....
South Arabian Federation	138.2	.....	.....	20.0	108.1	1.2	.3	8.3	.3	.....	.....	.....
Spain	926.5	.....	.....	131.7	675.6	.....	.....	116.1	3.1	.....	.....	.....
Sudan	33.0	.....	.....	.....	31.4	.3	1.3	.....	.....	.....	.....	.....
Surinam	11.5	.....	.....	1.1	9.6	.6	.2	.....	.....	.....	.....	.....
Sweden	497.0	.....	58.7	36.6	382.7	9.7	9.3	.....	.....	.....	.....	.....
Switzerland	332.3	.....	148.0	38.8	145.5	.....	.....	.....	.....	.....	.....	.....
Syrian Arab Republic	67.2	.....	.....	.....	61.8	.....	.....	5.4	.....	.....	.....	.....
Thailand	442.7	.....	16.5	68.2	344.7	.....	.....	13.3	.....	.....	.....	.....
Turkey	244.9	.....	.....	.....	94.4	1.0	4.0	.....	.....	.....	[3] 145.5	.....
United Kingdom	3,131.9	(1)	(1)	208.7	2,793.4	120.0	9.8	.....	.....	.....	.....	.....
Vatican City	14.5	.....	1.4	.....	.9	.....	.....	.7	(1)	.....	[3] 11.5	(6)
Viet-Nam	338.3	.....	.....	84.6	253.7	.....	.....	.....	.....	.....	.....	.....
Yemen Arab Republic	98.3	.....	50.3	.....	45.7	.....	.....	2.3	.....	.....	.....	.....
Zambia	79.9	.....	.....	16.0	47.9	16.0	.....	.....	.....	.....	.....	.....
Total (85 countries reported)	63,887.6	3.5	9,239.8	5,906.7	40,446.4	2,422.7	136.4	2,537.5	15.5	1,364.6	1,810.8	[7] 3.7

[1] Less than 0.1 ton. [2] Commemorative issue. [3] Stainless steel. [4] "Monnaies-médailles." [5] Coined for private account. [6] Less than 0.1 ton of manganese and titanium.
[7] Unspecified metals. See also the Note to the preceding table for revisions to the 1963 table on Consumption of metals.

Coinage of Nations and Coins in Circulation in 1964

Conversion factors used: 1 gram = 15.43235639 grains. 1 inch = 25.4 millimeters. Coins are round except as noted. Figures preceded by letter m signify measurement made of one coin in a collection, not necessarily for the reported year's coinage. Thickness measurements are usually for the edge or rim of the coins. Year of coinage may not necessarily coincide with date on coins, or date of issue. Leaders in coinage column indicate that no coins were minted during the year for the particular type, but coins described are in circulation. Leaders only in other columns denote unreported data. Do is an abbreviation for ditto, signifying the same as the line above.

UNITED STATES OF AMERICA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 dollar[1]	.....	26.73	900 silver, 100 copper	38.10	2.90
Half dollar	205,810,374	12.5	....do	30.61	2.18
Quarter dollar	385,884,070	6.25	....do	24.26	1.70
Dime	814,875,192	2.5	....do	17.91	1.35
5 cents	800,736,602	5	75 copper, 25 nickel	21.21	1.98
Do[2]	.....	5	56 copper, 35 silver, 9 manganese	21.21	1.98
1 cent[3]	.....	3.11	95 copper, 5 zinc and tin	19.05	1.57
Do[4]	3,388,279,162	3.11	95 copper, 5 zinc	19.05	1.57
Do[5]	.....	2.7	Zinc-coated steel	19.05	1.57
Total[6]	5,595,585,400				

Reported coinage Philadelphia and Denver Mints.

[1] The latest silver dollar coinage was September 1935.

[2] Coined under authority of the Second War Powers Act (approved Mar. 27, 1942) from October 1, 1942 through December 31, 1945.

[3] Public Law 87-643, approved September 5, 1962, changed the bronze composition of the one-cent coin to 95 percent copper and 5 percent zinc (31 U.S.C. 317).

[4] Copper-zinc one-cent coin manufactured from 1944 through 1946, and from Sept. 1962. (See footnote 3.)

[5] Zinc-coated steel one-cent coin manufactured only during calendar year 1943.

[6] Includes 3,950,762 sets (19,753,810 pieces) of proof coins manufactured by the Philadelphia Mint. Proof coins were sold to collectors in sets of one coin of each denomination currently minted (1¢, 5¢, 10¢, 25¢, and 50¢).

United States coins circulate in the 50 States; the District of Columbia; Puerto Rico, the American Samoa, Guam, and Virgin Islands; and the Panama Canal Zone. In addition, United States coins also circulate in Haiti, Liberia, Panama, and elsewhere.

Coins manufactured during 1964 were dated 1964.

ADEN

(East African coins and Maria Theresa thalers circulate in Aden. For characteristics of the Maria Theresa thaler (trade coin), see Austria. See also the table for the South Arabian Federation.)

AFRICA, EAST

Currency area includes Kenya, Tanzania (formerly Tanganyika and Zanzibar), Uganda, and Aden.

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 shilling	.....	7.7759	250 silver, 700 copper, 50 manganese; and 75 copper, 25 nickel.	27.7	.....
50 cents	4,000,000	3.8879	75 copper, 25 nickel	21	1.55
Do	.....	3.8879	250 silver, 700 copper, 50 manganese.	21	.....
10 cents*	.....	9.4496	95.5 copper, 3 tin, 1.5 zinc	30.9	1.85
Do	10,002,000	9.4496	97 copper, 2.5 zinc, 0.5 tin	30.9	.....
5 cents*	12,200,000	5.6699	....do	25.5	1.70
Do*	.....	5.6699	95.5 copper, 3 tin, 1.5 zinc	25.5	1.70
1 cent*	.....	1.9440	....do	20.2	1.04
Do	.....	1.9440	....do	25.5	1.04
Do	.....	1.9440	97 copper, 2.5 zinc, 0.5 tin	25.5	1.04
Do	.....	1.9440	....do	20.2	1.37
Total	26,202,000				

Reported coinage Mints in the United Kingdom.

Cupronickel 1 shilling and 50 cent coins, first minted in 1948 and first issued in 1949, are gradually replacing silver coins. Thicknesses of cupronickel coins are slightly greater than for silver coins.

*Round coin with central hole. Diameter of hole 6.4 mm.

Bronze 10- and 5-cent denominations minted prior to 1942 were of different proportions of metals, with weights of 175 and 100 grains respectively, same diameters as present coins but slightly thicker.

Coins manufactured during 1964 were dated 1964 with the exception of the following which were dated 1963:
50 cents.... 4,000,000 and 5 cents.... 4,600,000.

Coinage of Nations and Coins in Circulation in 1964--Continued

AFRICA, EQUATORIAL--STATES OF[1]

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 francs[2]	.....	12	75 copper, 25 nickel	31	2.21
Do	.....	12	....do	31	2.21
25 francs	.....	8	91 copper, 9 aluminum	27	2.35
10 francs	7,000,000	4	....do	23.5	1.7
5 francs	.....	3	....do	20	1.7
2 francs	.....	2.2	95 aluminum, 5 magnesium	27	2
1 franc	.....	1.3	....do	23	1.6
Total[3]	7,000,000				

Reported coinage French Government Mint. Issuing agency, Central Bank of the States of Equatorial Africa and Cameroun.

[1] Includes the Republics of Cameroun, Gabon, Chad, Congo (Brazzaville), and the Central African Republic.

[2] The 50-franc coin, with distinctive Camerounian designs and legends, circulates in the Republic of Cameroun only.

[3] Distribution of the 1964 coinage among the various Republics was as follows:
Cameroun: 4,050,000 pieces.
Gabon: 50,000 pieces.
Chad: 2,600,000 pieces.
Congo (Brazzaville): None.
Central African Republic: 300,000 pieces.

AFRICA, WEST

(Includes Sierra Leone* and Gambia)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Florin (2 s.)	.....	11.31036	79 copper, 20 zinc, 1 nickel	28.5	.....
Shilling (1 s.)	.....	5.65518	....do	23.6	.....
Sixpence (6 d.)	.....	3.499	....do	19.4	.....
Threepence (3 d.)	.....	5.184	75 copper, 25 nickel	21.5	2.13
Penny (1 d.)	.....	9.45	....do	30.9	.....
Do**	.....	9.45	95.5 copper, 3 tin, 1.5 zinc	30.9	1.85
Do	.....	9.45	97 copper, 2.5 zinc, 0.5 tin	30.9	.....
Halfpenny (1/2 d.)	.....	5.67	75 copper, 25 nickel; 95.5 copper, 3 tin, 1.5 zinc.	25.5	.....
Tenthpenny (1/10 d.)	.....	1.944	95.5 copper, 3 tin, 1.5 zinc	(a)	1.52
Do	.....	1.944	75 copper, 25 nickel	(a)	m 1.1
Total	.....				

*On August 4, 1964, Sierra Leone introduced the decimal system. The new monetary unit, the Leone, is divided into 100 cents. See the separate table for Sierra Leone's decimal coinage.

**Perforated.

[a] Round coin measuring 20.2 mm. in diameter with central hole measuring 6.3 mm. in diameter.

AFRICA, WEST--MONETARY UNION OF*

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
25 francs	.....	8	91 copper, 9 aluminum	27	2.35
10 francs	10,000,000	4	....do	23.5	1.70
5 francs	.....	3	....do	20	1.70
2 francs	.....	2.2	95 aluminum, 5 magnesium	27	.....
1 franc	5,000,000	1.3	....do	23	.....
Total	15,000,000				

Issuing agency, Central Bank of the States of West Africa.

*Includes the Republics of Ivory Coast, Dahomey, Upper Volta, Mauritania, Niger, Senegal, and Togo.

Coinage of Nations and Coins in Circulation in 1964--Continued

ALGERIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 francs	.....	12	75 copper, 25 nickel	30	2.4
50 francs	.....	8	....do	27	1.8
20 francs	.....	5.5	....do	23	1.6
Total	.....				

Law No. 64-111, of April 10, 1964, changed the monetary unit of Algeria from the Algerian franc to the Algerian dinar.

ANDORRA

(Spanish money principal circulating medium in Andorra. French money also circulates)

ARGENTINA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
25 pesos[1]	20,485,420	6.5	Steel core 90 percent by weight with nickel cladding 5 percent each side.	25.5	2
10 pesos[1]	46,188,951	5	....do	23	1.8
5 pesos[1]	12,302,074	4	....do	21	1.8
1 peso	.....	6.5	....do	25.5	1.9
50 centavos	.....	5	....do	23	1.8
20 centavos	.....	4	....do	21	1.8
Do[2]	.....	4	Steel core 90 percent by weight with cladding of cupro-nickel alloy 5 percent each side. (Alloy 75 percent copper and 25 percent nickel). Unmilled edge.	21	1.254
10 centavos[2]	.....	3	....do	19	1.3
Do	.....	3	Steel core 90 percent by weight with nickel cladding 5 percent each side.	19	1.143
5 centavos	.....	2	....do	17	.95
Do[2]	.....	2	Steel core 90 percent by weight with cladding of cupro-nickel alloy 5 percent each side. (Alloy 75 percent copper and 25 percent nickel). Unmilled edge.	17	.95
Total	78,976,445				

Reported coinage Argentina Mint.

[1] The coin is 12-sided.

[2] Coins of copper 92%, aluminum 8%; and copper 75%, nickel 25% continue to circulate. Weights and diameters same as above, thicknesses 1.3, 1.2, and 1 mm., respectively.

AUSTRAL ISLANDS

(See French Polynesia)

Coinage of Nations and Coins in Circulation in 1964--Continued

AUSTRALIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Pound, shilling, pence system					
Crown (5s.)	.....	28.2759	925 silver, 75 copper	38.4	3
Florin (2s.)	.....	11.31036	....do	28.7	2.1
Do	.....	11.31036	500 silver, 400 copper, 50 nickel, 50 zinc.	28.7	2.2
Shilling (1s.)	.....	5.65518	925 silver, 75 copper	23.8	1.8
Do	.....	5.65518	500 silver, 400 copper, 50 nickel, 50 zinc.	23.8	1.9
Sixpence (6d.)	.....	2.82759	925 silver, 75 copper	19.4	1.4
Do	.....	2.82759	500 silver, 400 copper, 50 nickel, 50 zinc.	19.4	1.5
Threepence (3d.)	.....	1.41379	925 silver, 75 copper	16.1	1
Do	20,320,000	1.41379	500 silver, 400 copper, 50 nickel, 50 zinc.	16.1	1
Penny (1d.)	97,774,800	9.44984	97 copper, 2.5 zinc, 0.5 tin	30.8	2
Do	.....	9.44984	95.5 copper, 3 tin, 1.5 zinc	30.8	2
Half penny (1/2d.)	.....	5.6699	....do	25.5	1.6
Do	18,230,400	5.6699	97 copper, 2.5 zinc, 0.5 tin	25.5	1.6
Decimal system[1]					
1 cent	22,160,000	2.592	....do	17.5	1.5
Total	158,485,200				

Reported coinage Melbourne and Perth Branches of the Royal Mint. Coins manufactured during 1964 were dated 1964 except for the decimal one cent coins which were all dated 1966.

Australian coins are legal tender in Papua, New Guinea Trust Territory administered by Australia, Norfolk Island, and Nauru.

Australian silver coins of 500 fineness were first issued July 21, 1947.

United Kingdom coins legal tender in Australia, quantity in circulation negligible.

[1] The decimal system of currency will be adopted on February 14, 1966. The monetary unit, the dollar, will be divided into 100 cents.

AUSTRIA

Denomination[1]	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 schillings	2,676,600	20	900 silver, 100 copper	34	2.45
25 schillings	1,687,600	13	800 silver, 200 copper	30	2.1
10 schillings	1,902,000	7.5	640 silver, 360 copper	27	1.6
5 schillings	4,191,000	5.2	....do	23.5	1.4
1 schilling	14,457,000	4.2	91.5 copper, 8.5 aluminum	22.5	1.55
50 groschen	6,908,000	3	....do	19.5	1.5
10 groschen	35,729,000	1.1	98.5 aluminum, 1.5 magnesium	20	1.6
5 groschen	7,011,000	2.5	Zinc	19	1.5
2 groschen	124,000	.9	98.5 aluminum, 1.5 magnesium	18	1.5
1 groschen	.....	1.8	Zinc	17	1.32
1 reichspfennig	.....	1.8	....do	17	1.3
Trade coins					
4 fold ducat	.....	13.9636	986 1/9 gold, 13 8/9 copper	39.5	.8
1 fold ducat	.....	3.4909	....do	19.75	.8
100 kronen	.....	33.8753	900 gold, 100 copper	37	2.2
20 kronen	.....	6.7751	....do	21	1.4
20 francs	.....	6.4516	....do	21	1.4
10 francs	.....	3.2258	....do	19	.9
Maria Theresa thaler	153,781	28.0668	833 1/3 silver, 166 2/3 copper	39.5	2.5
Total	74,839,981				

Reported coinage Austrian Mint.

[1] The 5 and 1 schillings and 50 groschen of 98.5 aluminum and 1.5 magnesium were demonetized during 1961. All Maria Theresa thalers are dated 1780.

AZORES

(Coins of Portugal circulate in the Azores)

BAHAMAS

(United Kingdom coins circulate in the Bahamas)

Coinage of Nations and Coins in Circulation in 1964--Continued

BAHREIN ISLANDS

(Coins of India circulate in Bahrein Islands)

BARBADOS

(See Caribbean Territories, Eastern Group)

BASUTOLAND

(Coins of the Republic of South Africa circulate in Basutoland)

BECHUANALAND

(Coins of the Republic of South Africa and Rhodesia circulate in Bechuanaland)

BELGIUM

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 francs	.....	18	835 silver, 165 copper	33	2.4
50 francs*	.....	12.5	....do	30	2.1
20 francs	.....	8	....do	27	1.6
5 francs	.....	12	Pure nickel	31	2.3
Do	11,648,000	6	75 copper, 25 nickel	24	1.7
1 franc	17,540,000	4	....do	21	1.51
50 centimes	16,200,000	2.75	95 copper, 3 tin, 2 zinc	19	1.39
25 centimes	.....	6.5	75 copper, 25 nickel	26-4.5	1.7
Do	.....	6.5	64 copper, 20 zinc, 16 nickel	26-3.5	1.7
Do	3,452,000	6.5	Zinc du commerce	26-3.5	1.9
Do	43,070,000	1.8	75 copper, 25 nickel	16	1
20 centimes	.....	2	95 copper, 3 tin, 2 zinc	17	1.21
Total	91,910,000				

Reported coinage Belgian Mint.
Belgian coins with two diameters are round with central hole.
Belgian coins circulate in Luxembourg along with distinctive Luxembourg coins.
*The 1961 50 francs design commemorates the marriage of the King and Queen.

BERMUDA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Crown (5 s.)*	.....	28.2759	500 silver, 400 copper, 50 nickel, 50 zinc.	38.74	2.92
Do**	470,000	22.6213	....do	36.07	.....
Total	470,000				

Reported coinage Mints in the United Kingdom.
*Special commemorative coin minted in 1958, bearing date 1959.
**First coinage during 1964. Crowns manufactured during 1964 were dated 1964.
United Kingdom coins circulate in Bermuda.

BHUTAN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1/2 rupee	.....	5.8319	Nickel	m 24	m 1.8
Single pice	.....	2.916	97 copper, 2.5 zinc, 0.5 tin	21.3	.....
Total	.....				

Coins of India also circulate in Bhutan.

Coinage of Nations and Coins in Circulation in 1964--Continued

BOLIVIA

Gold medallions authorized by Decree dated May 14, 1953

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Medallions	.....	38.888	900 gold, 100 copper	37	.....
Do	.....	15.444	....do	28.5	.....
Do	.....	7.777	....do	23.5	.....
Do	.....	3.888	....do	14	.....
Total	.....				

Gold medallions do not actively circulate. Banco Minero de Bolivia exchanges medallions for native gold.
On January 1, 1963, the monetary unit of Bolivia changed from the BOLIVIANO to the PESO BOLIVIANO. One peso boliviano = 1,000 bolivianos.

BRAZIL

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
2 cruzeiros	.....	2.7	99.5 aluminum, 0.5 other	25	.....
Do	.....	8	90 copper, 8 aluminum, 2 zinc	25	2.2
Do	.....	5	99.5 aluminum, 0.5 other	21	.....
1 cruzeiro	.....	2.4	....do	23	.....
Do	.....	4	....do	19	.....
Do	.....	7	90 copper, 8 aluminum, 2 zinc	23	2.2
Do	.....	4	....do	19	.....
Total	.....				

Coins in the denominations of 10, 20, and 50 centavos were demonetized by Law No. 4511 of December 1, 1964.

BRITISH BORNEO

(See Malaysia)

BRITISH GUIANA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
British Guiana fourpence ("bit").	.....	1.88506	500 silver, 400 copper, 50 nickel, 50 zinc.	16.5	1.5

Coins of the United Kingdom and the Caribbean Territories, Eastern Group circulate in British Guiana.

Coinage of Nations and Coins in Circulation in 1964--Continued

BRITISH HONDURAS

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 cents	.....	11.6205	925 silver, 75 copper	29.8	2.1
Do	50,000	9.07185	75 copper, 25 nickel	27.7	.....
25 cents[1]	.....	5.8105	925 silver, 75 copper	23.2	1.8
Do	.....	5.8105	75 copper, 25 nickel	23.2	.....
Do	100,000	5.65518	....do	23.6	.....
10 cents	.....	2.324	925 silver, 75 copper	18	m 1.4
Do	60,000	2.40015	75 copper, 25 nickel	17	.....
5 cents	105,000	3.6287	79 copper, 20 zinc, 1 nickel	20.3	1.68
1 cent	.....	5.67	95.5 copper, 3 tin, 1.5 zinc	25.5	m 1.6
Do	.....	2.83495	.....do	19.4	.....
Do[2]	.....	2.59196	.....do	19.5	1.37
Do[2]	300,000	2.59196	97 copper, 2.5 zinc, 0.5 tin	19.5	1.37
Total	615,000				

Reported coinage Mints in the United Kingdom.
[1] Last coinage of 25-cent silver coins was 1919.
[2] Coin has 12 scallops.
Coins manufactured during 1964 were dated 1964.

BRUNEI

(See Malaysia)

BURMA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 kyat	.....	11.6638	75 copper, 25 nickel	30.5	2.24
50 pyas	4,000,000	7.7759	....do	26	1.93
25 pyas[1]	13,200,000	6.8039	....do	22.5&24	2.03
10 pyas[2]	16,562,500	4.5359	....do	19.8&23.4	1.73
5 pyas[3]	28,400,000	3.2399	....do	18.5&19.5	1.55
1 pya	.....	2.268	95.5 copper, 3 tin, 1.5 zinc	18	m 1.2
Total	62,162,500				

Reported coinage Mints in the United Kingdom.
[1] Scalloped, 6 waves.
[2] Square coin with rounded corners.
[3] Scalloped, 12 waves.
Coins manufactured during 1964 were dated 1963.

BURUNDI

Denomination* (issued before 1964)	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 franc	.....	3.75	67 copper, 33 zinc	21	1.3
Do	.....	3.75	70 copper, 30 zinc	21	1.3
Total	.....				

* Coins shown represent those which were issued by the Bank d'Emission du Rwanda et du Burundi.

CAMBODIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 sen	.....	3.8	95 aluminum, 5 magnesium	31	2.43
20 sen	.....	2.2	....do	27	2.05
10 sen	.....	1.3	....do	23	1.56
Total	.....				

Designations of monetary values were changed officially from PIASTRE to RIEL and from CENTIME to SEN by Law (Kram) No. 84-NS of March 26, 1956.

CAMEROUN, FEDERAL REPUBLIC OF

(See Africa, Equatorial)

Coinage of Nations and Coins in Circulation in 1964--Continued

CANADA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 dollar	7,296,832	23.3276	800 silver, 200 copper	36.1	2.92
50 cents	.....	11.6638	925 silver, 75 copper	29.7	2.2
Do	9,377,676	11.6638	800 silver, 200 copper	29.7	2.16
25 cents	.....	5.8319	925 silver, 75 copper	23.6	1.8
Do	36,479,343	5.8319	800 silver, 200 copper	[a] 23.9	1.78
10 cents	.....	2.3328	925 silver, 75 copper	18	1.4
Do	49,518,549	2.3328	800 silver, 200 copper	18	1.42
5 cents (round)	.....	1.1664	925 silver, 75 copper; and 800 silver, 200 copper.	15.5	.6
Do (round)[b]	78,075,068	4.5359	Pure nickel	21.2	1.91
Do (12-sided)[c]	.....	4.5359	88 copper, 12 zinc (tombac)	(d)	1.9
Do (12-sided)[e]	.....	4.5359	Steel chrome plated	(d)	1.9
Do (12-sided)[f]	.....	4.5359	Pure nickel	(d)	1.91
1 cent[g]	484,655,322	3.2399	98 copper, 1.5 zinc, 0.5 tin	19.1	1.65
Total	665,402,790				
Newfoundland coins[h]					

Reported coinage Royal Canadian Mint.

Silver coins of 925 fineness: Authorized by Act of May 4, 1910; coined in 50-, 25-, 10-, and 5-cent denominations.

Silver coins of 800 fineness: Authorized by Act of May 11, 1920; coined in 1-dollar, 50-, 25-, 10-, and 5-cent denominations.

The first coinage of silver dollars was in 1935. The last coinage of silver 5-cents was in 1920.

[a] Diameter of 25 cents was changed from .930 inch (23.6 mm.) to .940 inch (23.9 mm.) in 1953.

[b] Five cents of pure nickel, round in shape, were coined from 1922 through part of 1942 and again beginning in 1963.

[c] Five cents of tombac composition (12-sided) were coined during part of 1942 and also 1943.

[d] 12-sided coin, 20.88 mm. - 20.93 mm. between parallel sides and 21.23 mm. - 21.29 mm. between opposite angles.

[e] Five cents of steel composition (12-sided) were coined 1944-1945 and 1951-1954.

[f] Five cents of pure nickel (12-sided) were coined 1946-1951, and again beginning in 1955 through 1962.

[g] Bronze one cent coins were composed of 95.5% copper, 3% tin, and 1.5% zinc prior to April 1, 1942.

[h] Distinctive Newfoundland coins, last minted in 1948, continue to circulate in Newfoundland along with Canadian coins.

Coins manufactured during 1964 were dated 1964.

CARIBBEAN TERRITORIES, EASTERN GROUP

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 cents	.....	13	75 copper, 25 nickel	30.1	.....
25 cents	480,000	6.5	....do	24	1.98
10 cents	1,400,000	2.6	....do	18.1	.....
5 cents	1,350,000	5	79 copper, 20 zinc, 1 nickel	21	.....
2 cents	.....	9.45	95.5 copper, 3 tin, 1.5 zinc	30.9	1.78
Do	1,187,500	9.45	97 copper, 2.5 zinc, 0.5 tin	30.9	1.78
1 cent	2,500,000	5.67	....do	25.5	1.60
Do	.....	5.67	95.5 copper, 3 tin, 1.5 zinc	25.5	1.60
1/2 cent	.....	2.83495	....do	20.2	1.27
Total	6,917,500				

Reported coinage Mints in the United Kingdom.

A new decimal coinage with design British Caribbean Territories, Eastern Group, based upon the British West Indian dollar, first minted in 1955 (Royal Mint, London), and first issued on November 15, 1955. The currency area currently includes Barbados, British Guiana, the Leeward Islands, Trinidad and Tobago; and Grenada, St. Vincent, St. Lucia and Dominica comprising the Windward Islands. United Kingdom coins continue to circulate at present.

Coins manufactured during 1964 were dated 1964.

CENTRAL AFRICAN REPUBLIC

(See Africa, Equatorial)

Coinage of Nations and Coins in Circulation in 1964--Continued

CEYLON

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 rupees	.....	28.2757	925 silver, 75 copper	38.86	2.74
1 rupee	.....	11.3107	75 copper, 25 nickel	28.50	2.24
Do	15,300,000	7.1279	....do	25.4	.....
50 cents	.....	5.508	79 copper, 20 zinc, 1 nickel	24.1	1.93
Do	5,000,000	5.508	75 copper, 25 nickel	21.5	.....
25 cents	16,000,000	3.24	....do	18	.....
Do	.....	2.754	79 copper, 20 zinc, 1 nickel	19	1.60
10 cents	6,000,000	4.212	....do	(a)	1.73
5 cents	.....	3.888	75 copper, 25 nickel	(b)	1.6
Do	.....	3.888	79 copper, 20 zinc, 1 nickel	(b)	1.6
Do	8,000,000	3.24	....do	(b)	1.57
2 cents	.....	2.592	....do	(c)	1.45
Do	.....	2.592	....do	18.42	1.30
Do	8,000,000	.778	Aluminum alloy with 3+% magnesium	(c)	.....
1 cent	13,000,000	.7	....do	16	.....
Do	.....	4.725	95.5 copper, 3 tin, 1.5 zinc	22.5	1.7
Do	.....	2.362	97 copper, 2.5 zinc, 0.5 tin	22.5	.9
Do	.....	2.365	....do	22.45	1.02
1/2 cent	.....	2.362	....do	18	1.5
Total	71,300,000				

Reported coinage Mints in the United Kingdom.
[a] Coin has 8 scallops. Across scallops, 23.1 mm. Inside scallops, 20.96 mm.
[b] Square coin with round corners. Diagonally, 21.5 mm. Across flats, 18.2 mm.
[c] Coin has 8 scallops. Across scallops, 18.4 mm. Inside scallops, 17 mm.
Coins manufactured during 1964 were dated 1963 with the exception of 4 million 10 cent coins which were dated 1965.

CHAD, REPUBLIC OF

(See Africa, Equatorial)

CHILE[1]

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 centesimos (.10 escudo).	27,020,000	8	Bronze-aluminum (90 copper, 10 aluminum etc.).	27	.....
5 centesimos (.05 escudo).	16,628,000	4	....do	23.5	.....
2 centesimos (.02 escudo).	2,050,000	3	....do	20	.....
1 centesimo (.01 escudo).	21,240,000	3	Aluminum (95 aluminum, 5 other)	29	2.0
1/2 centesimo (.005 escudo).	1,200,000	2	....do	25	.....
Total	68,138,000				

Reported coinage Chilean Mint.
[1] Law 13,305 of April 4, 1959, changed the monetary unit from PESO to ESCUDO and authorized a new series of coins as shown in the table.

CHINA, REPUBLIC OF (TAIWAN)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 dollar[1]	35,400,000	6	55 copper, 27 zinc, 18 nickel	25	1.6
50 cents	.....	7	92 copper, 8 aluminum	27.13	1.59
20 cents	.....	1.8	Aluminum	22.8	1.626
10 cents	.....	4.5	95 copper, 5 zinc	21	1.48
Do	18,800,000	1.15	99 aluminum, 1 magnesium	19	1.7
Total	54,200,000				

Reported coinage Central Mint of China.
[1] First coined and issued in 1961.

Coinage of Nations and Coins in Circulation in 1964--Continued

COLOMBIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 peso	.....	25	900 silver, 100 alloy metal	37	2.5
50 centavos	9,274,000	12.5	75 copper, 25 nickel	30	3.2
20 centavos	29,075,000	5	....do	23	1.6
10 centavos	61,672,000	2.5	....do	18	1.4
5 centavos	9,336,000	4	95 copper, 5 nickel	21	1.6
2 centavos	3,350	3	84 copper, 16 zinc	19	1.5
1 centavo	.....	2	Steel nickel plated (25%)	17	1.05
Do	3,165,000	2	95 copper, 5 nickel	17	1.3
Total	112,525,350				

Reported coinage Colombian Mint.

COMORO ARCHIPELAGO

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 francs	500,000	4	92 copper, 6 aluminum, 2 nickel	23.5	.....
10 francs	600,000	3	....do	20	.....
5 francs	1,000,000	3.5	95 aluminum, 5 magnesium	31	.....
2 francs	600,000	2.2	....do	27	.....
1 franc	500,000	1.3	....do	23	.....
Total	3,200,000				

Reported coinage French Government Mint.

CONGO, REPUBLIC OF (BRAZZAVILLE)

(See Africa, Equatorial)

CONGO, DEMOCRATIC REPUBLIC OF THE (LEOPOLDVILLE)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 francs	.....	17.5	600 silver, 400 copper	35	2.3
10 francs	3,000,000	3.38	97 aluminum, 3 magnesium	30	1.75
5 francs	.....	2.2	95 aluminum, 4.5 magnesium, 0.5 manganese.	26	2
Do	.....	13	86.3 copper, 7.9 zinc, 3.3 nickel, 1.5 aluminum, 1.0 iron.	33	2
Do	.....	7.5	66 2/3 copper, 33 1/3 zinc	27	2
2 francs*	.....	6	....do	25/29	1.5
Do (round)	.....	5	....do	22	1.5
1 franc	.....	2.5	....do	19	1.3
Do	.....	1.45	95 aluminum, 4.5 magnesium, 0.5 manganese.	22	1.92
Do	.....	10	75 copper, 25 nickel	28	2
50 centimes	.....	.685	97 aluminum, 3 magnesium	18	1.2
20 centimes	.....	6	75 copper, 25 nickel	25	1.5
10 centimes	.....	4	....do	22	1.3
Total	3,000,000				

Reported coinage Belgian Mint.
*Hexagonal shaped coin.

COSTA RICA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
2 colones	.....	14	75 copper, 25 nickel	32	2.28
Do	.....	12	17% chrome-stainless steel	32	2
1 colon	.....	10	75 copper, 25 nickel	29	2.08
Do	.....	8 2/3	17% chrome-stainless steel	29	2
50 centimos	.....	7	75 copper, 25 nickel	26	1.7
25 centimos	.....	3.45	....do	23	1.3
10 centimos	.....	2	....do	18	1.1
Do	.....	1.75	17% chrome-stainless steel	18	1.2
5 centimos	.....	1	75 copper, 25 nickel	15	1
Do	.....	.875	17% chrome-stainless steel	15	.8
Total	.....				

Coinage of Nations and Coins in Circulation in 1964--Continued

CYPRUS

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 mils	2,500	11.31036	75 copper, 25 nickel	28.5	2.29
50 mils	2,500	5.65518	....do	23.6	1.73
25 mils	2,500	2.82759	....do	19.4	1.32
5 mils	.....	5.6699	99.5 copper, 3 tin, 1.5 zinc	25.5	1.60
Do	2,500	5.6699	97 copper, 2.5 zinc, 0.5 tin	25.5	1.52
3 mils	.....	2.83495	95.5 copper, 3 tin, 1.5 zinc	20.2	.....
1 mil	2,500	1.0	Aluminum alloy with 3+% magnesium	(a)	1.7
Total*	12,500				

Reported coinage Mints in the United Kingdom.
[a] Twelve-sided coin measuring 17.8 mm. across flats.
*Proof coins.

DAHOMEY, REPUBLIC OF

(See Africa, West--Monetary Union of)

DENMARK

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 kroner*	359,473	17	800 silver, 200 copper	33	2.4
Do	.....	15	75 copper, 25 nickel	33	2.40
2 kroner*	.....	15	800 silver, 200 copper	31.5	2.45
Do	.....	13	92 copper, 6 aluminum, 2 nickel	31.5	2.45
Do	1,443,498	15	75 copper, 25 nickel	33	2.4
1 krone	.....	6.5	92 copper, 6 aluminum, 2 nickel	25.5	1.9
Do	10,688,996	6.8	75 copper, 25 nickel	25.5	1.9
25 ore:					
Christian X	.....	4.5	....do	23	1.7
Do	.....	3.6	Zinc	23	1.6
Frederik IX	7,097,275	4.5	75 copper, 25 nickel	23	1.60
10 ore:					
Christian X	.....	2.4	Zinc	18	1.6
Do	.....	3	75 copper, 25 nickel	18	1.7
Frederik IX	16,282,368	3	....do	18	1.70
5 ore:					
Christian X	.....	7.6	95 copper, 4 tin, 1 zinc	27	1.9
Do	.....	2.4	Aluminum	27	1.8
Do	.....	6.4	Zinc	27	1.8
Frederik IX	8,479,016	6.4	....do	27	1.8
Do	63,646,902	6	95 copper, 4 tin, 1 zinc	24	1.8
2 ore:					
Christian X	.....	3.8	....do	21	1.6
Do	.....	1.2	Aluminum	21	1.5
Do	.....	3.2	Zinc	21	1.5
Frederik IX	16,911,497	3.2	....do	21	1.47
1 ore:					
Christian X	.....	1.9	95 copper, 4 tin, 1 zinc	16	1.3
Do	.....	1.6	Zinc	16	1.3
Frederik IX	21,975,030	1.6	....do	16	1.31
Total	146,884,055				

Reported coinage Danish Mint.
Danish coins circulate in Faroe Islands and fractional Danish coins circulate in Greenland.
*Commemorative issue.

DOMINICA (WINDWARD ISLANDS)

(See Caribbean Territories, Eastern Group)

Coinage of Nations and Coins in Circulation in 1964--Continued

DOMINICAN REPUBLIC

Denomination	Coinage during year--number of pieces[1]	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 peso		26.73	Silver - copper	38.1	2.9
1/2 peso		12.5	....do	30.6	2.2
25 centavos		6.25	....do	24.3	1.7
10 centavos		2.5	....do	17.9	1
5 centavos		5	75 copper, 25 nickel	21.2	1.90
1 centavo		3	95 copper, 5 zinc and tin	19	1.57
Do		3	97 copper, 2.5 zinc, 0.5 tin	19	.....
Total					

[1] Information not available.

ECUADOR

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 sucre	20,000,000	6.5	Steel clad with 5% nickel on each side.	26	1.6
Do	.....	7	75 copper, 25 nickel	26	.....
Do	.....	7	Pure nickel	26	1.6
50 centavos	.....	5	Steel clad with 5% pure nickel on each side.	23	1.5
20 centavos	.....	3.6	....do	21	1.3
Do	.....	4	80 copper, 20 zinc	21	1.5
Do	.....	4	75 copper, 25 nickel	21	1.5
10 centavos	20,000,000	2.75	Steel clad with 5% nickel on each side.	19	1.3
Do	.....	3	80 copper, 20 zinc	19	1.3
Do	.....	3	75 copper, 25 nickel	19	1.3
5 centavos	.....	2	80 copper, 20 zinc	17	1
Do	.....	2	75 copper, 25 nickel	17	1
Total	40,000,000				

Coinage Mint not reported.

EGYPT (UNITED ARAB REPUBLIC)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 pounds[1]	2,000	52	875 gold, 25 silver, 100 copper	40	.....
5 pounds[1]	4,000	26	....do	33	.....
Do[1]	.....	42.5	....do	37	.....
Do	.....	42.5	875 gold, 75 silver, 50 copper	37	.....
1 pound[1]	.....	8.5	875 gold, 25 silver, 100 copper	24	.....
Do	.....	8.5	875 gold, 75 silver, 50 copper	24	.....
50 piastres	.....	4.25	875 gold, 25 silver, 100 copper	20	0.75
Do[1]	.....	28	900 silver, 100 copper	40	.....
Do[1]	249,004	20	720 silver, 280 copper	40	1.6
25 piastres[1]	252,004	10	....do	30	1.44
Do[1]	.....	17.5	....do	35	1.8-1.9
20 piastres	.....	14	....do	33	1.6-1.7
Do	.....	28	833 1/3 silver, 166 2/3 copper	40	2.2
10 piastres	.....	7	720 silver, 280 copper	26	1.35
Do	.....	7	....do	27	1.3-1.4
Do	.....	14	833 1/3 silver, 166 2/3 copper	33	1.6
Do	.....	7	625 silver, 375 copper	26	1.35
Do[1]	524,004	5	720 silver, 280 copper	24	1.12
5 piastres[1]	510,004	2.5	....do	19	.91
Do	.....	3.5	....do	22	.94-.96
Do	.....	3.5	625 silver, 375 copper	22	.95
Do	.....	7	833 1/3 silver, 166 2/3 copper	26	1.3
2 piastres	.....	2.8	....do	19	1
Do[2]	.....	.....	500 silver, 400 copper, 50 manganese, 50 zinc.	.....	.....
20 milliemes[1]	.....	5.75	92 copper, 8 aluminum	25	1.2
Do	.....	5.8	....do	25	1.5
10 milliemes	10,690,000	4.9	....do	23	1.5
Do	.....	5.5	75 copper, 25 nickel	23	1.5
Do	.....	5.75	95.5 copper, 3 tin, 1.5 zinc	24	1.4
5 milliemes	.....	4	75 copper, 25 nickel	21	1.3
Do	.....	4	95.5 copper, 3 tin, 1.5 zinc	20	1.5
Do	17,404,000	3.6	92 copper, 8 aluminum	21	1.33
2 milliemes	.....	2.33	....do	18	1.15
1 millieme	.....	1.8	....do	16	1.15
Do	.....	4.4	95 copper, 4 tin, 1 zinc	23	1.2
Total	29,635,016				

Reported coinage Egyptian Mint. [1] Commemorative issue. [2] Hexagonal.

Coinage of Nations and Coins in Circulation in 1964--Continued

EL SALVADOR

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 centavos	.....	5	900 silver, 100 copper	21	1.9
25 centavos*	.....	2.5	....do	17.9	1.3
Do	.....	7.5	....do	29	1.5
10 centavos	.....	7	75 copper, 25 nickel; and 70 copper, 18 zinc, 12 nickel.	26	1.7
5 centavos	.....	5	75 copper, 25 nickel	23	1.78
Do	.....	5	Nickel silver 12%; and 70 copper, 18 zinc, 12 nickel.	23	1.7
3 centavos	.....	4	75 copper, 25 nickel	20	1.7
1 centavo	.....	2.5	95 copper, 5 zinc	16	1.68
Do	.....	2.5	95 copper, 5 zinc and tin	16	1.7
Do	.....	2.5	75 copper, 25 nickel	16	1.7
Total	.....				

*United States dimes (1/10 dollar) also circulate as 25-centavo denomination in El Salvador, however they are being withdrawn from circulation.

ETHIOPIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 cents	.....	7.0307	800 silver, 200 copper	25	2
Do	.....	7.0307	700 silver, 300 copper	25	2
25 cents*	.....	6.8039	95 copper, 5 zinc	26	2.1
Do*	.....	6.8039	95 copper, 5 zinc and tin	26	2.1
10 cents	4,800,000	6.0911	95 copper, 5 zinc	23	2.11
Do	.....	6.0911	95 copper, 5 zinc and tin	23	2.1
5 cents	11,952,000	4.0175	95 copper, 5 zinc	20	1.83
Do	.....	4.0175	95 copper, 5 zinc and tin	20	1.8
1 cent	.....	2.85115	95 copper, 5 zinc; and 95 copper, 5 zinc and tin.	17	1.8
Total	16,752,000				

Reported coinage Mints in the United Kingdom.
*Scalloped coin.
Fifty-cent coins are being withdrawn from circulation.
Coins manufactured during 1964 were dated 1944.

FALKLAND ISLANDS

(United Kingdom coins circulate in the Falkland Islands)

FAROE ISLANDS

(Danish coins circulate in the Faroe Islands)

FIJI

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Florin (2 s.)	.....	11.31036	500 silver, 500 copper	28.6	2.2
Do	.....	11.31036	75 copper, 25 nickel	28.5	2.31
Shilling (1 s.)	.....	5.65518	500 silver, 500 copper	23.9	1.7
Do	.....	5.65518	75 copper, 25 nickel	23.6	1.73
Sixpence (6 d.)	.....	2.82759	500 silver, 500 copper	19.4	1.3
Do	.....	2.82759	75 copper, 25 nickel	19.4	1.4
Threepence (3 d.)	240,000	6.1559	79 copper, 20 zinc, 1 nickel	(a)	2.54
Penny (1 d.)	432,000	6.4799	75 copper, 25 nickel	b 26	1.98
Halfpenny (1/2 d.)	.....	3.23995	....do	b 21	1.6
Total	672,000				

Reported coinage Mints in the United Kingdom.
a Twelve-sided coin, 21.1 mm. across flats, and 21.9 mm. diagonally.
b Diameter of central perforation 7 mm.
Composition of the 1942 and 1943 coinage in the United States was as follows: Florins, shillings and sixpence, 900 silver and 100 copper; penny and halfpenny, 65 copper and 35 zinc; weights and dimensions the same as shown in the table above.
Coins manufactured during 1964 were dated 1964.

Coinage of Nations and Coins in Circulation in 1964--Continued

FINLAND[1]

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Old Markkaa*					
1000 markkaa[2]	.....	14	875 silver, 125 copper.....	30	2.4
500 markkaa[2]	.....	12	500 silver, 400 copper, 100 nickel..	32	2
200 markkaa	.....	8.3	500 silver, 380 copper, 120 zinc....	27.5	1.9
100 markkaa	.....	5.2	....do.....	24	1.7
50 markkaa	.....	5.5	93 copper, 5 aluminum, 2 nickel.....	25	1.9
20 markkaa	.....	4.5	....do.....	22.5	1.9
10 markkaa	.....	3	....do.....	20	1.5
5 markkaa	.....	2.55	Iron with nickel plating.....	18	1.5
Do.	.....	4.5	92 copper, 6 aluminum, 2 nickel.....	23	1.8
Do.	.....	4.5	90 copper, 7 zinc, 3 aluminum.....	23	1.8
Do.	.....	4.55	72 copper, 28 zinc.....	23	1.8
1 markka	.....	1.15	Iron with nickel plating.....	16	1
Do.	.....	4	75 copper, 25 nickel.....	21	1.5
Do.	.....	4	95 copper, 4 tin, 1 zinc; or pure copper.	21	1.5
Do.	.....	3.5	Iron.....	21	1.5
New Markkaa-Pennia**					
1 markka	9,999,000	6.4	350 silver, 570 copper, 80 zinc.....	24	1.77
50 pennia	3,101,000	5.5	93 copper, 5 aluminum, 2 nickel.....	25	1.9
20 pennia	4,248,000	4.5	....do.....	22.5	1.9
10 pennia	6,926,000	3	....do.....	20	1.5
5 pennia	4,634,000	2.6	97 copper, 2.5 zinc, 0.5 tin.....	18	1.4
1 penni	49,300,000	1.6	....do.....	15.8	1.1
Total	78,208,000				

Reported coinage Finnish Mint.

[1] In accordance with a Currency Act and an Act for Enforcement of the Currency Act, promulgated on March 30, 1962 and effective January 1, 1963, Finland introduced a new monetary unit called the "new markka". The new unit, divided into 100 parts called "penni" is equivalent to 100 old markkaa.

[2] Commemorative issue.

* Old markkaa coins will remain in circulation until they are replaced by the new series of coins.

** The new series of penni coins was placed in circulation beginning January 1, 1963, and the new markka coins were placed in circulation during October 1964.

FRANCE

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Old Francs					
100 francs	.....	6	75 copper, 25 nickel.....	24	1.9
50 francs	.....	8	91 copper, 9 aluminum.....	27	2.4
20 francs	.....	4	....do.....	23.5	1.7
10 francs	.....	3	....do.....	20	1.7
5 francs	.....	3.5	95 aluminum, 5 magnesium.....	31	2.3
2 francs	.....	2.2	....do.....	27	1.9
1 franc	.....	1.3	....do.....	23	1.4
Francs*					
10 francs	363,000	25	900 silver, 100 copper.....	37	.....
5 francs	32,378,000	12	835 silver, 165 copper.....	29	2.2
1 franc	77,240,000	6	Pure nickel.....	24	1.9
1/2 franc	6,496,000	4.5	....do.....	19.5	.....
50 centimes	41,446,000	7	92 copper, 6 aluminum, 2 nickel.....	25	.....
20 centimes	127,521,000	4	....do.....	23.5	.....
10 centimes	93,409,000	3	....do.....	20	.....
5 centimes	126,480,000	3.4	Stainless steel.....	19	.....
1 centime	22,654,000	1.65	....do.....	15	.....
Total	527,987,000				

Reported coinage French Government Mint.

* The new francs (NF) or "nouveau francs" are equal to 100 former French francs. The 10 franc and the 1/2 franc coins were first coined in 1964 and they will be issued during January 1965. The 5 and 1 franc coins were first coined in 1959 and first issued in 1960. The centime coins were first coined and issued in 1962. Beginning January 1, 1963 the term "new" was omitted according to Decree No. 62-1320 of November 9, 1962.

Coinage of Nations and Coins in Circulation in 1964--Continued

FRENCH GUADELOUPE

(Metropolitan French coins circulate in French Guadeloupe)

FRENCH GUIANA

(Metropolitan French coins circulate in French Guiana)

FRENCH MARTINIQUE

(Metropolitan French coins circulate in French Martinique)

FRENCH POLYNESIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 francs	.....	3.5	95 aluminum, 5 magnesium	31	2.5
2 francs	.....	2.2	....do	27	1.9
1 franc	.....	1.3	....do	23	1.7
50 centimes	.....	0.7	....do	18	.....
Total	.....				

French Polynesia, formerly called French Settlements in Pacific Oceania, is administratively divided into the following circonscriptions: The Windward Islands, Leeward Islands, Tuámotu group, Austral Islands, and the Marquezas Islands.

FRENCH SOMALILAND

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 francs	.....	4	91 copper, 9 aluminum	23.5	.....
5 francs	.....	3.5	95 aluminum, 5 magnesium	31	.....
2 francs	62,500	2.2	....do	27	.....
1 franc	.....	1.3	....do	23	.....
Total	62,500				

Reported coinage French Government Mint.

GABON, REPUBLIC OF

(See Africa, Equatorial)

GAMBIA

(See Africa, West)

GERMANY, FEDERAL REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 Deutsche Mark	7,674,799	11.2	625 silver, 375 copper	29	2.07
2 Deutsche Mark	16,959,631	7	75 copper, 25 nickel	26.75	1.79
1 Deutsche Mark	44,603,609	5.5	....do	23.5	1.75
50 pfennig	46,592,348	3.5	....do	20	1.58
10 pfennig	165,800,821	4	Iron core with tombac plating on both sides (sometimes called pinchbeck plating).	21.5	1.7
5 pfennig	108,334,510	3	....do	18.5	1.7
2 pfennig	107,637,343	3.25	95 copper, 4 tin, 1 zinc	19.25	1.52
1 pfennig	.....	2	Iron core 90% by weight with copper plating 5% by weight on each side.	16.5	1.35
Do	193,643,795	2	....do	16.5	1.38
Total	691,246,856				

Reported coinage German Federal Government Mints.

Coinage of Nations and Coins in Circulation in 1964--Continued

GHANA[1]

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Pound, shilling, pence system coins[1]					
Commemorative coin..	.....	15.97611	916 2/3 gold, 83 1/3 copper.....	28.40	.....
10 shillings.....	.....	28.2759	925 silver, 75 copper.....	38.74	.....
2 shillings.....	.....	9.07185	75 copper, 25 nickel.....	26.49	2.13
1 shilling.....	.....	4.53595	....do.....	20.96	1.83
Sixpence.....	.....	2.26796	....do.....	16.99	1.42
Threepence[2].....	.....	3.23995	....do.....	19.51	1.60
Penny.....	.....	5.6699	95.5 copper, 3 tin, 1.5 zinc.....	25.48	1.65
Halfpenny.....	.....	2.83495	....do.....	20.19	1.27
Decimal system coins[3]					
10 pesewas.....	22,750,000	3.25	75 copper, 25 nickel.....	20	.....
5 pesewas[2].....	19,500,000	4.15	....do.....	22	.....
Total.....	42,250,000				

Reported coinage Mints in the United Kingdom.

[1] The Government of Ghana introduced distinctive Ghanaian coins July 14, 1958, and simultaneously commenced withdrawal of West African coins.

[2] Coin has 12 scallops.

[3] Effective July 19, 1965, Ghana will adopt a decimal currency system. The monetary unit, the cedi, will consist of 100 pesewas. In addition to the decimal coins shown in the table, cupronickel 50 and 25 pesewa coins will be issued.

Coins manufactured during 1964 were dated 1965.

GIBRALTAR

(United Kingdom coins circulate in Gibraltar)

GOA

(Indian coins circulate in Goa)

GREECE

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
30 drachmas[1].....	2,000,000	12	835 silver, 165 copper.....	30	2.2
20 drachmas[2].....	132,000	7.5	....do.....	26.01	.....
10 drachmas[3].....	.....	10	99.5 nickel, 0.5 copper.....	30	1.57
5 drachmas.....	.....	9	75 copper, 25 nickel.....	28	2
2 drachmas.....	.....	6	....do.....	24	1.95
1 drachma	.....	4	....do.....	21	1.70
50 lepta.....	.....	2.3	....do.....	18	1.37
20 lepta[4].....	8,000,000	1.2	95 aluminum, 5 magnesium.....	24	1.25
10 lepta[4].....	12,000,000	1	....do.....	22	1.25
5 lepta[4].....	.....	0.85	....do.....	20	1.4
Total.....	22,132,000				

Reported coinage: 30 drachmas Swiss Federal Mint, 20 drachmas Mints in the United Kingdom (coins dated 1960), and the 20 and 10 leptas were manufactured by the Austrian Mint.

[1] Commemorative issue.

[2] First coined in 1960.

[3] First coined in 1959.

[4] Central hole: Diameter of 20 lepta, 4 mm.; 10 lepta, 3.5 mm.; and 5 lepta, 3 mm.

Coinage of Nations and Coins in Circulation in 1964--Continued

GREENLAND

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 krone	.....	7.5	92 copper, 6 aluminum, 2 nickel	28	1.9
50 ore	.....	3.75	....do	22	1.6
25 ore	.....	7	75 copper, 25 nickel	25	1.95
Total	.....				

Fractional Danish coins also circulate in Greenland.

GRENADA (WINDWARD ISLANDS)

(See Caribbean Territories, Eastern Group)

GUATEMALA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 centavos*	.....	11.944	720 silver, 280 copper	31	2.0
25 centavos	134,916	8 1/3	....do	27	1.75
10 centavos	964,259	3 1/3	....do	21	1.4
5 centavos	449,272	1 2/3	....do	16	1.2
2 centavos	.....	6	70 copper, 30 zinc	25.5	1.6
1 centavo	.....	3	79 copper, 20 zinc, 1 nickel	20	1.52
Do	5,162,010	3	70 copper, 30 zinc	21	1.35
1/2 centavo	.....	1 1/2	....do	16	.7
Total	6,710,457				

Reported coinage Guatemalan Mint.
*First coined and issued in 1962.

GUERNSEY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Threepence[1]	.....	6.80389	75 copper, 25 nickel	21	.....
Do[2]	.....	3.53154	....do	21	.....
8 doubles	.....	9.7198	95.5 copper, 3 tin, 1.5 zinc	30.9	.....
Do	.....	9.7198	95 copper, 4 tin, 1 zinc	31.6	.....
Do	.....	9.7198	97 copper, 2.5 zinc, 0.5 tin	30.9	.....
4 doubles	.....	4.8599	95.5 copper, 3 tin, 1.5 zinc	25.5	.....
Do	.....	4.8599	95 copper, 4 tin, 1 zinc	26.4	.....
2 doubles	.....	3.564	....do	22.2	1.3
1 double	.....	2.268	....do	19	1.3
Total	.....				

[1] First coined in 1959, coin has twelve scallops.
[2] Twelve scallops. Maximum diameter 21 mm., minimum diameter, 19.9 mm. First coined in 1956.
United Kingdom coins also circulate in Guernsey.

Coinage of Nations and Coins in Circulation in 1964--Continued

GUINEA

Denomination[1]	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
25 francs	.....	9	75 copper, 25 nickel	27	m 2.03
10 francs	.....	6	....do	23.5	m 1.75
5 francs	.....	3.5	....do	20	m 1.52
1 franc	.....	1.5	....do	17	m .89
Total	.....				

A new monetary unit, the Guinea franc, was introduced on March 1, 1960 to replace the CFA franc.

[1] The four denominations of cupronickel coins shown in the table are the second series of coins placed in circulation since March 1, 1960. A series of three denominations of aluminum-bronze coins (25, 10, and 5 francs) were issued before 1962.

HAITI

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 centimes	.....	9.88	75 copper, 25 nickel	29	1.9
20 centimes	.....	7.5	70 copper, 18 zinc, 12 nickel	26	1.9
Do	.....	7.55	75 copper, 25 nickel	26	1.8
10 centimes	.....	4	....do	22	1.3
Do	.....	4	70 copper, 18 zinc, 12 nickel	22.7	1.4
5 centimes	.....	2.65	75 copper, 25 nickel	20	1.1
Do	.....	2.75	70 copper, 18 zinc, 12 nickel	19.9	1.3
Total	.....				

United States coins also circulate in Haiti.

HONDURAS

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 lempira	.....	12.5	900 silver, 100 copper	31	2
50 centavos	.....	6.25	....do	24	1.7
20 centavos	.....	2.5	....do	18	1.4
10 centavos	.....	7	75 copper, 25 nickel	26	1.8
5 centavos	.....	5	....do	21	2
2 centavos	.....	3	95 copper, 5 zinc and tin	20	1.4
1 centavo	.....	1.5	....do	15	1.3
Do	.....	2	....do	15	1.7
Total	.....				

HONG KONG

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 dollar[1]	.....	11.6638	75 copper, 25 nickel	30	.....
50 cents	8,000,000	5.832	....do	23.6	1.93
10 cents	16,900,000	4.5359	79 copper, 20 zinc, 1 nickel	20.6	1.98
5 cents	.....	2.592	....do	16.5	1.8
Total	24,900,000				

Reported coinage Mints in the United Kingdom.

[1] First coined in 1960.

Coins manufactured during 1964 were dated 1964 with the exception of 3.0 million 50 cents and 7.9 million 10 cents which were dated 1963.

Coinage of Nations and Coins in Circulation in 1964--Continued

ICELAND

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
500 kronur[1]	.....	8.96039	900 gold, 100 copper	23.01	.....
2 kronur	.....	9.5	92 copper, 6 aluminum, 2 nickel	28	2.08
Do	.....	9.5	79 copper, 20 zinc, 1 nickel	28	.....
1 krona	.....	4.75	....do	22.5	1.73
Do	.....	4.75	92 copper, 6 aluminum, 2 nickel	22.5	1.5
25 aurar	2,000,000	2.4	75 copper, 25 nickel	17	1.45
Do	.....	2	Zinc	17	1.3
10 aurar	2,000,000	1.5	75 copper, 25 nickel	15	1.19
Do	.....	1.25	Zinc	15	1
5 aurar	.....	6	95.5 copper, 3 tin, 1.5 zinc	24	1.78
Do	.....	6	95 copper, 4 tin, 1 zinc	24	1.5
Do	800,000	6	97 copper, 2.5 zinc, 0.5 tin	24	1.78
2 aurar	.....	3	95.5 copper, 3 tin, 1.5 zinc; 95 copper, 4 tin, 1 zinc; 97 copper, 2.5 zinc, 0.5 tin.	19	1.3
1 eyrir	.....	1.6	95.5 copper, 3 tin, 1.5 zinc	15	1.27
Do	.....	1.6	95 copper, 4 tin, 1 zinc	15	1
Do	.....	1.6	97 copper, 2.5 zinc, 0.5 tin	15	1.27
Total	4,800,000				

Reported coinage Mints in the United Kingdom.
[1] Commemorative issue.
Coins manufactured during 1964 were dated 1965.

INDIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Rupee-anna coinage[1]					
1 rupee	.....	11.6638	500 silver, 400 copper, 50 zinc, and 50 nickel.	30.5	.....
Do[2]	.....	11.6638	Pure nickel	27.9	2.1
1/2 rupee	.....	5.8319	500 silver, 400 copper, 50 zinc, and 50 nickel.	24.1	.....
Do[2]	.....	5.8319	Pure nickel	24.1	1.4
1/4 rupee	.....	2.916	500 silver, 400 copper, 50 zinc, and 50 nickel.	19.1	.....
Do[2]	.....	2.916	Pure nickel	19.1	1.2
4 annas	.....	6.8039	75 copper, 25 nickel	23.5&25.4	.....
1 anna*	.....	3.8879	....do	21 & 19.8	1.4
Single pice*	.....	6.4799	Copper	25.4	.....
Do*	.....	4.8599	97 copper, 2.5 zinc, 0.5 tin	25.4	.....
Do*	.....	3.8879	....do	21.3	1.4
Do*	.....	2.916	....do	21.3	1.1
Do*	.....	1.944	....do	21.3	1.4
Rupee-naya paisa decimal coinage[2]					
Decimal rupee	12,260,000	10	Pure nickel	26	.....
50 naye paise	47,290,000	5	....do	24	1.55
25 naye paise	90,440,000	2.5	....do	19	1.25
10 naye paise[3]	92,760,000	5	75 copper, 25 nickel	23	1.8
5 naye paise[4]	156,920,000	4	....do	22	1.8
3 naye paise[5]	133,840,000	1.25	Aluminum with 3.5-4.0 percent magnesium.	([5])	1.95
2 naye paise[3]	359,880,000	3	....do	18	1.65
1 naya paisa	.....	1.5	97 copper, 2.5 zinc, 0.5 tin	16	1.14
Do	647,930,000	1.5	78-83 copper, 17-20 zinc, 0.9-1.4 nickel.	16	1.2
Total	1,541,320,000				

Reported coinage Indian Government Mints Alipore, Bombay, and Hyderabad. The decimal system of coinage, authorized by the Indian Coinage (Amendment) Act, 1955, became effective April 1, 1957. Decimal coins in the denominations of 10, 5, 2, and 1 naye paise were placed in circulation from April 1, 1957; the 25 naye paise, in 1959; the 50 naye paise, in 1960; the decimal rupee, in 1962; and the 3 naye paise, in 1964.
[1] Rupee-anna coins are round with two exceptions: 4 and 1 anna coins of cupronickel with 8 and 12 scallops; and single pice of 1.944 grams, round with round hole in center approximately 9.4 millimeters in diameter. There are 16 annas to one rupee.
Bronze alloy prior to February 1936 was 95 copper, 4 tin, and 1 zinc; from February 1936 through 1942, 95.5 copper, 3 tin, and 1.5 zinc; and after 1943 as shown in table.
[2] Currently issued: Eight denominations of decimal coins and the former pure nickel 1 rupee, 1/2 and 1/4 rupee which are equivalent to the decimal rupee, 50 and 25 naye paise, respectively.
[3] Scalloped (8).
[4] Square with round corners.
[5] Hexagonal shaped coin with rounded corners and unmilled rim, 21 mm. across corners and 19.5 mm. across flat sides.
Indian coins also circulate in Bahrein, Bhutan, Qatar, the Trucial States, Muscat, Nepal, and Goa.

Coinage of Nations and Coins in Circulation in 1964--Continued

IRAN (Year ended March 20, 1964)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 pahlevi	20	40.67990	900 gold, 100 copper	40	2.0
2 1/2 pahlevi	30	20.33995	....do	30	1.80
1 pahlevi	20,000	8.13598	....do	22	1.25
1/2 pahlevi	40,000	4.06799	....do	19	.83
1/4 pahlevi	80,000	2.033995	....do	16	.60
Do	.....	2.033995	....do	14	.76
Do	.....	2.033995	900 gold, 100 copper and silver or 100 copper.	16	.58
10 rials	3,762,780	9	75 copper, 25 nickel	31	1.32
Do	.....	12	....do	31	1.78
Do	.....	16	600 silver, 400 copper	32	2.5
5 rials	7,837,646	5	75 copper, 25 nickel	26	1.05
Do	.....	7	....do	26	1.5
Do	.....	8	600 silver, 400 copper	26	1.9
2 rials	8,569,698	3	75 copper, 25 nickel	22.5	.83
Do	.....	4	....do	22.5	1.15
Do	.....	3.2	600 silver, 400 copper	22	1.3
1 rial	13,332,241	1.75	75 copper, 25 nickel	18.5	.74
Do	.....	2	....do	18.5	.85
Do	.....	1.6	600 silver, 400 copper	18	.9
50 dinars	.....	3.49	Copper	20	.....
Do	.....	3.49	91.5 copper, 8.5 aluminum	20	.....
Do	800,000	2.5	....do	20	1.0
25 dinars	.....	3	....do	19	.....
10 dinars	.....	2.68	....do	18	.....
5 dinars	.....	1.65	....do	16	.....
Total	34,442,415				

Reported coinage Iranian Government Mint. Few silver coins are in active circulation.

Coinage of Nations and Coins in Circulation in 1964--Continued

IRAQ

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 fils[1]	.....	10	500 silver, 400 copper , 50 nickel, 50 zinc.	29	.....
50 fils[1]	.....	5	....do.....	23	.....
25 fils[2]	.....	2.5	....do.....	20	.....
10 fils[3]	4,000,000	6.75	75 copper, 25 nickel.....	26	1.9
5 fils[3]	.....	5	....do.....	22	.....
1 fils[4]	.....	2.5	95.5 copper, 3 tin, 1.5 zinc.....	19	.....
Total.....	4,000,000				

Reported coinage Mints in the United Kingdom.
[1] First coined in 1959, authorized by Republican Ordinance No. 460 of 1959.
[2] First coined in 1960; first issued in 1961. Authorized by Republican Ordinance No. 649 of 1959.
[3] First coined in 1959; first issued in 1960. Coin has twelve scallops.
[4] First coined and issued in 1960. Coin is ten-sided. Diameter, inside measurement.

Note:--The Government of Iraq, by Republican Ordinance No. 415 dated July 2, 1960, demonetized all coins minted prior to 1959; such coins ceased to be legal tender as from January 6, 1961. All coins shown in the table above bear on the obverse the Coat of Arms of the Republic of Iraq.

IRELAND, REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Half-crown (2 1/2 s.)	.....	14.13795	750 silver, 250 copper.....	32.3	2.3
Do.....	3,200,000	14.13795	75 copper, 25 nickel.....	32.3	2.31
Florin (2 s.).....	.....	11.31036	750 silver, 250 copper.....	28.5	2.3
Do.....	4,000,000	11.31036	75 copper, 25 nickel.....	28.5	2.31
Shilling (1 s.).....	.....	5.65518	750 silver, 250 copper.....	23.6	1.8
Do.....	4,000,000	5.65518	75 copper, 25 nickel.....	23.6	1.8
Sixpence (6 d.).....	6,000,000	4.53593	....do.....	20.83	1.4
Do.....	.....	4.53593	Pure nickel.....	21	1.9
Threepence (3 d.)...	4,000,000	3.23995	75 copper, 25 nickel.....	17.7	1.9
Do.....	.....	3.23995	Pure nickel.....	17.7	1.9
Penny (1 d.).....	9,600,000	9.44984	97 copper, 2.5 zinc, 0.5 tin.....	30.9	.....
Do.....	.....	9.44984	95.5 copper, 3 tin, 1.5 zinc.....	30.9	1.9
Halfpenny (1/2 d.)..	.....	5.6699	....do.....	25.5	1.8
Do.....	2,160,000	5.6699	97 copper, 2.5 zinc, 0.5 tin.....	25.5	.....
Farthing (1/4 d.)...	.....	2.83495	95.5 copper, 3 tin, 1.5 zinc.....	20.2	1.5
Do.....	.....	2.83495	97 copper, 2.5 zinc, 0.5 tin.....	20.2	1.5
Total*.....	32,960,000				

Reported coinage Mints in the United Kingdom.
Coins manufactured during 1964 were dated 1964 with the exception of 3.6 million pennies which were dated 1963.

ISLE OF MAN

(United Kingdom coins circulate in the Isle of Man)

Coinage of Nations and Coins in Circulation in 1964--Continued

ISRAEL

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 pounds[1]	.....	26.68	916.6 gold, 83.4 copper	33	1.76
50 pounds[1]	7,516	13.34	....do	27	1.31
20 pounds[1]	.....	7.988	....do	22	1.6
5 pounds[1]	15,600	25	900 silver, 100 copper	34	3.4
1 pound[1]	.....	14.1	75 copper, 25 nickel	32.2	2.4
Do	7,945	9	....do	27.5	2.2
1/2 pound	4,181,607	6.8	....do	24.5	2
Do[1]	.....	12	....do	29.5	2.4
Pruta coinage[2]					
500 prutot[1]	.....	25.5	500 silver, 500 copper and nickel	38	2.8
250 prutot[1]	.....	14.3	....do	32.25	2.2
Do	.....	14.1	75 copper, 25 nickel	32.25	2.3
100 prutot	.....	11.3	....do	28.5	2.3
Do	.....	7.3	Nickel plated steel	25.6	2.2
50 prutot	.....	5	....do	23.5	1.7
Do	.....	5.6	75 copper, 25 nickel	23.5	1.8
25 prutot	.....	2.8	....do	19.5	1.3
Do	.....	2.5	Nickel plated steel	19.5	1.3
10 prutot (round)	.....	6.1	95 copper, 3 tin, 2 zinc	24.5	1.6
Do[3]	.....	1.6	Aluminum	24.5	1.4
Do	.....	1.5	....do	24.5	1.4
Do	.....	1.5	Aluminum brown anodized	24.5	1.4
5 prutot	.....	3.2	95 copper, 3 tin, 2 zinc	20	1.5
1 pruta	.....	1.3	Aluminum	21	1.7
Agora coinage[2]					
25 agorot	162,113	6.5	92 copper, 6 aluminum, 2 nickel	25.5	1.9
10 agorot	1,767,321	4.2	....do	21.5	1.8
5 agorot	287,003	2.32	....do	17.5	1.5
1 agora[3]	23,179,623	1.03	97 aluminum, 3 magnesium	20	1.35
Total	29,608,728				

[1] Commemorative coin.
[2] Since January 1, 1960 the Israeli pound has been divided into 100 agorot instead of 1,000 prutot.
[3] Coin has twelve scallops.

ITALY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
500 lire	4,880,000	11	"Lega argento" (835 silver, 165 copper).	29	2
100 lire	32,200,000	8	"Acmonital" (Steel containing 18 percent chrome).	27.8	2
50 lire	37,900,000	6.25	....do	24.8	2
20 lire	.....	3.6	"Bronzital" (91.6 copper, 8.0 aluminum, 0.4 titanium).	21.3	1.6
10 lire	.....	1.6	"Italma" (96.2 aluminum, 3.5 magnesium, 0.3 manganese).	23.3	1.6
5 lire	.....	1	....do	20.2	1.5
2 lire	.....	0.8	....do	18.3	1.4
1 lira	.....	0.625	....do	17.2	1.2
Total	74,980,000				

Reported coinage Italian Mint.
Coins of Italy circulate in San Marino.
Coinage for 1963 is given elsewhere in this Report.

IVORY COAST, REPUBLIC OF

(See Africa, West--Monetary Union of)

Coinage of Nations and Coins in Circulation in 1964--Continued

JAMAICA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Penny	480,000	7.5	79 copper, 20 zinc, 1 nickel	27	1.83
Halfpenny	1,440,000	4.5	....do	22.5	1.65
Farthing	.....	2.75	....do	20.2	.....
Total	1,920,000				

Reported coinage Mints in the United Kingdom.
United Kingdom coins also circulate in Jamaica, including Turks, Caicos, and Cayman Islands.
Coins manufactured during 1964 were dated 1964.

JAPAN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1,000 yen*	15,000,000	20	925 silver, 75 copper	35	2.5
100 yen*	90,000,000	4.8	600 silver, 300 copper, 100 zinc	22.6	1.7
50 yen	.....	5.5	Pure nickel	25	1.6
Do	69,200,000	5	....do	(a)	1.6
10 yen	479,200,000	4.5	95 copper, 4-3 zinc, 1-2 tin	23.5	1.5
5 yen	379,700,000	3.75	60-70 copper, 40-30 zinc	(b)	1.5
Do	.....	4	....do	22	1.6
1 yen	1,665,100,000	1	Pure aluminum	20	1.5
Total	2,698,200,000				

Reported coinage Japanese Mint.
[a] Round coin 25 mm. in diameter with central hole 6 mm. in diameter.
[b] Round coin 22 mm. in diameter with central hole 5 mm. in diameter.
*Commemorative issue.

JERSEY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Threepence	1,200,000	6.8039	79 copper, 20 zinc, 1 nickel	(a)	.....
Do	.....	4.7174	....do	21	1.85
Penny	.....	9.44984	95.5 copper, 3 tin, 1.5 zinc	30.9	1.83
Do	1,200,000	9.44984	97 copper, 2.5 zinc, 0.5 tin	30.9	.....
Halfpenny	.....	5.6699	95.5 copper, 3 tin, 1.5 zinc	25.5	.....
Total[b]	2,400,000				

Reported coinage Mints in the United Kingdom.
[a] Twelve sided coin, measuring 21.1 mm. across flat sides.
b Does not include 7,000 proof sets containing two each of the threepence (nickel brass) and the penny (bronze) denominations, or a total of 28,000 coins.
United Kingdom coins also circulate in Jersey.
Regular issue coins manufactured during 1964 were dated 1964.

JORDAN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 fils	3,000	12	75 copper, 25 nickel	30	2.2
50 fils	1,003,000	7.5	....do	26	1.9
20 fils	3,000	3.75	....do	20	1.6
10 fils	1,253,000	10	97 copper, 2.5 zinc, 0.5 tin	28	2.2
Do	.....	10	95.5 copper, 3 tin, 1.5 zinc	28	2.2
5 fils	.....	6	....do	24	1.8
Do	3,753,000	6	97 copper, 2.5 zinc, 0.5 tin	24	1.8
1 fils	3,000	3	....do	18	1.6
Do	.....	3	95.5 copper, 3 tin, 1.5 zinc	18	1.6
Total	6,018,000				

Reported coinage Mints in the United Kingdom.
Coins manufactured during 1964 were dated 1964 with the exception of 1,250,000 five fils which were dated 1962.

Coinage of Nations and Coins in Circulation in 1964--Continued

KENYA

(See Africa, East)

KOREA, REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 hwan	.....	6.73909	75 copper, 25 nickel	26	1.70
50 hwan	.....	3.69354	70 copper, 18 zinc, 12 nickel	22.86	1.27
10 hwan	.....	2.46236	95 copper, 5 zinc	19.1	1.17
Total	.....				

Note:--Law No. 1088 promulgated on June 9, 1962 changed the monetary unit from HWAN to WON. The WON shall be divided into 100 CHON, and shall be equivalent to ten hwan. The law provided for new won coins, and for the exchange of coins of the 50 and 10 hwan denominations for new bank notes at the rate of 10 hwan to 1 won until July 11, 1962. The 50 and 10 hwan coins are temporarily in circulation as 5 and 1 won respectively, according to Law No. 1132 promulgated on Aug. 28, 1962.

KUWAIT

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 dinars*	.....	13.57149	916 2/3 gold, 83 1/3 other	28.4	.....
100 fils	160,000	6.5	75 copper, 25 nickel	26	.....
50 fils	300,000	4.5	....do	23	.....
20 fils	480,000	3	....do	20	.....
10 fils	800,000	3.75	79 copper, 20 zinc, 1 nickel	21	.....
5 fils	600,000	2.5	....do	19.5	.....
1 fils	600,000	2	....do	17	.....
Total	2,940,000				

Reported coinage Mints in the United Kingdom.

Distinctive Kuwaiti coins were first coined during 1960, and first issued during 1961, except for the 5-dinar gold coins which were first coined during 1961. The Kuwaiti Dinar is divided into 1,000 fils, and every 100 fils equals one Dirham.

*Not in active circulation.

Coins manufactured during 1964 were dated 1964.

LAOS

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 cents	.....	3.5	95 aluminum, 5 magnesium	31	2.7
20 cents	.....	2.2	....do	27	2.4
10 cents	.....	1.3	....do	23	1.9
Total	.....				

Coins are round with central holes measuring 4 mm. for the 50-cent, 4 mm. for the 20-cent, and 3 mm. for the 10-cent coin.

The monetary unit of Laos is the "kip", changed from piastre May 5, 1955. The kip is divided into 100 centimes (cents). Coins shown, bearing the date 1952, were struck in 1953 and placed in circulation in 1954 under authority of Royal Ordinance No. 336/74-CR dated September 25, 1954.

Coinage of Nations and Coins in Circulation in 1964--Continued

LEBANON

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 piastres	.....	5	600 silver, 400 copper	24	1.4
25 piastres	.....	4	91 copper, 9 aluminum	23.5	1.4
10 piastres	.....	3.5	75 copper, 25 nickel	22	1.6
Do	.....	3.5	91 copper, 9 aluminum	22	1.6
5 piastres	.....	2.9	....do	20	1.6
Do	.....	1	96 aluminum, 4 magnesium	20	1.6
Do	.....	1	Aluminum	20	1.7
2 1/2 piastres[1]	.....	2.75	91 copper, 9 aluminum	20	1.6
1 piastre[2]	.....	2	....do	18	1.6
Total	.....				

[1] Round coin with central hole measuring 4 mm. in diameter.
[2] Round coin with central hole measuring 6 mm. in diameter.

LEEWARD ISLANDS--ATLANTIC GROUP

(See Caribbean Territories, Eastern Group)

LEEWARD ISLANDS--PACIFIC GROUP

(See French Polynesia)

LIBERIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 dollars[1]	.....	18.65	900 gold, 100 copper	27	1.70
1 dollar	.....	20.73565	900 silver, 100 copper	34	2.74
50 cents	.....	10.36783	....do	29	1.90
25 cents	.....	5.18391	....do	23	1.50
10 cents	.....	2.07357	....do	17	1.17
5 cents	.....	4.14713	75 copper, 25 nickel	20	1.73
1 cent	.....	2.59196	95 copper, 5 zinc	17.9	1.40
Total	.....				

United States coins also are legal tender and circulate in Liberia.
[1] Commemorative issue.

LIBYA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
2 piastres	225,000	7.5	75 copper, 25 nickel	26	2
1 piastre	1,100,000	3.75	....do	20	1.7
5 milliemes	.....	10	95.5 copper, 3 tin, 1.5 zinc	28	2.2
Do	380,000	10	97 copper, 2.5 zinc, 0.5 tin	28	2.2
2 milliemes	.....	6	....do	24	1.8
Do	.....	6	95.5 copper, 3 tin, 1.5 zinc	24	1.8
1 millieme	.....	3	....do	18	1.6
Do	600,000	3	97 copper, 2.5 zinc, 0.5 tin	18	1.6
Total	2,305,000				

Reported coinage Mints in the United Kingdom.
Coins manufactured during 1964 were dated 1952.

Coinage of Nations and Coins in Circulation in 1964--Continued

LIECHTENSTEIN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 franken	.....	11.29	900 gold, 100 copper	25	1.6
25 franken	.....	5.645	....do	20	1.4
Total	.....				

Coins of Switzerland circulate in Liechtenstein.

LUXEMBOURG

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
250 francs*	5,000	25	835 silver, 165 copper	37	2.3
100 francs*	50,000	18	....do	33	2.05
5 francs	.....	6	75 copper, 25 nickel	24	1.7
1 franc	.....	4	....do	21	1.51
25 centimes	.....	0.76	Aluminum	19	1
Total	55,000				
Other					
"Monnaies-médailles"	.....	16.64	900 gold, 100 copper	35	1
Do	.....	12.904	....do	26	1.4
Do	25,050	6.4516	....do	21	1.09
Do	.....	25	835 silver, 165 copper	37	2.3
Total	25,050				
Grand total	80,050				

Reported coinage Belgian Mint.
Belgian coins also circulate in Luxembourg.
The 5-franc cupronickel coin weighing 7 grams was demonetized during 1962.
* Commemorative issue.

MADEIRA ISLANDS

(Coins of Portugal circulate in Madeira Islands)

MALAGASY REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 francs	.....	4	91 copper, 9 aluminum	23.5	1.7
10 francs	.....	3	....do	20	1.7
5 francs	.....	3.5	95 aluminum, 5 magnesium	31	2.3
2 francs	.....	2.2	....do	27	1.9
1 franc	.....	1.3	....do	23	1.4
Total	.....				

MALAWI (formerly Nyasaland)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Half-crown (2 1/2 s.)	1,832,000	14.13795	60 copper, 20 zinc, 20 nickel	32.3	2.31
Florin (2 s.)	1,885,000	11.31036	....do	28.5	2.31
Shilling (1 s.)	2,330,000	5.65518	....do	23.6	1.73
Sixpence (6 d.)	2,400,000	2.82759	....do	19.4	1.40
Total	8,447,000				

Reported coinage Mints in the United Kingdom.
Distinctive Malawi coins manufactured during 1964 were dated 1964.
Coins of the former Federation of Rhodesia and Nyasaland were in circulation in Malawi throughout 1964.

Coinage of Nations and Coins in Circulation in 1964--Continued

MALAYSIA*

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 cents	5,000,000	9.3325	75 copper, 25 nickel	27.8	2.21
20 cents	15,000,000	5.65518	....do	23.6	1.73
10 cents	39,400,000	2.82759	....do	19.4	1.40
5 cents	27,560,000	1.413795	....do	16.3	1.02
1 cent	.....	4.21193	95.5 copper, 3 tin, 1.5 zinc	(a)	1.65
Do	.....	4.21193	97 copper, 2.5 zinc, 0.5 tin	(a)	1.65
Do	20,000,000	1.944	....do	17.8	.92
Total	106,960,000				

Reported coinage Mints in the United Kingdom. The 50, 20, 10, and 5 cent coins manufactured during 1964 were dated 1961, the 1 cent coins were dated 1962.

[a] Square coin, 19.8 mm. across flats, 23.4 mm. across diagonals.

Issues of coins of the former Malayan Currency Commission and Straits Settlements Commission continue to circulate except for silver coins which were demonetized Dec. 31, 1952.

*Malaysia: Federation Sept. 16, 1963 included Malaya, British North Borneo (Sabah), Sarawak, and Singapore. Currency area also includes Brunei.

MALDIVE ISLANDS

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 laris	.....	5.655	79 copper, 20 zinc, 1 nickel	23.6	.....
25 laris	.....	4.147	....do	20.19	.....
10 laris	.....	5.184	....do	(a)	.....
5 laris	.....	2.592	....do	(b)	.....
2 laris	.....	3.24	97 copper, 2.5 zinc, 0.5 tin	(c)	.....
1 lari	.....	1.5	....do	15.01	.....
Total	.....				

[a] Twelve scallops, measuring 23.1 mm. across scallops, 21.6 mm. inside scallops.

[b] Eight scallops, measuring 20.3 mm. across scallops, 17.8 mm. inside scallops.

[c] Square coin with rounded corners, 18.2 mm. across flats, 21.5 mm. across diagonals.

MALI, REPUBLIC OF

(No information available.)

MALTA

(United Kingdom coins circulate in Malta)

MARQUEZAS ISLANDS

(See French Polynesia)

MAURITANIA, REPUBLIC OF

(See Africa, West--Monetary Union of)

MAURITIUS

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 rupee	200,000	11.6638	75 copper, 25 nickel	30	2.44
1/2 rupee	.....	5.8319	....do	23.6	.....
1/4 rupee(25 cents)	400,000	2.916	....do	19	.....
10 cents[1]	200,000	5.1839	....do	23.5	1.75
5 cents	.....	9.7198	95.5 copper, 3 tin, 1.5 zinc	28.4	2.06
Do	400,000	9.7198	97 copper, 2.5 zinc, 0.5 tin	28.4	2.06
2 cents	500,000	3.8879	....do	23.1	1.37
Do	.....	3.8879	95.5 copper, 3 tin, 1.5 zinc	23.1	1.37
1 cent	.....	1.944	....do	17.8	1.14
Do	500,000	1.944	97 copper, 2.5 zinc, 0.5 tin	17.8	1.14
Total	2,200,000				

Reported coinage Mints in the United Kingdom. Coins manufactured during 1964 were dated 1964 with following exception of the 10 cent coins which were dated 1963.

[1] Coin has 12 scallops.

Coinage of Nations and Coins in Circulation in 1964--Continued

MEXICO

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 pesos	.....	28.888	900 silver, 100 copper	40	.....
5 pesos	.....	18.055	720 silver, 280 copper	36	.....
Do	.....	27 7/9	....do	40	3
1 peso	15,615,000	16	100 silver, 700 copper, 100 nickel, 100 zinc.	34.5	.....
Do	.....	13 1/3	300 silver, 500 copper, 100 nickel, 100 zinc.	32	2.3
50 centavos	.....	6 2/3	....do	26	1.7
Do	.....	14	95 copper, 2.5 tin, 2.5 zinc	33	.....
Do*	43,806,000	6.5	75 copper, 25 nickel	25	.....
25 centavos*	20,686,000	5.5	....do	23	.....
Do	.....	3 1/3	300 silver, 500 copper, 100 nickel, 100 zinc.	21.5	1.3
20 centavos	28,652,500	10	95 copper, 5 zinc	28.5	2.2
10 centavos	.....	5 1/2	....do	23.5	.....
Do	.....	5 1/2	80 copper, 20 nickel	23.5	1.4
5 centavos	71,768,000	4	85 copper, 15 zinc	20.5	1.7
Do	.....	4	80 copper, 20 nickel	20.5	1.7
Do	.....	6 1/2	95 copper, 5 zinc	25.5	1.8
1 centavo	4,280,000	2	85 copper, 15 zinc	16	1.4
Total	184,807,500				

Reported coinage Mexican Mint.
*First coined and issued in 1964.

MONACO (1963)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Old Francs					
100 francs	.....	6	75 copper, 25 nickel	24	1.85
Do	.....	12	....do	30	.....
50 francs	.....	8	91 copper, 9 aluminum	27	.....
20 francs	.....	4	....do	23.5	.....
10 francs	.....	3	....do	20	.....
5 francs	.....	3.5	Aluminum	31	.....
2 francs	.....	2.2	....do	27	.....
1 franc	.....	1.3	....do	23	.....
New Francs[1]					
5 francs	.....	12	835 silver, 165 copper	29	2.2
1 franc	.....	6	Nickel	24	1.9
Total	.....				

[1] First coined in 1959. The new franc is equal to 100 former francs.
French coins also circulate in Monaco.

MOROCCO

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
500 francs	.....	22.5	900 silver, 100 copper	36	2.95
200 francs	.....	8	720 silver, 280 copper	27	1.9
1 dirham	3,000,000	6	....do	24	1.82
100 francs	.....	4	....do	22	1.4
50 francs	3,765,500	8	91 copper, 9 aluminum	27	2.3
20 francs	4,000,000	4	....do	23.5	1.65
10 francs	4,000,000	3	....do	20	1.5
5 francs	.....	1.85	95 aluminum, 5 magnesium	25	1.95
2 francs	3,000,000	1.2	....do	22	1.5
1 franc	5,920,000	0.8	....do	19	1.50
Total	23,685,500				

Reported coinage French Government Mint.
The dirham replaced the Moroccan franc as the monetary unit on October 16, 1959. One dirham equals 100 francs.

Coinage of Nations and Coins in Circulation in 1964--Continued

MUSCAT

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
15 rials[1]	.....	7.98776	916 2/3 gold, 83 1/3 copper	22.1	.....
1 rial[2]	179,000	28.067	500 silver, 400 copper, 50 nickel, 50 zinc.	38.74	.....
Do	.....	28.067	833 1/3 silver, 166 2/3 copper	38.74	2.79
1/2 rial	.....	26.30836	916 2/3 gold, 83 1/3 copper	33.02	.....
Do[1]	300,000	14.03285	500 silver, 400 copper, 50 nickel, 50 zinc.	33.02	.....
10 baizas	.....	3.888	75 copper, 25 nickel	(a)	(a)
5 baizas	.....	3.5	....do	20	.....
Do	.....	3.888	....do	(b)	(b)
3 baizas	.....	1.94397	97 copper, 2.5 zinc, 0.5 tin	17.78	.....
Do	.....	2.83495	....do	20.19	.....
Do	.....	2.83495	95.5 copper, 3 tin, 1.5 zinc	20.19	.....
Total	479,000				

Reported coinage Mints in the United Kingdom. The Arabic dates on Muscat coins manufactured during 1964 were as follows: One rial coins 1378, and 1/2 rial coins 1381. [1] First coined in 1961. [2] First coined in 1963. [a] Square coin with rounded corners. Dimensions not available. Coined during 1954 and 1955 by the Indian Government Mint. [b] Scalloped coin (12 scallops). Dimensions not available. Coined during 1954 and 1955 by the Indian Government Mint.

Maria Theresa thalers, coins of India, and Persian Guld Indian rupees also circulate in Muscat.

NEPAL

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Bakla Ashrafi	.....	11.6638	995 gold, 5 other	25.2	1.22
Patla Ashrafi	.....	5.8319	....do	25.2	.61
1/6 Ashrafi	.....	1.944	....do	18.29	.28
Dabal (rupee)	15	11.0806	800 silver, 200 copper	29.6	1.6
Do	.....	11.0806	333.3 silver, 666.7 copper	29.6	1.6
Do	.....	11.6638	75 copper, 25 nickel	29.6	1.9
Do	61,475	11.6638	....do	28.6	2.34
Mohur (50 pice)	16	5.5403	800 silver, 200 copper	25.2	1.2
Do	.....	5.5403	333.3 silver, 666.7 copper	25.2	1.2
Do	26,148	5.8319	75 copper, 25 nickel	25.2	1.62
Do	.....	5.8319	....do	24.8	1.4
Suka (25 pice)	346,762	2.916	....do	19.1	1.16
Pachanni	26	2.2161	333.3 silver, 666.7 copper	18.3	.9
Do	.....	2.3328	75 copper, 25 nickel	17.8	1.1
Das paisa (10 pice)	.....	6.4799	95 copper, 5 zinc	24.8	1.5
Do	5,072,278	5	....do	24.8	1.2
Do	23,726	5	95 copper, 5 aluminum	24.8	1.3
Pach paisa (5 pice)	8,106,992	3.8879	95 copper, 5 zinc	22.2	1
Do	7,462	3	95 copper, 5 aluminum	22.2	1
Do	.....	3.2399	70 copper, 20 nickel, 10 zinc	20.3	1
4 pice*	.....	2.3587	66 copper, 34 zinc	19.1	.....
Dui paisa (two pice)	.....	3.8879	....do	22.9	1.1
Do	.....	2.592	....do	20.8	.9
Do	577,570	2.268	....do	19.1	.9
Do	11,260,553	2.25	....do	19	.9
Ek paisa (one pice)	4,926,657	1.5	....do	16.5	.84
Do	93	1.4256	....do	16.5	.8
Do	.....	1.944	....do	20.1	.7
Do	.....	1.62	....do	18.3	.7
Total	30,409,773				

Reported coinage Nepalese Mint. *Coin has central hole. There are 100 pice to the dabal.

NETHERLANDS

Denomination[1]	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Ducat[2]	.....	3.494	983 gold, 17 copper	21	0.7
2 1/2 guilders[3]	2,800,000	15	720 silver, 280 copper	33	2.2
1 guilder	9,000,000	6.5	....do	25	1.8
25 cents	25,000,000	3	Pure nickel	19	1.5
10 cents	41,000,000	1.5	....do	15	1.2
5 cents	21,000,000	3.5	95 copper, 4 tin, 1 zinc	21	1.5
1 cent	73,000,000	2	....do	17	1.3
Total	171,800,000				

Reported coinage Netherlands Mint. [1] The monetary unit is the guilder, also called florin. [2] Gold ducat is a Netherlands trade coin without legal tender capacity. [3] First coined in 1959, first issued on Jan. 16, 1961. The coin is also known as the Rijksdaalder.

Netherlands fractional coins are also legal tender in Biak.

Coinage of Nations and Coins in Circulation in 1964--Continued

NETHERLANDS ANTILLES (CURACAO)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
2 1/2 guilders	200,000	25	720 silver, 280 copper	38	2.7
1 guilder	300,000	10	....do	28	2
25 cents	.....	3.575	640 silver, 360 copper	19	1.7
10 cents	.....	1.4	....do	15	1.1
5 cents[1]	.....	4.5	75 copper, 25 nickel	18	1.8
2 1/2 cents	.....	4	95 copper, 4 zinc, 1 tin	23.5	1.4
1 cent	.....	2.5	....do	19	1.4
Total	500,000				

Reported coinage Netherlands Mint.
[1] Square coin.

NEW CALEDONIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 francs	.....	3.5	95 aluminum, 5 magnesium	31	.....
2 francs	.....	2.2	....do	27	.....
1 franc	.....	1.3	....do	23	.....
50 centimes	.....	0.7	....do	18	.....
Total	.....				

NEW GUINEA, PAPUA

(Australian coins circulate in Papua, located in the southeastern portion of New Guinea and owned by Australia.)

NEW GUINEA, TERRITORY OF

(Australian coins circulate in the United Nations Trust Territory of New Guinea, located in the northeastern portion of New Guinea and administered by Australia.)

NEW HEBRIDES

(Australian, French, and United Kingdom coins circulate in the New Hebrides)

NEW ZEALAND

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Crown (5 s.)	.....	28.2759	75 copper, 25 nickel	38.7	.....
Half-crown (2 1/2 s.)	.....	14.13795	....do	32.3	2.31
Florin (2 s.)	7,000,000	11.31036	....do	28.5	2.31
Shilling (1 s.)	3,400,000	5.65518	....do	23.6	1.73
Sixpence (6 d.)	7,800,000	2.82759	....do	19.4	1.40
Threepence (3 d.)	6,400,000	1.41379	....do	16.3	.99
Penny (1 d.)	.....	9.44984	95.5 copper, 3 tin, 1.5 zinc	30.9	1.70
Do	18,000,000	9.44984	97 copper, 2.5 zinc, 0.5 tin	30.9	1.70
Halfpenny (1/2 d.)	2,880,000	5.6699	....do	25.5	1.65
Do	.....	5.6699	95.5 copper, 3 tin, 1.5 zinc	25.5	1.65
Total	45,480,000				

Reported coinage Mints in the United Kingdom.
New Zealand silver coins were first placed in circulation in 1933; they have been in process of withdrawal since 1947 when cupronickel coins were issued to replace them.
New Zealand bronze coins were first placed in circulation in 1939.
Coins manufactured during 1964 were dated 1964.

Coinage of Nations and Coins in Circulation in 1964--Continued

NICARAGUA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 centavos	.....	8	75 copper, 25 nickel	26	2
25 centavos	1,000,000	5	....do	23	1.8
Do	.....	7.5	70 copper, 30 zinc	27	1.9
10 centavos	.....	5.5	....do	24	1.8
Do	4,000,000	4	75 copper, 25 nickel	20	1.8
5 centavos	4,000,000	3	....do	17	1.8
Do	.....	3.75	70 copper, 30 zinc	21	1.6
Do	.....	5	75 copper, 25 nickel	21	1.6
1 centavo	.....	2.5	70 copper, 30 zinc	18	1.5
Do	.....	4	95 copper, 5 zinc and tin	20	1.6
Total	9,000,000				

Reported coinage Mints in the United Kingdom.
Coins manufactured during 1964 were dated 1964.

NIGER, REPUBLIC OF

(See Africa, West--Monetary Union of)

NIGERIA

Denomination*	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Florin (2s.)	.....	9.96867	75 copper, 25 nickel	26.92	2.6
Shilling (1s.)	.....	4.98433	....do	22.86	1.9
Sixpence (6d.)	.....	2.49217	....do	17.78	1.5
Threepence (3d.)[1]	25,200,000	3.23995	79 copper, 20 zinc, 1 nickel	19.05	1.5
Penny (1d.)[2]	.....	7.55944	95.5 copper, 3 tin, 1.5 zinc	27.94	.....
Do[3]	97,878,000	7.55944	97 copper, 2.5 zinc, 0.5 tin	27.94	1.9
Halfpenny (1/2d.)[4]	23,359,200	3.77972	....do	21.59	1.6
Do[2]	.....	3.77972	95.5 copper, 3 tin, 1.5 zinc	21.59	.....
Total	146,437,200				

Reported coinage Mints in the United Kingdom.
[1] Twelve sided coin.
[2] Round coin with central hole.
[3] Round coin with central hole measuring 6.5 mm. in diameter.
[4] Round coin with central hole measuring 5.0 mm. in diameter.
*First coined in 1959. West African coins are in process of withdrawal.
Coins manufactured during 1964 were dated 1959.

Coinage of Nations and Coins in Circulation in 1964--Continued

NORTH BORNEO (SABAH)

(See Malaysia)

NORTHERN RHODESIA

(See Zambia)

NORWAY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 kroner[1]	1,408,000	20	900 silver, 100 copper	35	.....
5 kroner[2]	7,346,000	11.5	75 copper, 25 nickel	29.5	2.23
1 krone	3,469,000	7	....do	25	1.83
Do	.....	7	....do	25	1.9
Do*	.....	7	....do	25	2.1
50 ore	2,692,000	4.8	....do	22	1.63
Do	.....	4.8	....do	22	1.8
Do*	.....	4.8	....do	22	1.9
25 ore	4,953,000	2.4	....do	17	1.4
Do	.....	2.4	....do	17	1.5
Do*	.....	2.4	....do	17	1.6
10 ore	9,781,000	1.5	....do	15	1.18
Do	.....	1.5	....do	15	1.2
Do*	.....	1.5	....do	15	1.3
5 ore	6,108,000	8	95 copper, 4 tin, 1 zinc	27	1.75
Do	.....	8	....do	27	1.8
Do	.....	8	....do	27	2
2 ore	7,250,000	4	....do	21	1.55
Do	.....	4	....do	21	1.7
Do	.....	3.5	....do	21	1.7
1 ore	11,020,000	2	....do	16	1.38
Do	.....	2	....do	16	1.40
Do	.....	2	....do	16	1.40
Total	54,027,000				

Reported coinage Norwegian Mint.

[1] Commemorative issue. First coined and issued in 1964. The 10 kroner coin is the first Norwegian silver coin manufactured since 1917 when regular issue silver denominations were replaced by cupronickel coins.

[2] First coined in 1963, first issued in March 1964.

*Perforated.

Coinage for 1963 is given elsewhere in this Report.

NYASALAND

(See Malawi)

Coinage of Nations and Coins in Circulation in 1964--Continued

PAKISTAN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Rupee-anna coinage					
1 rupee		11.6638	Pure nickel	27.9	2.16
1/2 rupee		5.8319	....do	24.1	1.60
1/4 rupee		2.916	....do	19.1	1.32
2 annas[a]		5.8319	75 copper, 25 nickel	(a)	1.55
1 anna[b]		3.8879	....do	(b)	1.37
Do[c]		2.916	....do	(c)	1.37
1/2 anna[d]		2.916	....do	(d)	1.27
Do[e]		2.592	79 copper, 20 zinc, 1 nickel	(e)	1.35
Rupee-paisa coinage*					
50 paisa**	3,021,476	5.8319	Pure nickel	24	1.60
25 paisa**	4,583,654	2.916	....do	19	1.30
10 paisa	51,745,000	5	75 copper, 25 nickel	(f)	1.59
5 paisa	63,770,000	3	79 copper, 20 zinc, 1 nickel	(g)	1.39
2 paisa	67,660,000	2.25	97 copper, 2.5 zinc, 0.5 tin	(h)	1.52
1 paisa	39,570,000	1.5	....do	17	1.27
Total	230,350,130				

Reported coinage Pakistani Mint.

*Effective January 1, 1961, decimal coinage was introduced in Pakistan. The rupee is retained as the monetary unit, but it is divided into 100 parts called paisa.

**First coined and issued in 1963.

[a] Square coin with rounded corners and unmilled rim. Diameter across flat sides 0.88 inch (22.4 mm.), across corners 1 inch (25.4 mm.).

[b] Sinuous (waved) edge with 12 scallops. Maximum diameter 0.827 inch (21 mm.), minimum 0.7795 inch (19.8 mm.).

[c] Octagonal shape with waved edge and unmilled rim. Maximum diameter 0.77 inch (19.6 mm.), minimum 0.73 inch (18.5 mm.).

[d] Square coin with rounded corners and unmilled rim. Diameter across flat sides 0.684 inch (17.4 mm.), across corners 0.778 inch (19.8 mm.).

[e] Shape and diameters of nickel-brass half anna are the same as cupronickel half anna.

[f] Twelve scallops with unmilled rim. Maximum diameter 23 mm., minimum diameter 21.80 mm.

[g] Square coin with rounded corners and unmilled rim. Diameter across flat sides 18.6 mm., across corners 21 mm.

[h] Twelve scallops with unmilled rim. Maximum diameter 18.0 mm., minimum diameter 17.5 mm.

PANAMA (REPUBLIC OF)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 balboa		26.73	900 silver, 100 copper	38	2.9
0.50 balboa		12.5	....do	30.6	2.2
0.25 balboa		6.25	....do	25	1.7
0.10 balboa		2.5	....do	18	1.3
5 centesimos		5	75 copper, 25 nickel	21	2
2 1/2 centesimos		3.3	....do	18	1.8
1 1/4 centesimos		3.11	95 copper, 5 zinc and tin	20	1.6
1 centesimo		3.11	....do	19	1.6
Do		3.11	97 copper, 2.5 zinc, 0.5 tin	19	.....
Total					

United States coins also circulate in Panama.

Coinage of Nations and Coins in Circulation in 1964--Continued

PARAGUAY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 centimos	.....	6	92 copper, 8 aluminum	25	1.5
Do[1]	.....	6.8	79 copper, 20 zinc, 1 nickel	25	1.80
25 centimos	.....	5	92 copper, 8 aluminum	23	1.5
Do[1]	.....	5.2	79 copper, 20 zinc, 1 nickel	23	1.68
15 centimos[1]	.....	3.9	....do	21	1.47
10 centimos[1]	.....	2.9	....do	19	1.39
Do	.....	4	92 copper, 8 aluminum	21	1.45
5 centimos	.....	3	....do	19	1.32
1 centimo	.....	2	....do	17	1.1
Total	.....				

[1]Scalloped 12 waves, diameter to the outer edge (plain edge).

PERU

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 soles	10,628	46.8071	900 gold, 100 copper	37	2.533
50 soles	2,425	23.40355	....do	30	1.967
20 soles	1,302	9.36142	....do	23	1.347
10 soles	1,554	4.68071	....do	18	1.096
5 soles	2,063	2.34036	....do	15	.803
1 libra	13,670	7.988	916 2/3 gold, 83 1/3 copper	22	1.245
1/2 libra	10,139	3.994	....do	19.3	.812
1/5 libra	24,768	1.598	....do	14.5	.577
1 sol	5,887,582	14	70 copper, 30 zinc	33	2
Do	.....	14	79 copper, 20 zinc, 1 nickel	33	2
1/2 sol	5,315,054	7.5	70 copper, 30 zinc	27	1.6
Do	.....	7.5	79 copper, 20 zinc, 1 nickel	27	1.6
20 centavos	9,550,112	3.8	70 copper, 30 zinc	24	1
Do	.....	7	....do	24	1.9
10 centavos	16,504,124	2.7	....do	20	1
Do	.....	4	....do	20	1.6
5 centavos	12,304,086	1.87	....do	17	1
Do	.....	3	....do	17	1.6
2 centavos	.....	1.4	95 zinc, 5 copper	17	0.8
Do	.....	10	95 copper, 3 tin, 2 zinc	24	2.3
Do	.....	5	95 copper, 5 zinc	24	1.3
1 centavo	405,004	1.1	95 zinc, 5 copper	15	0.8
Do	.....	5	95 copper, 3 tin, 2 zinc	19	2
Do	.....	2.5	95 copper, 5 zinc	19	0.9
Total	50,032,511				

Reported coinage Peruvian Mint.

Gold coins of Peru are minted for private account, and are not in circulation.

The sol and half sol denominations are issued by the Central Reserve Bank; all other denominations are issued by the State.

Coinage of Nations and Coins in Circulation in 1964--Continued

PHILIPPINES

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 peso	.....	26.73	900 silver, 100 copper	38.1	2.74
50 centavos	.....	12.5	....do	30.6	2.03
Do	.....	10	750 silver, 250 copper	27.6	2.1
Do	.....	10.22138	70 copper, 18 zinc, 12 nickel	30.6	2.03
25 centavos	200,000	5.11069	....do	24.3	1.65
20 centavos	.....	4	750 silver, 250 copper	20.8	2.1
10 centavos	.....	2	....do	16.7	1.6
Do	30,000,000	2.04428	70 copper, 18 zinc, 12 nickel	17.9	1.19
5 centavos	.....	4.87	65 copper, 12 zinc, 23 nickel	19.1	2.3
Do	33,200,000	4.85344	80 copper, 20 zinc	21.2	1.90
1 centavo	.....	5.184	95 copper, 5 zinc	24.8	1.5
Do	.....	3.11	....do	19.1	1.52
Total	63,400,000				

Reported coinage Mints in the United Kingdom.
Paper currency in 50, 20, 10, and 5 centavo denominations is used to supplement present issue of coins.
Coins manufactured during 1964 were dated 1964.

PORTUGAL

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 escudos	.....	21	800 silver, 200 copper	34	2.3
10 escudos	.....	12.5	680 silver, 320 copper	30	1.7
Do	.....	12.5	835 silver, 165 copper	30	1.7
5 escudos	4,268,000	7	75 copper, 25 nickel	24.5	1.3
Do	.....	7	650 silver, 350 copper	25	1.4
2 1/2 escudos	17,948,000	3.5	75 copper, 25 nickel	20	1.2
Do	.....	3.5	650 silver, 350 copper	20	1.1
1 escudo	1,611,000	8	61 copper, 20 zinc, 19 nickel	26.8	1.6
50 centavos	7,654,000	4.5	....do	22.8	1.3
20 centavos	7,010,000	3	95 copper, 3 zinc, 2 tin	20.5	1.1
10 centavos	10,257,000	2	....do	17.5	1
Total	48,748,000				

Reported coinage Portuguese Mint.
Coins of Portugal circulate in Madeira and the Azores.

PORTUGUESE EAST AFRICA, MOZAMBIQUE

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 escudos	.....	10	720 silver, 280 copper	30	1.5
10 escudos	.....	5	....do	24	1.2
5 escudos	.....	4	600 silver, 400 copper	22	1
2 1/2 escudos	.....	3.5	75 copper, 25 nickel	20	1.3
1 escudo	.....	8	95 copper, 3 zinc, 2 tin	26	1.8
50 centavos	.....	4	....do	20	1.5
20 centavos	.....	3	....do	20.5	1.1
Do	.....	2.5	....do	18	1
10 centavos	.....	1.8	....do	16	1.1
Total	.....				

Coinage of Nations and Coins in Circulation in 1964--Continued

PORTUGUESE MACAO

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 patacas	.....	15	720 silver, 280 copper	31	2
1 pataca	.....	3	....do	19	1.1
50 avos	.....	3.5	75 copper, 25 nickel	20	1.3
10 avos	.....	4	95 copper, 3 zinc, 2 tin	22	1.2
5 avos	.....	2	....do	17	1.1
Total	.....				

PORTUGUESE TIMOR

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 escudos	600,000	7	650 silver, 350 copper	25	2
6 escudos	.....	7	....do	25	2
3 escudos	.....	3.5	....do	20	1.5
1 escudo	.....	8	61 copper, 20 zinc, 19 nickel	26.8	2
60 centavos	.....	4.5	....do	22.8	1.5
30 centavos	.....	4	95 copper, 3 zinc, 2 tin	22	1.4
10 centavos	.....	2	....do	18	1.1
Total	600,000				

Reported coinage Portuguese Mint.

Coinage of Nations and Coins in Circulation in 1964--Continued

PORTUGUESE WEST AFRICA, ANGOLA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 escudos	.....	10	720 silver, 280 copper	30	1.5
10 escudos	.....	5	....do	24	1.2
2 1/2 escudos	.....	3.5	75 copper, 25 nickel	20	1.3
1 escudo		8	95 copper, 3 zinc, 2 tin	26	1.8
50 centavos	.....	4	....do	20	1.6
20 centavos	.....	4.5	61 copper, 20 zinc, 19 nickel	23	.....
Do	.....	3	95 copper, 3 zinc, 2 tin	20.5	1.1
Do	.....	2.5	....do	18	1.2
10 centavos	.....	2.5	61 copper, 20 zinc, 19 nickel	19	.....
Do	.....	2	95 copper, 3 zinc, 2 tin	17.5	1
5 centavos	.....	1.35	61 copper, 20 zinc, 19 nickel	15	.....
Total	.....				

PORTUGUESE WEST AFRICA-CAPE VERDE

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 escudos	.....	5	720 silver, 280 copper	24	1.2
2 1/2 escudos	.....	3.5	75 copper, 25 nickel	20	1.3
1 escudo	.....	8	95 copper, 3 zinc, 2 tin	26	1.8
Do	.....	8	61 copper, 20 zinc, 19 nickel	26.8	1.6
50 centavos	.....	4.5	....do	22.8	1.3
20 centavos	.....	5	96 copper, 4 zinc	25	1.2
10 centavos	.....	4	....do	22.5	1.2
5 centavos	.....	3	....do	19	.....
Total	.....				

PORTUGUESE WEST AFRICA, GUINEA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 escudos	.....	10	720 silver, 280 copper	30	1.5
10 escudos	.....	5	....do	24	1.2
2 1/2 escudos	.....	3.5	75 copper, 25 nickel	20	1.3
1 escudo	.....	8	95 copper, 3 zinc, 2 tin	26	1.8
Do	.....	7.5	....do	26.8	1.6
50 centavos	.....	4	....do	22.8	1.3
Do	.....	4	....do	20	1.5
20 centavos	.....	5	96 copper, 4 zinc	25	1.2
10 centavos	.....	4	....do	22.5	1.2
5 centavos	.....	3	....do	19	.....
Total	.....				

Coinage of Nations and Coins in Circulation in 1964--Continued

PORTUGUESE WEST AFRICA, SAN TOME AND PRINCIPE

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 escudos	.....	12.5	720 silver, 280 copper	30	1.7
5 escudos	.....	4	600 silver, 400 copper	22	1.2
Do	.....	7	650 silver, 350 copper	25	1.4
2 1/2 escudos	.....	3.5	....do	20	1.1
Do	.....	3.5	75 copper, 25 nickel	20	1.3
1 escudo	.....	8	95 copper, 3 zinc, 2 tin	26	1.8
Do	.....	8	61 copper, 20 zinc, 19 nickel	26.8	1.6
50 centavos	.....	4	95 copper, 3 zinc, 2 tin	20	1.6
Do	.....	4.5	61 copper, 20 zinc, 19 nickel	22.8	1.3
20 centavos	.....	2.5	95 copper, 3 zinc, 2 tin	18	1.2
10 centavos	.....	1.8	....do	16	1.1
Total	.....				

REUNION

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 francs	2,000,000	8.5	Pure nickel	26.5	.....
50 francs	500,000	6	92 copper, 6 aluminum, 2 nickel	24	.....
Do	.....	6	Pure nickel	24	.....
20 francs	750,000	4	92 copper, 6 aluminum, 2 nickel	23.5	.....
Do	.....	4	91 copper, 9 aluminum	23.5	.....
10 francs	.....	3	....do	20	.....
Do	1,000,000	3	92 copper, 6 aluminum, 2 nickel	20	.....
5 francs	.....	3.5	95 aluminum, 5 magnesium	31	.....
2 francs	.....	2.2	....do	27	.....
1 franc	1,000,000	1.3	....do	23	.....
Total	5,250,000				

Reported coinage French Government Mint.

RHODESIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Half crown (2 1/2 s.)	11,502,048	14.13795	75 copper, 25 nickel	32.3	2.37
Two shillings (2 s.)	10,502,048	11.31036	....do	28.5	2.33
One shilling (1 s.)	15,502,048	5.65518	....do	23.6	1.78
Six pence (6 d.)	13,502,048	2.82759	....do	19.4	1.47
Three pence (3 d.)	.....	1.41379	....do	16.3	.99
One penny[1] (1 d.)	.....	6.4798	95.5 copper, 3 tin, 1.5 zinc	27	1.68
Do[1]	.....	6.4798	97 copper, 2.5 zinc, 0.5 tin	27	1.68
Half penny[1] (1/2 d.)	.....	2.9159	....do	21	.....
Do	.....	2.9159	95.5 copper, 3 tin, 1.5 zinc	21	1.24
Total[2]	51,008,192				

Reported coinage South African Government Mint.

[1] Round coin with central hole measuring 5 mm. in diameter.

[2] Includes 2,048 proof coins in each denomination, or a total of 8,192. The coins manufactured during 1964 were also stamped 25, 20, 10, and 5 cents respectively.

The Federation of Southern Rhodesia, Northern Rhodesia and Nyasaland occurred in 1953 and the first Rhodesia and Nyasaland coins were dated 1955.

British coins ceased to be legal tender in Southern Rhodesia in 1939 and in Northern Rhodesia and Nyasaland in 1955.

The first Southern Rhodesia coins of the 2/6d., 2/-, 1/-, 6d. and 3d. denominations were of .925 silver and were dated 1932. The first 1d. and 1/2d. coins were of cupro-nickel and dated 1934.

Southern Rhodesia coins were first issued in Nyasaland in 1933 and in Northern Rhodesia in 1934.

In 1942, the composition of the 1d. and 1/2d. denominations was changed from cupro-nickel to bronze and in 1944 the fineness of the silver coins was reduced from .925 to .500.

The last minting of silver coins was in 1946; thereafter the composition of the 2/6d., 2/-, 1/-, 6d. and 3d. denominations was cupro-nickel.

In 1953, a commemorative issue of 125,000 silver crown pieces of .500 fineness was made to mark the centenary of the birth of Cecil John Rhodes, the Founder of Southern Rhodesia.

Former coins referred to are described in previous issues of this Report.

Note: The Federation of Rhodesia and Nyasaland was dissolved on Dec. 31, 1963. The federal area had consisted of Southern Rhodesia (now Rhodesia), Northern Rhodesia (now Zambia), and Nyasaland (now Malawi). At the time the federation was dissolved it was agreed that the Bank of Rhodesia and Nyasaland would continue its operations until June 1, 1965, to facilitate the transition to separate and independent monetary systems in the former areas of the federation. Throughout 1964 the coins shown in the table above were in circulation in the three areas. See the separate tables for Malawi and Zambia for their distinctive coins to be issued in 1965.

Coinage of Nations and Coins in Circulation in 1964--Continued

RWANDA, REPUBLIC OF

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 francs.....	6,000,000	10.5	75 copper, 25 nickel.....	30	1.66
5 francs.....	4,000,000	6	95 copper, 3 tin, 2 zinc.....	25.5	1.3
1 franc.....	3,000,000	3	75 copper, 25 nickel.....	21	1.07
Total.....	13,000,000				

Reported coinage Belgian Mint. New series of coins first minted in 1964.

SABAH (FORMERLY BRITISH NORTH BORNEO)

(See Malaysia)

SAINT-PIERRE ET MIQUELON

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
2 francs.....	.....	2.2	95 aluminum, 5 magnesium.....	27	.....
1 franc.....	.....	1.3	....do.....	23	.....
Total.....	.....				

SAN MARINO

(Coins of Italy circulate in San Marino)

SARAWAK

(See Malaysia)

SAUDI ARABIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Saudi sovereign.....	.....	7.98805	916 2/3 gold, 83 1/3 copper.....	22	1.7
1 riyal.....	.....	11.6638	916 2/3 silver, 83 1/3 copper.....	30.5	1.7
1/2 riyal.....	.....	5.8319	....do.....	24.4	1.4
1/4 riyal.....	.....	2.916	....do.....	19.5	1.1
4 girsh.....	.....	12	75 copper, 25 nickel.....	30	2.180
2 girsh.....	.....	6	....do.....	26	1.2
1 girsh.....	.....	3	....do.....	22	1.219
Do.....	.....	6.5	....do.....	26	1.5
1/2 girsh.....	.....	6.5	....do.....	23	1.5
1/4 girsh.....	.....	4.25	....do.....	20	1.4
1 halalah.....	.....	2.5	95 copper, 4 tin, 1 zinc.....	19	1.23
Total.....	.....				

There are 20 girsh in one riyal, and 5 halalah in one girsh. There are several Anglicized spellings of the Arabic units.

SENEGAL, REPUBLIC OF

(See Africa, West--Monetary Union of)

Coinage of Nations and Coins in Circulation in 1964--Continued

SEYCHELLES

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 rupee	.....	11.6638	500 silver, 400 cooper, 50 zinc, 50 nickel.	30	.....
Do	.....	11.6638	75 copper, 25 nickel	30	.....
1/2 rupee	.....	5.8319	500 silver, 400 copper, 50 zinc, 50 nickel.	23.6	.....
Do	.....	5.8319	75 copper, 25 nickel	23.6	.....
25 cents	.....	2.916	500 silver, 400 copper, 50 zinc, 50 nickel.	19	.....
Do	40,000	2.916	75 copper, 25 nickel	19	.....
10 cents[1]	.....	6.8039	....do	25	.....
Do	.....	6.156	79 copper, 20 zinc, 1 nickel	(a)	.....
5 cents	20,000	9.7198	97 copper, 2.5 zinc, 0.5 tin	28.4	.....
Do	.....	9.7198	95.5 copper, 3 tin, 1.5 zinc	28.4	.....
2 cents	.....	3.8879	....do	23.1	.....
Do	20,000	3.8879	97 copper, 2.5 zinc, 0.5 tin	23.1	.....
1 cent	20,000	1.944	....do	17.8	.....
Do	.....	1.944	95.5 copper, 3 tin, 1.5 zinc	17.8	.....
Total	100,000				

Reported coinage Mints in the United Kingdom.

[1] Scalloped, 12 waves.

[a] Twelve sided coin, 21.1 mm. across flats; 21.9 mm. diagonally.

Coins manufactured during 1964 were dated as follows: 25 cents and 5 cents dated 1964, 2 cents and 1 cents dated 1963.

SIERRA LEONE[1]

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 cents	8,000,000	8.2295	75 copper, 25 nickel	26.9	.....
10 cents	24,000,000	4.9247	....do	22.9	.....
5 cents	9,000,000	2.4922	....do	17.8	.....
1 cent	38,000,000	5.6699	97 copper, 2.5 zinc, 0.5 tin	25.5	.....
1/2 cent	6,000,000	2.835	....do	20.2	.....
Total[2]	85,000,000				

Reported coinage Mints in the United Kingdom.

[1] A decimal system of currency was adopted by Sierra Leone on August 4, 1964. The monetary unit, the leone, is divided into 100 cents. (See also Africa, West).

[2] Excludes 45,756 proof coins manufactured during 1964, as follows: Twelve sets containing one each of the leone (916 2/3 gold); 20, 10, and 5 cents (925 silver); 1 cent and 1/2 cent (bronze). Ten sets containing one each of the leone, 20, 10, and 5 cents (925 silver); 1 cent and 1/2 cent (bronze). 7,604 sets containing one each of the leone, 20, 10, and 5 cents (cupronickel); 1 cent and 1/2 cent (bronze). The gross weight of the gold one leone coin is 550 grains (35.6394 grams), and the gross weight of the silver and the cupronickel one leone is 349.1 grains (22.6213 grams). The diameter of all one leone coins is 1.42 inches or 36.07 millimeters.

The regular issue coins, as shown in the table above, were dated 1964.

SINGAPORE

(See Malaysia)

SOMALI REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 somalo	.....	7.6	250 silver, 550 copper, 100 nickel, 100 zinc.	26.7	1.80
50 centesimi	.....	3.8	....do	21.1	1.50
10 centesimi	.....	10	95 copper, 5 zinc	30	1.90
5 centesimi	.....	6	....do	25.1	1.60
1 centesimo	.....	3	....do	20.1	1.35
Total	.....				

The Somali Republic, dating from July 1, 1960, consists of a Southern Region (the former Trust Territory of Italian Somalia) and a Northern Region (the former British Protectorate of Somaliland). East African shillings which circulated in the Northern Region of the Somali Republic ceased to be legal tender on June 26, 1961.

SOMALILAND, FRENCH

(See French Somaliland)

Coinage of Nations and Coins in Circulation in 1964--Continued

SOUTH AFRICA, REPUBLIC OF[1]

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters[2]	Thickness in millimeters[2]
Decimal coins[1]					
2 rand[3]	206,320	7.98805	916 2/3 gold, 83 1/3 copper	22.2	1.22
1 rand[3]	8,064	3.99402	....do	19.5	.79
50 cents[4]	120,577	28.2759	500 silver, 500 copper[5]	39	2.58
20 cents[4]	3,773,253	11.31036	....do	28.6	1.91
10 cents[4]	3,282,066	5.65518	....do	23.6	1.40
5 cents[4]	3,577,942	2.82759	....do	19.3	1.04
2 1/2 cents[4]	23,157	1.41379	....do	16.3	.74
Cent[4]	11,601,250	9.44984	75 copper, 24.5 zinc, 0.15 tin	30.9	1.37
Half-cent[4]	8,506,568	5.6699	....do	25.5	1.22
Total[6]	31,099,197				

Reported coinage South African Mint.

[1] On February 14, 1961 South Africa introduced the decimal system of coinage in accordance with the Decimal Coinage Act, No. 61 of 1959 and Proclamation No. 376 of 1960. The monetary unit, the rand, is divided into 100 cents, and is equal to 10 shillings or one-half pound. Coins of the pound, shilling, pence system, which are described on page 133 of the Annual Report of the Director of the Mint Fiscal Year Ended June 30, 1961, will continue to circulate at present along with decimal coins in South Africa, Basutoland, Bechuanaland, South West Africa, and Swaziland.

[2] Mean diameters and thicknesses used in practice, are of fillets from which coin blanks are punched.

[3] Includes 2,402 proof coins manufactured during 1964.

[4] Includes 14,261 proof coins.

[5] Fineness of South African silver coins changed from 800 to 500 March 1, 1951.

[6] Includes 104,631 proof coins.

SOUTH ARABIAN FEDERATION

Denomination[1]	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 fils	6,000,000	9.072	75 copper, 25 nickel	27.74	.....
25 fils	4,000,000	4.536	....do	20.96	.....
5 fils	10,000,000	4.5	97 copper, 2.5 zinc, 0.5 tin	23.14	.....
1 fils	10,000,000	.778	97 aluminum, 3 magnesium	19.81	.....
Total	30,000,000				

Reported coinage Mints in the United Kingdom.

Coins manufactured during 1964 were dated 1964.

[1] In October 1964 the Federation of South Arabia, which includes Aden, established the South Arabian Currency Authority as the issuing body for the area. On April 1, 1965, the Federation's monetary unit, the dinar, will be issued. The dinar will be divided into 1,000 fils.

Throughout 1964 East African coins were in circulation in the Federation.

SOUTH WEST AFRICA

(Coins of the Republic of South Africa circulate in South West Africa)

SOUTHERN RHODESIA

(See Rhodesia)

SPAIN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 pesetas	3,820	12.5	75 copper, 25 nickel	30	1.98
25 pesetas	19,217,105	8.5	....do	26.5	1.73
5 pesetas	51,054,401	5.75	....do	23	1.56
2 1/2 pesetas	.....	7	90 copper, 10 aluminum	25	1.87
1 peseta	80,819,884	3.5	....do	21	1.33
50 centimos*	5,204,980	4	75 copper, 25 nickel	20	1.48
10 centimos	.....	1.85	97.5 aluminum, 2.5 copper	23	1.66
Do	106,490,033	0.75	96.5 aluminum, 3.5 magnesium	17.3	1.19
5 centimos	.....	1.15	97.5 aluminum, 2.5 copper	20	1.64
Total	262,790,223				

Reported coinage Spanish Mint.

*Round coin with central hole measuring 4.0 mm. in diameter.

ST. LUCIA AND ST. VINCENT (WINDWARD ISLANDS)

(See Caribbean Territories, Eastern Group)

Coinage of Nations and Coins in Circulation in 1964--Continued

SUDAN, REPUBLIC OF THE

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 piastres	.....	10	75 copper, 25 nickel	27.7	1.89
5 piastres	.....	5	....do	23.6	1.3
2 piastres	.....	2	....do	17.5	0.95
Do	.....	3	....do	20	1.1
10 milliemes	3,500,000	5	95 copper, 4 tin, 1 zinc	(a)	1.15
5 milliemes	3,000,000	4.16	....do	(b)	1.15
2 milliemes	.....	3.2	....do	(c)	1.1
1 millieme	.....	1.79	....do	16	1
Total	6,500,000				

Reported coinage Sudanese Mint.
[a] Twelve scallops, measuring 25.5 mm. across scallops, 24.3 mm. inside scallops.
[b] Twelve scallops, measuring 22.8 mm. across scallops, 21.8 mm. inside scallops.
[c] Twelve scallops, measuring 20.2 mm. across scallops, 19.4 mm. inside scallops.

SURINAM

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 guilder	.....	10	720 silver, 280 copper	28	2
25 cents	800,000	3.5	75 copper, 25 nickel	20	1.5
Do	.....	3.575	640 silver, 360 copper	19	1.7
10 cents	600,000	2	75 copper, 25 nickel	16	1.4
Do	.....	1.4	640 silver, 360 copper	15	1.1
5 cents*	600,000	4	79 copper, 20 zinc, 1 nickel	18	1.8
Do*	.....	4.2	64 copper, 21 zinc, 15 nickel	18-21.3	1.7
1 cent	1,600,000	2.5	95 copper, 4 tin, 1 zinc	18	1.4
Do	.....	2.5	....do	19	1.4
Do	.....	2.5	95 copper, 4 zinc, 1 tin	19	1.4
Do (1943)	.....	2.5	70 copper, 30 zinc	19	1.4
Total	3,600,000				

Reported coinage Netherlands Mint.
*Square coins with rounded corners.

SWAZILAND

(Coins of the Republic of South Africa circulate in Swaziland)

Coinage of Nations and Coins in Circulation in 1964--Continued

SWEDEN

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 kronor	.....	25	900 silver, 100 copper	36	.....
Do	.....	22.88	400 silver, 500 copper, 50 nickel, 50 zinc.	36	.....
Do	.....	18	....do	34	2.579
2 kronor	.....	15	800 silver, 200 copper	31	.....
Do	1,212,750	14	400 silver, 500 copper, 50 nickel, 50 zinc.	31	2.42
1 krona	.....	7.5	800 silver, 200 copper	25	.....
Do	16,605,000	7	400 silver, 500 copper, 50 nickel, 50 zinc.	25	1.88
50 ore	.....	5	600 silver, 400 copper	22	.....
Do	.....	4.8	400 silver, 500 copper, 50 nickel, 50 zinc.	22	1.607
Do	.....	4.8	75 copper, 25 nickel	22	.....
Do	4,589,000	4.5	....do	22	1.61
25 ore	.....	2.42	600 silver, 400 copper	17	.....
Do	.....	2.32	400 silver, 500 copper, 50 nickel, 50 zinc.	17	1.362
Do	.....	2.4	75 copper, 25 nickel	17	.....
Do	17,200,000	2.18	....do	17	1.36
10 ore	.....	1.45	400 silver, 600 copper	15	.....
Do	.....	1.44	400 silver, 500 copper, 50 nickel, 50 zinc.	15	1.144
Do	.....	1.5	75 copper, 25 nickel	15	1.2
Do	35,580,000	1.35	....do	15	1.14
5 ore	11,381,500	8	95 copper, 4 tin, 1 zinc	27	1.93
Do	.....	6.94	Iron	27	.....
2 ore	20,608,750	4	95 copper, 4 tin, 1 zinc	21	1.61
Do	.....	3.47	Iron	21	.....
1 ore	18,987,500	2	95 copper, 4 tin, 1 zinc	16	1.39
Do	.....	1.74	Iron	16	.....
Total	126,164,500				

Reported coinage Swedish Mint.

SWITZERLAND

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
50 francs[1]	.....	11.29	900 gold, 100 copper	25	2
25 francs[1]	.....	5.645	....do	20	1.5
5 francs	597,000	15	835 silver, 165 copper	31	2.6
2 francs	4,558,000	10	....do	27	2.2
1 franc	12,560,000	5	....do	23	1.6
50 centimes	17,400,000	2.5	....do	18	1.35
20 centimes	14,370,000	4	75 copper, 25 nickel	21	1.8
Do	.....	4	Nickel	21	1.8
10 centimes	16,340,000	3	75 copper, 25 nickel	19	1.5
Do	.....	3	Nickel	19	1.6
5 centimes	17,080,000	2	75 copper, 25 nickel	17	1.27
Do	.....	2	Nickel	17	1.4
2 centimes	.....	3	95 copper, 4 tin, 1 zinc	20	1.30
1 centime	.....	1.5	....do	16	1.10
Total	82,905,000				

Reported coinage Swiss Federal Mint.

[1] Not in active circulation.

Swiss coins circulate in Liechtenstein.

Coins manufactured during 1964 were dated 1964 with the exception of the 5 franc coins which were dated 1965.

Coinage of Nations and Coins in Circulation in 1964--Continued

SYRIAN ARAB REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 piastres	.....	10	680 silver, 320 copper	28	2
50 piastres	.....	5	600 silver, 400 copper	24	1.2
25 piastres	.....	2.5	....do	20	.83-.84
10 piastres	.....	4	75 copper, 25 nickel	21	1.5
Do	6,000,000	4	92 copper, 8 aluminum	21	1.8
5 piastres	7,000,000	3	....do	19	1.6
Do	.....	3	75 copper, 25 nickel	19	1.5
Do	.....	4.2	Bronze-aluminum	22.5	1.5
2 1/2 piastres	8,000,000	2	92 copper, 8 aluminum	17	1.5
Do	.....	2	75 copper, 25 nickel	17	1.5
Do*	.....	2.9	Bronze-aluminum	21	1.5
Total	21,000,000				

Reported coinage Swiss Federal Mint.
*Perforated.

TANZANIA

(See Africa, East)

THAILAND

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
20 baht	1,000,000	20	750 silver, 250 copper	35	.....
Tical or baht	.....	15	900 silver, 100 copper	30	2.5
Do	.....	7.5	64 copper, 23 nickel, 10 zinc, 3 silver	27	1.51
Do[1]	.....	9	75 copper, 25 nickel	27	1.82
Do	33,000,000	7.5	....do	27	1.51
2 slung	.....	7.5	650 silver, 350 copper	25	2
1 slung	.....	3.75	....do	20	1.6
50 satang	.....	7.5	....do	25	2
Do	.....	5	90 tin, 10 copper	25.5	1.7
Do	13,180,000	4.5	91 copper, 9 aluminum	23	1.48
25 satang	.....	3.75	650 silver, 350 copper	20	1.6
Do	.....	2.5	90 tin, 10 copper	20.5	1.4
Do	24,220,000	2.5	91 copper, 9 aluminum	20.5	1.2
20 satang	.....	3	650 silver, 350 copper	22	1.2
10 satang	.....	2.5	....do	19	1.3
Do	.....	3.5	Pure nickel	20	1.5
Do	.....	5	90 tin, 10 copper	20	2
Do	.....	1.75	....do	17.5	1.3
Do	.....	1.75	91 tin, 9 copper	17.5	1.2
Do	6,430,000	1.75	91 copper, 9 aluminum	17.5	1.16
Do	.....	1.75	95 copper, 4 tin, 1 zinc	17.5	1.16
5 satang	.....	1.5	650 silver, 350 copper	16.5	1.1
Do	.....	2	Pure nickel	17.5	1.2
Do	.....	3	90 tin, 10 copper	17.5	2
Do	.....	1.25	....do	15	1.1
Do	.....	1.25	91 tin, 9 copper	15	1.1
Do	2,400,000	1.25	91 copper, 9 aluminum	15	1.1
Do	.....	1.25	95 copper, 4 tin, 1 zinc	15	1.1
1 satang	.....	1.5	90 tin, 10 copper	15	1.3
Do	.....	5	95 copper, 4 tin, 1 zinc	22.5	1.9
Do	.....	3.5	....do	20.5	1.5
1/2 satang	.....	2	....do	19	1.1
Total	80,230,000				

Reported coinage Royal Mint of Thailand.
[1] Commemorative coin first coined in 1960, first issued in 1961.

TOGO, REPUBLIC OF

(See Africa, West--Monetary Union of)

Coinage of Nations and Coins in Circulation in 1964--Continued

TONGA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Koula	.....	32.51739	916 2/3 gold, 83 1/3 silver	45	.....
Half koula	.....	16.25870	....do	30	.....
Quarter koula	.....	8.12902	....do	22	.....
Total	.....				

Coins shown in the table above were manufactured during 1963 and were dated 1962.

TRINIDAD AND TOBAGO

(See Caribbean Territories, Eastern Group)

TRUCIAL STATES

(Coins of India circulate in the Trucial States)

Coinage of Nations and Coins in Circulation in 1964--Continued

TUAMOTU ISLANDS

(See French Polynesia)

TUNISIA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 francs	.....	12	75 copper, 25 nickel	31	2.25
50 francs	.....	8	....do	27	2.10
20 francs	.....	5.5	....do	23	1.95
5 francs	.....	2.3	....do	18	1.29
2 francs	.....	8	91.5 copper, 8.5 aluminum	27	.....
1 franc	.....	4	....do	23	m 1.7
100 millimes	.....	7.5	Mixed metals	27	.....
50 millimes	.....	6	....do	25	.....
20 millimes	.....	4.5	....do	22	.....
10 millimes	.....	3.5	....do	19	.....
5 millimes	.....	1.5	96 aluminum, 4 magnesium	24	.....
2 millimes	.....	1	....do	21	.....
1 millime	.....	0.65	....do	18	.....
Total	.....				

The dinar replaced the franc as the monetary unit during the latter part of 1958. The dinar equals 1,000 millimes.

TURKEY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 liras	.....	15	830 silver, 170 copper	34	1.6
2 1/2 liras	2,181,600	12	"Acmonital" (steel)	30	2.7
1 lira (pound)	4,744,000	8	....do	27	2.4
Do	.....	7.25	75 copper, 25 nickel	27	1.40
25 kurus	13,584,000	5	"Acmonital" (steel)	22.6	2.2
Do	.....	4.5	70 copper, 30 zinc	22.6	1.35
10 kurus	10,230,000	4	95 copper, 4 tin, 1 zinc	21	1.7
Do	.....	2.75	70 copper, 30 zinc	18	1.35
5 kurus	18,600,000	2.5	95 copper, 4 tin, 1 zinc	17	1.5
Do	.....	2.25	70 copper, 30 zinc	16	1.35
2 1/2 kurus	.....	3.125	....do	(a)	1.15
1 kuru	.....	1	....do	14	.85
Do	.....	2.25	....do	(b)	1.15
Do	2,740,000	1	95 copper, 4 tin, 1 zinc	14	.85
Total	52,079,600				

Reported coinage Turkish Mint.
[a] Round coin 21 mm. in diameter with central hole 5 mm. in diameter.
[b] Round coin 18 mm. in diameter with central hole 4 mm. in diameter.
One lira and 50 kurus silver coins were demonetized during 1961.

UGANDA

(See Africa, East)

Coinage of Nations and Coins in Circulation in 1964--Continued

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND[a]

Denomination	Coinage during year--number of pieces*	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Imperial coins					
Sovereign (pound)....	**5,090	7.98805	916 2/3 gold, 83 1/3 copper.....	22.1	1.63
Crown (5 s.).....	.....	28.2759	500 silver, 400 copper, 50 nickel, 50 zinc.	38.7	3
Do.....	.....	28.2759	75 copper, 25 nickel.....	38.7	3
Half-crown (2 1/2 s.)	.....	14.13795	500 silver, 400 copper, 50 nickel, 50 zinc.	32.3	2.4
Do.....	4,576,800	14.13795	75 copper, 25 nickel.....	32.3	2.31
Florin (2 s.).....	.....	11.31036	500 silver, 400 copper, 50 nickel 50 zinc.	28.5	2.4
Do.....	16,313,000	11.31036	75 copper, 25 nickel.....	28.5	2.31
Shilling (1 s.).....	.....	5.65518	500 silver, 400 copper, 50 nickel, 50 zinc.	23.6	1.9
Do.....	18,864,000	5.65518	75 copper, 25 nickel.....	23.6	1.73
Sixpence (6 d.).....	.....	2.82759	500 silver, 400 copper, 50 nickel, 50 zinc.	19.4	1.7
Do.....	137,352,000	2.82759	75 copper, 25 nickel.....	19.4	1.40
Threepence (3 d.)....	.....	1.41379	500 silver, 400 copper, 50 nickel, 50 zinc.	16.3	1
Do.....	47,440,000	6.80388	79 copper, 20 zinc, 1 nickel.....	(b)	2.79
Penny (1 d.).....	144,462,000	9.44984	97 copper, 2.5 zinc, 0.5 tin.....	30.9	.....
Do.....	.....	9.44984	95.5 copper, 3 tin, 1.5 zinc.....	30.9	2
Halfpenny (1/2 d.)...	.....	5.6699	....do.....	25.5	1.65
Do.....	72,134,400	5.6699	97 copper, 2.5 zinc, 0.5 tin.....	25.5	1.65
Maundy Money[c]					
Fourpence (4 d.).....	1,213	1.88506	925 silver, 75 copper.....	17.6	1.02
Threepence (3 d.)....	1,213	1.41379	....do.....	16.3	.94
Twopence (2 d.).....	1,137	0.94253	....do.....	13.4	.89
Penny (1 d.).....	1,215	0.47126	....do.....	11.2	.69
Total.....	441,152,068				

Reported coinage Royal Mint, London.

*Coins manufactured during 1964 were dated 1964 with the exception of the following which were dated 1963:

Half-crown.....	77,600	Threepence.....	5,360,000
Florin.....	909,000	Penny.....	5,502,000
Shilling.....	5,038,000	Halfpenny.....	2,316,000
Sixpence.....	7,092,000		

**Consists of sovereigns which were struck prior to 1964, and were not included in any previous totals. The data on the coins were as follows:

a 1962.....	1,468	1963.....	3,622

United Kindgom coins circulate in: Bahamas, Bermuda, British Guiana, Falkland Islands, Gibraltar, the Isle of Man, and Malta. United Kindgom coins circulate in the eastern group of Caribbean Territories, Guernsey, Jamaica, and Jersey which have their own coins.

[b] 12-sided coin, 21.1 mm. between parallel sides, 21.9 mm. diagonally.

[c] Maundy Money does not actively circulate. It is minted for distribution of the Royal Maundy at Westminster Abbey on Maundy Thursday. (Issued under Coinage Act of 1946).

The farthing (1/4 d.) was demonetized effective January 1, 1961, by the Proclamation of October 26, 1960.

UPPER VOLTA, REPUBLIC OF

(See Africa, West--Monetary Union of)

Coinage of Nations and Coins in Circulation in 1964--Continued

URUGUAY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 pesos[1]	.....	12.5	900 silver, 100 copper	33	.....
1 peso	.....	6	75 copper, 25 nickel	26	.....
50 centesimos	.....	4.5	....do	22	.....
25 centesimos	.....	3	....do	18	.....
10 centesimos	.....	5	79 copper, 20 zinc, 1 nickel	24	.....
5 centesimos	.....	3.5	....do	20	.....
2 centesimos	.....	2	....do	16	.....
Total	.....				

[1] Commemorative issue.

VATICAN CITY

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
500 Vatican lire	140,000	11	835 silver, 165 copper	29	2
100 Vatican lire	.....	5.1966	900 gold, 100 other	20.7	1.3
Do	1,116,400	8	"Acmonital" (Steel containing 18 percent chrome).	27.8	2
50 Vatican lire	240,000	6.25	....do	24.8	2
20 Vatican lire	180,000	3.6	"Bronzital" (91.6 copper, 8 aluminum, 0.4 titanium).	21.3	1.6
10 Vatican lire	180,000	1.6	"Italma" (96.2 aluminum, 3.5 magnesium, 0.3 manganese).	23.3	1.6
Do	.....	3	....do	29	1.7
5 Vatican lire	120,000	1	....do	20.2	1.5
Do	.....	2.5	....do	26.7	1.8
2 Vatican lire	120,000	0.8	....do	18.3	1.4
Do	.....	1.75	....do	24.1	1.5
1 Vatican lira	120,000	0.625	....do	17.2	1.2
Do	.....	1.25	....do	21.6	1.3
Total	2,216,400				

Reported coinage Italian Government Mint.
Coinage for 1963 is given elsewhere in this Report.

Coinage of Nations and Coins in Circulation in 1964--Continued

VENEZUELA

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 bolivares	.....	25	900 silver, 100 copper	37	2.4
2 bolivares	.....	10	835 silver, 165 copper	27	2
1 bolivar	.....	5	....do	23	1.6
1/2 bolivar	.....	2.5	....do	18	1.3
1/4 bolivar	.....	1.25	....do	16	0.9
12 1/2 centimos	.....	5	75 copper, 25 nickel	23	1.65
5 centimos	.....	2.5	....do	19	1.17
Total	.....				

VIET-NAM

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
10 piastres (10 dong)*	23,800,000	5.5	75 copper, 25 nickel	25.5	.....
1 piastre (1 dong)	44,000,000	4	....do	22.5	.....
50/100 de piastre	.....	3.8	96.5 aluminum, 3.5 magnesium	31	.....
Do	.....	3.5	95 aluminum, 5 magnesium	31	2.36
Do (50 xu)	.....	3.1	Aluminum	30	1.62
20/100 de piastre	.....	2.2	95 aluminum, 5 magnesium	27	2.06
10/100 de piastre	.....	1.3	....do	23	1.70
Total	67,800,000				

Reported coinage Mints in the United Kingdom.
Coins manufactured during 1964 were dated 1964.
*The new 10 piastre coins were not issued for circulation in 1964.

Coinage of Nations and Coins in Circulation in 1964--Continued

WINDWARD ISLANDS--ATLANTIC GROUP

(See Caribbean Territories, Eastern Group)

WINDWARD ISLANDS--PACIFIC GROUP

(See French Polynesia)

YEMEN ARAB REPUBLIC

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
1 rial.....	3,170,230	20	720 silver, 280 copper.....	40	1.60
20 buqshas(1/2 rial)	.....	10	....do.....	30	1.44
10 buqshas(1/4 rial)	.....	5	....do.....	24	1.12
5 buqshas(1/8 rial).	322	2.5	....do.....	19	.91
2 buqshas (1/20 rial)	2,016,000	4.9	92 copper, 8 aluminum.....	23	1.5
1 buqsha (1/40 rial)	4,078,000	3.6	....do.....	21	1.33
1/2 buqsha(1/80 rial)	528,000	2.33	.....	18	1.15
Total.....	9,792,552				

Reported coinage Egyptian Mint.
There are 40 buqshas in one rial.

ZAMBIA (formerly Northern Rhodesia)

Denomination	Coinage during year--number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
Florin (2s.).....	3,777,000	11.31036	60 copper, 20 nickel, 20 zinc.....	28.5	.....
Shilling (1s.).....	3,512,000	5.65518	....do.....	23.6	.....
Sixpence (6d.).....	3,500,000	2.82759	....do.....	19.4	.....
Total.....	10,789,000				

Reported coinage Mints in the United Kingdom.
Distinctive Zambian coins manufactured during 1964 were dated 1964, however, they well not be issued for circulation until 1965.
Coins of the former Federation of Rhodesia and Nyasaland were in circulation in Zambia throughout 1964.

ZANZIBAR

(See Africa, East)

Coinage of Nations--Calendar Year 1963--Italy, Norway, and Vatican City

(For coinage of other countries in 1963 see pages 264-314 in the 1964 Annual Report)

ITALY[1]

Denomination	Coinage in 1963 number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
500 lire[2]	3,520,000	11	"Lega argento" (835 silver, 165 copper)	29	2
100 lire	32,200,000	8	"Acmonital" (Steel containing 18 percent chrome)	27.8	2
50 lire	31,600,000	6.25	....do.	24.8	2
Total[3]	67,320,000				

Reported coinage Italian Mint.
[1] For characteristics of other coins in circulation see the 1964 table in this Report.
[2] Special series "Unita d'Italia."
[3] Metallic content 544.3 short tons, including 35.6 tons of silver, 7.0 tons of copper, and 501.7 tons of steel containing 18 percent chrome.

NORWAY[1]

Denomination	Coinage in 1963 number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
5 kroner[2]	7,074,000	11.5	75 copper, 25 nickel	29.5	2.23
1 krone	4,677,000	7	....do	25	1.83
50 ore	2,168,000	4.8	....do	22	1.63
25 ore	3,640,000	2.4	....do	17	1.4
10 ore	17,560,000	1.5	....do	15	1.18
5 ore	3,204,000	8	95 copper, 4 tin, 1 zinc	27	1.75
2 ore	4,840,000	4	....do	21	1.55
1 ore	8,010,000	2	....do	16	1.38
Total[3]	51,173,000				

Reported coinage Norwegian Mint.
[1] For characteristics of other coins in circulation see the 1964 table in this Report.
[2] First coined in 1963, first issued in March 1964.
[3] Metallic content 243.2 short tons, including 44.0 tons of nickel, 195.8 tons of copper, 0.7 ton of zinc, and 2.7 tons of tin.

VATICAN CITY[1]

Denomination	Coinage in 1963 number of pieces	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
500 lire[2]	200,000	11	"Lega argento" (835 silver, 165 copper)	29	2
100 lire[3]	1,066,000	8	"Acmonital" (Steel containing 18 percent chrome)	27.8	2
Total[4]	1,266,000				

Reported coinage Italian Government Mint.
[1] For characteristics of other coins in circulation see the 1964 table in this Report.
[2] Special series "Sede Vacante."
[3] Special series for Oecumenical Council Vatican II.
[4] Metallic content 11.8 short tons, including 2.0 tons of silver, 0.4 ton of copper, and 9.4 tons of steel containing 18 percent chrome.

Coinage of Nations--Calendar Year 1962--Italy

(For coinage of other countries in 1962 see pages 148-195 in the 1963 Annual Report and page 315 in the 1964 Annual Report)

ITALY[1]

Denomination	Coinage in 1962 number of pieces[2]	Gross weight in grams	Composition (proportion of metals)	Diameter in millimeters	Thickness in millimeters
100 lire.....	763,000	8	"Acmonital" (Steel containing 18 percent chrome).	27.8	2
50 lire.....	75,000	6.25	....do.....	24.8	2
Total[3].....	838,000				

Reported coinage Italian Mint.

[1] For characteristics of other coins in circulation see the 1964 table in this Report.

[2] Additional coinage during 1962 is reported on page 169 in the 1963 Annual Report. The total number of Italian coins manufactured during 1962 is as follows: 500 lire, 11,680,000 pieces; 100 lire, 23,763,000 pieces; 50 lire, 17,675,000 pieces.

[3] Metallic content 7.2 short tons of steel containing 18 percent chrome.

Summary--Consumption of metals in the 1955-64 Coinage of Nations

Metal	Gross weight--short tons									
	1955	1956	1957	1958	1959	1960	1961	1962[1]	1963[1]	1964
Gold.....	1.6	0.4	18.1	86.0	67.9	10.0	8.4	15.6	86.2	3.5
Silver.....	1,821.1	1,945.1	2,891.5	2,723.0	2,940.2	3,582.2	4,067.3	4,281.8	5,639.6	9,239.8
Nickel.....	2,303.2	2,384.6	2,693.9	2,701.5	3,735.1	5,260.6	4,541.4	4,276.9	4,563.6	5,906.7
Copper.....	11,620.9	15,202.1	17,610.0	17,970.8	20,229.9	21,908.9	26,503.7	28,918.7	32,756.3	40,446.4
Zinc.....	533.1	773.6	780.5	928.8	1,048.3	1,244.1	1,731.3	1,797.4	1,964.3	2,422.7
Tin.....	76.8	212.0	167.1	221.6	219.4	75.6	69.0	130.5	170.1	136.4
Aluminum.....	1,712.1	1,421.4	2,033.4	1,747.7	1,406.7	1,341.0	1,401.1	1,091.9	1,414.7	2,537.5
Magnesium.....	32.4	8.2	14.2	17.6	11.5	11.6	8.9	1.9	4.8	15.5
Manganese.....	4.7	2.5	.1	.5	.2	.2	(2)	(2)	.....	(2)
Steel.....	1,635.2	2,046.5	2,171.8	1,626.9	2,409.4	1,773.5	971.1	2,029.2	2,130.8	1,810.8
Iron.....	939.2	938.6	1,213.3	963.3	1,194.7	811.8	941.6	1,356.4	1,403.0	1,364.6
Titanium.....	.....	.....	.9	1.3	.1	(2)	(2)	(2)	.....	(2)
Other[3].....	7.6	.....	1.0	1.6	14.0	6.9	7.9	6.3	8.6	3.7
Total.....	20,687.9	24,935.0	29,595.8	28,990.6	33,277.4	36,026.4	40,251.7	43,906.6	50,142.0	63,887.6

[1] Revised.
[2] Less than 0.1 ton.
[3] Not available.

Silver coins withdrawn from circulation in specified countries during the calendar year 1964

Country	Nominal (face) value in monetary unit of issuing country	Silver content--fine troy ounces[1]
United States	713,779 United States dollars[2]	520,000
Africa, East	1,633,580 East African shillings[3]	101,800
Australia	62,791 Australian pounds	216,732
Belgium	114,000 Belgian francs	971
Canada	94,515 Canadian dollars	56,250
Ceylon	5,092 Ceylonese rupees	([4])
Colombia	1,528 Colombian pesos	368
Finland	427,000 "new" Finnish markkaa	31,289
Germany, Federal Republic	87,215 Deutsche Mark	3,926
Guatemala	31,098 Guatemalan quetzales	22,890
India	9,291,591.62 Indian rupees[5]	([4])
Ireland, Republic	75,032 Irish pounds	204,635
Japan	35,127,500 Japanese yen	32,517
Mexico	1,828,655 Mexican pesos	495,799
Morocco	2,009,255 Moroccan dirhams	242,028
Mozambique	11,890,822 Mozambique escudos	347,890
Rhodesia	15,541 Rhodesian pounds	([4])
South Africa	229,800 South African rand	484,182
Switzerland	1,855,000 Swiss francs	224,168
United Kingdom	1,137,816 pounds sterling	2,000,000
Zambia	15,541 Zambian pounds	([4])
Sum of stated ounces		4,985,445

[1] Approximate; not necessarily the actual amount of silver recovered.
[2] Consists of worn silver coin unfit for further circulation withdrawn by the Treasury and the Federal Reserve Banks and branches, and shipped to the Mints during the year.
[3] Represents net decrease of silver coins in circulation between June 30, 1963 and June 30, 1964, as reported by the East African Currency Board.
[4] Data not available.
[5] For the financial year 1963-64 (April 1963-March 1964), as reported by the Reserve Bank of India.

Estimated quantity of gold and silver issued for industrial, professional, and artistic purposes in specified countries during the calendar year 1964

Country	Gold	Silver	Source
	Fine troy ounces	Fine troy ounces	
United States	4,801,000	120,500,000	Official United States Government estimate by Director of the Mint.
Argentina	41,796	501,552	Banco Central de la Republica Argentina.
Australia	122,257	2,728,889	Gold, official government sources. Silver, estimate of industrial organizations.
Austria	164,226	153,584	Hauptpunzierungs-und Probieramt (Minting and assay office).
Belgium	321,507	4,822,611	
Bolivia	281	.....	Industrial sales by Banco Minero.
Canada	270,000	5,050,000	Estimate by Dominion Bureau of Statistics.
Ceylon	5,798	13,919	Department of Rural Development and Small Industries.
Chile	30,958	2,861,416	Estimate based on data of Banco Central de Chile and the publication DIRECCION de ESTADISTICA y CENSOS.
Colombia	68,701	127,816	Asociación Colombiana de Mineros.
El Salvador	390	.....	Banco Central de Reserva de El Salvador.
Finland	47,457	718,033	Kulta-ja-Hopeateosten Tarkastuslaitos (The Testinstitution of Gold and Silver Products in Finland).
Germany, Federal Republic	2,481,684	38,694,383	Bundesamt für Gewerbliche Wirtschaft, Frankfurt/Main (Federal Office for Industry and Crafts).
Ghana	5,750	.....	Ghana External Trade Statistics.
Guatemala	2,122	225	Industrial sales by Banco de Guatemala.
Guinea	729	410	Part; represents issue of officially stamped bars. Direction Generale de l'Industrie des Mines, Ministere du Developpement Economique.
Haiti	1,714	(1)	Department of Statistics, Banque Nationale de la République d'Haiti.
Iraq	100,000	.....	Official sales by Rafidain Bank.
Japan	366,229	25,024,466	Gold, based on Gold Control Law No. 62, 1953. Silver, based on survey of Research and Statistics Division, Ministry of International Trade and Industry.
Korea, Republic	49,580	407,676	
Laos	14,500	(1)	Direction des Douanes et Regies, Royal Government of Laos.
Lebanon	64,301	4,823	Ministry of National Economy.
Malagasy Republic	3,868	1,161	Service des Mines.
Malaya	5,817	8,900	Department of Statistics, States of Malaya, and Bank Negara Malaysia.
Mexico	275,190	4,145,534	Industrial sales by Banco de México.
Netherlands	318,765	939,982	Director of Internal Financial Affairs, Ministry of Finance.
Norway[2]	35,366	2,250,552	Norges Bank.
Pakistan	98	2,347	Ministry of Finance.
Panama	4,083	9,292	Office of Comptroller General, Republic of Panama.
Peru	88,400	714,679	Gold, trade estimates. Silver, Industrial Bank of Peru.
Portugal	361,247	1,272,122	Casa da Moeda, Lisbon.
South Africa	44,590	318,690	South African Treasury.
Spain	437,250	7,619,732	Sociedad Española de Metales Preciosos, S.A.
Sudan	(1)	290	Department of Statistics, represents imports of unwrought and semimanufactured silver in 1964.
Surinam	8,740	(1)	Industrial sales by Centrale Bank van Suriname.
Tunisia	21,536	.....	Banque Centrale de Tunisie.
Turkey	321,500	257,200	Darphane ve Damga Pulu Matbaasi Sultanahmet.
United Kingdom	(1)	23,000,000	ANNUAL BULLION REVIEW 1964, Samuel Montagu & Co., Ltd., Bullion Merchants, London.
Venezuela	259,939	.....	Ministerio de Mines e Hidrocarburos (Ministry of Mines and Hydrocarbons).
Sum of stated ounces	11,147,369	242,150,284	

[1] Data not available.
[2] Comparative data for 1963--Gold, 25,721 ounces and Silver, 1,768,291 ounces. (Not previously published).

Secondary gold and silver deposited with the monetary authority in specified countries during the calendar year 1964

Note: Includes old jewelry, plate, and other scrap materials. Does not include uncurrent or worn coin withdrawn from circulation (on a separate table), or coin scrap in process of coinage operations.

Government Mint	Fine troy ounces	
	Gold content	Silver content
United States	483,146	3,475,347
Australia	25,573	93,309
Canada	5,308	1,074
Germany, Federal Republic	.....	2,405,536
Pakistan	6,839	81
South Africa	49	2,683
Tunisia	[1] 2,518	.....
Turkey	175,222	.....

[1] Deposited with central monetary authority (no Government Mint in the country).

World production of gold, by countries[1] [2], 1955-59 (average) and 1960-64

(Troy ounces)

Country[1]	1955-59 (average)	1960	1961	1962	1963	1964P
North America:						
Canada	4,482,896	4,628,911	4,473,699	4,178,396	3,972,047	3,810,738
Central America and West Indies:						
Costa Rica	[3] [4] 1,140	e 3,000	e 3,000	e 3,000	e 3,000	e 3,000
Cuba[3]	1,073	348	.....	.....	61	.....
Dominican Republic	[4] 467	[3] 308	.....	.....	.....	.....
El Salvador	2,815	1,121	.....	.....	.....	.....
Guatemala	e 280	.....	.....	[3] 8	.....	.....
Haiti	.....	e 1,400	4,341	7,149	6,778	e 5,900
Honduras	1,793	[3] 2,172	[3] 1,685	[3] 2,132	[3] 2,474	[3] 3,319
Nicaragua	218,267	210,200	226,250	221,984	204,769	211,900
Mexico	345,074	300,256	268,684	236,758	237,948	209,976
United States[5]	1,787,206	1,679,800	1,566,800	1,556,000	1,468,750	1,469,000
Total	6,841,000	6,828,000	6,544,000	6,205,000	5,896,000	5,714,000
South America:						
Argentina	5,902	3,504	2,251	965	482	303
Bolivia (exports)	29,821	45,457	80,184	35,052	153,033	50,043
Brazil[6]	116,225	118,893	118,636	127,092	131,979	134,326
British Guiana	15,400	2,364	1,702	1,903	2,847	2,111
Chile	89,784	54,367	56,489	65,009	77,290	65,620
Colombia	382,785	433,947	401,060	396,827	324,514	364,991
Ecuador	17,257	15,209	15,210	20,591	21,041	16,905
French Guiana	11,521	18,940	7,941	5,273	6,993	.....
Peru[7]	160,216	141,001	137,418	122,985	101,019	85,809
Surinam	6,108	4,932	4,011	2,604	3,537	8,231
Venezuela	70,079	46,868	30,071	28,774	26,947	33,536
Total[e]	905,000	885,000	855,000	807,000	850,000	762,000
Europe:						
Finland	20,988	20,351	20,609	15,239	20,416	22,055
France	34,755	46,040	48,676	51,088	53,627	51,441
Germany, West	3,261	1,283	2,186	1,704	e 2,000	e 2,000
Greece	5,941	2,894	.....	.....	.....	.....
Italy	5,115	3,034	720	.....	.....	.....
Portugal	22,544	21,927	22,377	21,927	21,895	21,219
Spain	12,662	13,986	8,231	6,687	15,625	23,824
Sweden	104,426	94,073	83,270	128,667	128,600	e 124,000
U.S.S.R.[e] [8] [9]	3,600,000	4,100,000	4,400,000	4,800,000	5,100,000	5,600,000
Yugoslavia	51,081	63,980	67,195	70,507	83,656	93,687
Total[e] [1]	4,000,000	4,700,000	5,000,000	5,500,000	5,800,000	6,400,000
Asia:						
Burma	162	304	194	e 200	e 200	e 200
Cambodia	[4] 1,810	4,180	4,180	965	6,687	e 6,000
China[e]	32,000	50,000	60,000	60,000	60,000	60,000
India	186,961	160,593	156,510	163,326	138,280	147,958
Indonesia	e 3,500	e 5,000	5,337	4,469	4,437	e 5,300
Japan	251,379	261,496	294,534	286,593	262,142	252,094
Korea:						
North[10]	136,000	160,000	160,000	160,000	160,000	160,000
South	60,384	65,814	84,105	106,548	90,095	75,779
Malaya	20,694	20,745	12,486	6,923	9,116	7,295
Philippines	406,141	410,618	423,983	423,394	376,006	425,770
Sarawak	1,052	3,326	4,132	2,885	2,773	3,115
Taiwan	23,329	15,702	17,619	24,026	31,710	17,660
Total[e] [1] [9]	1,120,000	1,160,000	1,225,000	1,240,000	1,140,000	1,160,000

See footnotes at end of table.

World production of gold, by countries[1] [2], 1955-59 (average) and 1960-64--Continued

(Troy ounces)

Country[1]	1955-59 (average)	1960	1961	1962	1963	1964[p]
Africa:						
Angola	32	42	48	77	37	7
Bechuanaland	351	203	261	288	142	[e] 10
Cameroon	2,980	416	537	775	1,874	[e] 1,000
Central Africa, Republic of	576	289	80	100	96	75
Congo, Republic of (Brazzaville)	6,724	2,628	3,376	3,718	2,958	3,567
Congo, Republic of the (Leopoldville)	361,396	314,145	233,672	203,707	214,574	125,742
Eritrea	6,205	5,144	[e] 5,529	2,315	[e] 2,300	[e] 2,300
Ethiopia	30,113	40,915	[e] 41,500	25,700	[e] 25,000	[e] 25,000
Gabon, Republic of	25,075	17,683	15,304	16,300	35,719	42,760
Ghana	776,253	893,113	852,619	888,038	921,255	864,917
Kenya	9,531	8,645	12,299	9,327	10,193	12,475
Liberia[e]	670	1,119	2,088	2,184	1,960	1,824
Malagasy Republic	763	273	347	325	900	440
Morocco	907	104	136	.....	.....	.....
Mozambique	913	225	105	91	32	40
Nigeria	621	994	676	384	316	244
Rhodesia (formerly Southern)	543,933	562,703	570,095	554,647	566,277	575,386
Rwanda	3,651	1,566	900	[e] 900	[e] 500	[e] 500
South Africa, Republic of	17,050,159	21,383,019	22,941,561	25,491,993	27,431,573	29,136,542
South-West Africa	.....	.....	.....	[e] 183	[e] 3	32
Sudan	1,755	2,116	1,226	[e] 1,500	[e] 900	877
Swaziland	52	806	1,325	2,214	2,092	2,078
Tanzania[11]	74,432	107,009	102,502	101,972	102,917	93,040
Uganda (exports)	337	744	453	412	16	.....
United Arab Republic (Egypt)	4,309	1,214	931	.....	.....	.....
Upper Volta	1,992	1,161	15,497	39,770	44,786	[e] 33,200
Zambia	3,457	6,300	4,192	3,625	4,960	5,033
Total	18,907,000	23,350,000	24,810,000	27,350,000	29,370,000	30,930,000
Oceania:						
Australia	1,070,377	1,086,709	1,076,292	1,068,837	1,022,965	963,300
Fiji	74,417	72,203	83,417	87,354	107,262	100,493
New Guinea	62,309	45,019	41,789	39,007	43,552	38,934
New Zealand	28,888	33,326	28,294	21,742	14,206	8,948
Papua	489	132	31	45	47	43
Total	1,236,480	1,237,389	1,229,823	1,216,985	1,188,032	1,111,718
World total (estimate)[1]	33,000,000	38,200,000	39,700,000	42,300,000	44,200,000	46,100,000

[e] Estimate. [p] Preliminary.

[1] Gold is also produced in Bulgaria, Czechoslovakia, and Rumania but production data are not available; estimates for these countries are included in the total. East Germany, Hungary, and Thailand probably produce a negligible amount of gold. For some countries accurate figures are not possible to obtain owing to clandestine trade in gold (as, for example, in former French West Africa).

[2] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.

[3] Imports into the United States.

[4] Average annual production 1956-59.

[5] Refinery production.

[6] Mined gold only; production of alluvial gold unknown.

[7] Official government data include an estimate of 3,000 ounces of placer annually through 1963 and about 7,000 ounces in 1964. Actual placer production is believed to be nearer 22,000 ounces.

[8] In addition to the new figures shown for the years 1960-64, the following are the new figures (in millions of troy ounces) for earlier years: 1940, 5.1; 1941, 4.3; 1942, 3.3; 1943, 3.2; 1944, 3.2; 1945, 3.2; 1946, 3.3; 1947, 3.4; 1948, 3.6; 1949, 3.6; 1950, 3.6; 1951, 3.6; 1952, 3.6; 1953, 3.5; 1954, 3.5; 1955, 3.5; 1956, 3.5; 1957, 3.5; 1958, 3.6; and 1959, 3.9.

[9] Output from U.S.S.R. in Asia included with U.S.S.R. in Europe.

[10] Estimate according to Minerais et Metaux (France), except 1964.

[11] Including gold in lead concentrates exported amounting to: 9,709 ounces, 1955-59 (average); 8,963 ounces in 1960; 521 ounces in 1961; and none since.

Compiled by the Division of International Activities, Bureau of Mines, United States Department of the Interior.

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World production of silver, by countries[1] [2] [3], 1955-59 (average) and 1960-64

(Troy ounces)

Country	1955-59 (average)	1960	1961	1962	1963	1964[p]
North America:						
Canada	29,665,358	34,016,829	31,381,977	30,669,028	29,839,756	30,316,486
Central America and West Indies:						
Cuba (U.S. imports)	253,787	121,415	.....	.....	.....	.....
El Salvador	192,109	76,809	.....	.....	.....	.....
Guatemala	362,669	[4] e 663,121	[4] 515,905	e 32,400	e 64,200	[5] 9,445
Haiti	.....	e 19,600	61,424	94,761	107,022	e 93,700
Honduras	2,403,629	2,948,341	3,544,702	3,179,653	[6] 4,280,746	3,220,371
Nicaragua	271,922	326,673	417,253	500,050	405,252	332,370
Mexico	45,970,571	44,526,463	40,349,181	41,249,402	42,760,487	41,943,247
United States[7]	34,745,842	36,800,000	34,900,000	36,345,000	35,000,000	37,000,000
Total	113,865,900	119,499,300	111,170,400	112,070,300	112,457,500	112,915,600
South America:						
Argentina	1,505,920	1,671,838	1,430,675	2,086,101	1,935,860	1,944,509
Bolivia (exports)	5,865,782	4,887,138	3,901,203	3,759,193	4,854,762	4,822,611
Brazil	214,053	252,930	231,936	250,004	339,448	e 200,000
Chile	1,814,781	1,679,105	2,156,768	2,275,887	2,768,340	3,047,679
Colombia	107,420	134,333	127,943	131,599	106,279	130,353
Ecuador	81,630	126,419	101,190	127,739	121,784	117,126
Peru (recoverable)	24,781,843	30,755,496	34,161,707	32,930,783	36,800,350	37,043,217
Total	34,370,000	39,510,000	42,110,000	41,560,000	46,930,000	47,300,000
Europe:						
Austria	12,860	58,193	58,193	68,481	68,803	73,947
Czechoslovakia[8]	1,608,000	1,608,000	1,608,000	1,608,000	1,608,000	1,608,000
Finland	400,013	390,374	456,155	380,495	579,967	607,906
France	717,708	1,039,851	1,128,523	898,977	730,111	[9] 730,111
Germany:						
East[8]	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000
West	2,137,652	1,839,247	1,879,436	1,925,701	2,067,325	1,990,935
Greece	100,021	105,487	113,396	138,248	157,539	[9] 157,539
Hungary[8]	64,300	64,300	64,300	64,300	64,300	64,300
Italy	1,049,683	943,946	973,139	929,832	1,006,318	1,060,974
Norway	37,938	.....	.....	.....	.....	.....
Poland[8]	128,600	128,600	128,600	128,600	128,600	128,600
Portugal	55,736	52,920	48,258	52,920	48,419	48,775
Rumania[8]	643,000	643,000	643,000	643,000	643,000	643,000
Spain	1,635,528	1,739,677	4,526,599	5,684,123	4,955,201	[9] 4,955,201
Sweden	2,702,945	2,756,026	2,949,766	3,367,276	3,582,200	3,060,751
U.S.S.R.[e]	25,000,000	25,000,000	25,000,000	27,000,000	27,000,000	27,000,000
United Kingdom	23,766	7,098	4,744	514	.....	.....
Yugoslavia	2,982,476	3,025,160	3,454,083	3,750,931	3,791,923	4,036,879
Total[e]	44,100,000	44,200,000	47,800,000	51,400,000	51,200,000	51,000,000
Asia:						
Burma	1,713,585	1,984,263	1,743,302	1,940,037	2,076,938	1,355,000
China[8]	572,000	800,000	800,000	800,000	800,000	800,000
India	123,796	132,718	191,008	138,698	128,314	e 152,204
Indonesia	[10] 185,981	310,512	324,079	248,236	279,840	e 262,100
Japan	6,372,445	6,912,602	7,960,202	8,660,510	8,812,068	8,625,337
Korea:						
North[e]	286,000	500,000	640,000	640,000	640,000	640,000
South	208,609	329,649	460,341	412,912	444,002	404,456
Philippines	504,905	1,133,343	812,793	675,570	774,917	851,814
Taiwan	62,832	52,579	77,303	80,129	61,440	60,633
Total[e]	10,000,000	12,200,000	13,000,000	13,600,000	14,000,000	13,200,000

See footnotes at end of table.

World production of silver, by countries [1] [2] [3], 1955-59 (average) and 1960-64--Continued

(Troy ounces)

Country	1955-59 (average)	1960	1961	1962	1963	1964[p]
Africa:						
Algeria (recoverable)[11]	263,000	300,000	300,000	275,000	275,000	275,000
Bechuanaland	105	24	39	33	21	1
Congo, Republic of the (Leopoldville)	3,895,037	3,962,836	3,457,877	1,595,513	1,097,176	1,480,252
Ghana (exports)	31,173	14,160	7,027	4,443	4,827	[9] 4,827
Kenya	34,015	35,797	40,731	50,160	52,422	47,702
Morocco	2,117,130	1,097,273	907,905	826,338	772,743	604,080
Rhodesia (formerly Southern)	164,293	392,026	106,801	83,540	83,742	88,463
South Africa, Republic of	1,728,650	2,226,204	2,288,279	2,549,206	2,736,868	2,916,660
South-West Africa, (recoverable)	1,677,554	1,004,921	1,833,437	1,253,200	634,134	328,808
Sudan	.....	.....	.....	.....	.....	40
Swaziland	.....	58	103	132	120	130
Tanzania (exports)	540,404	614,279	64,144	23,959	22,669	25,329
Tunisia	94,060	34,401	69,767	24,615	9,131	12,635
Uganda (exports)	47	109	70	38	9	.....
Zambia[12]	607,863	920,601	738,558	697,054	883,681	977,978
Total	11,150,000	10,600,000	9,810,000	7,380,000	6,570,000	6,760,000
Oceania:						
Australia	15,262,372	15,215,956	13,059,166	17,553,691	19,580,823	18,275,000
Fiji	23,628	31,319	37,712	38,935	46,870	60,564
New Guinea (including Papua)	37,336	33,037	30,242	24,500	23,696	23,199
New Zealand	7,474	1,353	805	416	286	141
Total	15,331,000	15,282,000	13,128,000	17,618,000	19,652,000	18,359,000
World total (estimate)	228,800,000	241,300,000	237,000,000	243,600,000	250,800,000	249,500,000

[e] Estimate. [p] Preliminary.

[1] A negligible amount of silver is produced in Bulgaria, Mozambique, Panama, and Turkey, for which countries no estimate has been included in the total.

[2] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.

[3] Data derived in part from the Yearbook of the American Bureau of Metal Statistics and the 51st annual issue of Metal Statistics (Metallgesellschaft) Germany.

[4] Recoverable.

[5] U.S. imports.

[6] Exports.

[7] Refinery production.

[8] Estimate, according to the 51st annual issue of Metallgesellschaft (Germany) except 1964 which is an extension of the previous year's estimate.

[9] 1963 data.

[10] Average annual production 1957-59.

[11] Estimated recoverable silver content of lead and zinc concentrates, according to the 1963 annual issue of Minerais et Metaux (France) except 1964.

[12] Partially recovered from refinery sludges and blister copper.

Compiled by the Division of International Activities, Bureau of Mines, United States Department of the Interior.

Gold and silver monetary stocks of principal countries of the world at end of calendar year 1964

Country or international institution	Monetary unit	Exchange rate: New York Dec. 1964 average, or internal rate as noted	Par value Dec. 1964 for members of the International Monetary Fund	Gold bullion and coin held by Government agencies		Silver bullion and coin--U.S. dollar value ($)			
				Number of fine troy ounces (000 omitted)	U.S. dollar value[1] (000 omitted)	Bullion held by Government agencies[2] (000 omitted)	Coin held by Government agencies[3] (000 omitted)	Coin (estimated) in circulation, including coin in commercial banks[3] (000 omitted)	Total silver (000 omitted)
United States of America.	Dollar	$1.00	$1.00	[4] 442,026	[4] $15,470,897	[5] $1,550,539	[6] $7,701	[7] $2,642,971	$4,201,211
Africa, East (June 30)[8]..	Shilling	.14	.14	.....	.....	.....	.....	4,635	4,635
Algeria.....	Dinar[9]	[9] .20255	([10])	162	5,682	.....	.....	.....	.....
Argentina.....	Peso	.006652	([11])	2,030	71,045	.....	.....	.....	.....
Australia.....	Pound	2.2236	2.24	[12] 6,457	[12] 226,000	2,705	8,893	102,310	113,908
Austria.....	Schilling	.038707	.0384615	17,143	600,012	1,090	2,374	67,539	71,003
Belgium.....	Franc	.020144	.02	41,460	1,451,096	383	14,723	35,445	50,551
Bolivia.....	Peso boliviano	[13] .084175	([11])	138	4,829	[14] 73	.....	.....	73
Brazil.....	Cruzeiro	[15] .00054054	([11])	2,604	91,151	.....	.....	.....	.....
Burma.....	Kyat	[13] .20825	.21	2,390	83,656	.....	.....	.....	.....
Canada.....	Dollar	.93039	.925	29,306	1,025,711	13,834	140	192,174	206,148
Ceylon.....	Rupee	.20944	.21	.....	.....	.....	36	219	255
Chile.....	Escudo	[16] .37037	([11])	1,228	42,990	.....	.....	.....	.....
China, Rep. of (Taiwan)..	NT dollar	[13] .024938	([10])	1,565	54,781	2,586	3	.....	2,589
Colombia.....	Peso	[13] .111111	([11])	1,655	57,907	102	([17])	398	500
Congo, Leopoldville.....	Congo franc	[13] .0055555	([10])	83	2,922	.....	.....	.....	.....
Costa Rica.....	Colon	[18] .15106	.150943	60	2,106	.....	.....	.....	.....
Denmark.....	Krone	.14459	.144778	2,636	92,267	.....	.....	.....	.....
Dominican Rep. (Jan.)....	Peso	[16] 1.00	1.00	86	3,000	.....	232	3,626	3,858
Ecuador.....	Sucre	[13] .0550055	.0555556	320	11,207	54	7	.....	61
Egypt, United Arab Rep...	Pound	[13] 2.30	([11])	3,979	139,271	.....	.....	.....	.....
El Salvador.....	Colon	[16] .40	.40	510	17,840	.....	454	2,543	2,997
Ethiopia.....	Dollar	[16] .40	.40	234	8,198	.....	1,365	([19])	1,365
Finland.....	New Markka	.310084	.3125	2,439	85,358	1,542	155	5,155	6,852
France.....	Franc	.20405	.20255	106,548	3,729,165	7,781	([19])	[12] 188,000	195,781
Germany, Federal Rep.....	Deutsche Mark	.25149	.25	121,368	4,247,897	2,450	3,118	136,642	142,210
Ghana.....	Pound	[16] 2.80	2.80	160	5,596	.....	.....	.....	.....
Greece.....	Drachma	[16] .0333333	.0333333	2,212	77,433	.....	.....	.....	.....
Guatemala.....	Quetzal	[16] 1.00	1.00	656	22,962	99	467	5,782	6,348
Haiti.....	Gourde	[16] .20	.20	22	753	.....	.....	.....	.....
Honduras.....	Lempira	[16] .50	.50	[12] 3	[12] 109	.....	975	2,137	3,112
Iceland.....	Krona	[13] .0232234	.0232558	29	1,015	.....	.....	.....	.....
India.....	Rupee	.20898	.21	7,066	247,297	([19])	([19])	([19])	([19])
Iran (March 20).....	Rial	[16] .0132013	.0132013	4,023	140,812	.....	.....	([19])	([19])
Iraq.....	Dinar	[16] 2.80	2.80	3,195	111,811	49	2,058	3,822	5,929
Ireland, Rep. of.....	Pound	2.7906	2.80	539	18,874	.....	.....	2,295	2,295
Israel.....	Pound	[16] .333333	.333333	1,591	55,687	.....	.....	.....	.....
Italy.....	Lira	.0016003	.0016	60,189	2,106,601	[20] 7,730	[20] 1,232	[20] 83,520	[20] 92,482
Japan.....	Yen	.0027837	.00277778	8,700	304,493	11,172	4,154	151,137	166,463
Korea Republic.....	Won	[16] .0039216	([10])	79	2,772	35	.....	.....	35

See footnotes at end of table.

Gold and silver monetary stocks of principal countries of the world at end of calendar year 1964--Continued

Country or international institution	Monetary unit	Exchange rate: New York Dec. 1964 average, or internal rate as noted	Par value Dec. 1964 for members of the International Monetary Fund	Gold bullion and coin held by Government agencies		Silver bullion and coin--U.S. dollar value ($)			
				Number of fine troy ounces (000 omitted)	U.S. dollar value[1] (000 omitted)	Bullion held by Government agencies[2] (000 omitted)	Coin held by Government agencies[3] (000 omitted)	Coin (estimated) in circulation, including coin in commercial banks[3] (000 omitted)	Total silver (000 omitted)
Kuwait	Dinar	[16] $2.80	$2.80	1,360	$47,615	.....	.....	.....	.....
Lebanon	Pound	[15] .324675	([11])	[12] 5,234	[12] 183,200	.....	.....	$750	$750
Liberia	Dollar	[16] 1.00	1.00	[12] 1	[12] 41	.....	([19])	([19])	([19])
Libya	Pound	[16] 2.80	2.80	484	16,933	.....	.....	.....	.....
Luxembourg	Franc	[16] .02	.02	.....	.....	.....	$40	.....	40
Malaysia	Dollar	.32569	.326667	208	7,293	.....	54	[21] 7,087	7,141
Mexico	Peso	.080056	.08	4,840	169,408	$5,901	11,745	87,702	105,348
Morocco	Dirham	[13] .198764	.197609	976	34,157	([19])	956	6,623	7,579
Mozambique (Port. E. Africa)	Escudo	[16] .03904	.....	232	8,115	.....	1,643	4,640	6,283
Nepal	Rupee	[22] .13125	([10])	87	3,049	5,703	.....	.....	5,703
Netherlands	Guilder	.27831	.276243	48,229	1,688,017	2,009	3,729	68,214	73,952
Netherlands Antilles	Guilder	[13] .524934	.530264	558	19,527	.....	630	1,656	2,286
New Zealand	Pound	2.7630	2.7809	19	677	.....	.....	.....	.....
Nicaragua	Cordoba	[13] .141844	.142857	10	333	.....	.....	.....	.....
Nigeria	Pound	[13] 2.78	2.80	571	20,000	.....	.....	.....	.....
Norway	Krone	.13980	.14	876	30,654	.....	116	1,841	1,957
Pakistan	Rupee	[13] .208116	.21	1,521	53,229	.....	.....	.....	.....
Panama, Rep. of	Balboa	[16] 1.00	1.00	([17])	10	.....	[23] 1,700	[23] 900	[23] 2,600
Paraguay	Guarani	[13] .0079365	([11])	2	81	.....	.....	.....	.....
Peru	Sol	[16] .0372856	([11])	1,925	67,384	.....	([17])	.....	([17])
Philippines	Peso	[15] .255754	.50	662	23,170	6,916	2,472	20,565	29,953
Portugal	Escudo	.034777	.0347826	[12] 14,943	[12] 523,000	640	1,020	11,656	13,316
Rhodesia	Pound	[13] 2.78375	2.80	426	14,897	.....	46	[24] 788	834
Saudi Arabia	Riyal	[16] .222222	.222222	2,218	77,635	12,031	.....	.....	12,031
South Africa	Rand	1.3901	1.40	16,410	574,339	892	556	43,649	45,097
Spain	Peseta	.016666	.0166667	17,589	615,610	.....	4,878	.....	4,878
Surinam	Guilder	[13] .526316	.530264	207	7,254	.....	.....	.....	.....
Sweden	Krona	.19439	.193304	5,401	189,032	1,447	2,711	84,504	88,662
Switzerland	Franc	.23172	.....	77,862	2,725,165	14,491	6,830	120,663	141,984
Syrian Arab Rep	Pound	[13] .26178	([11])	672	23,513	.....	.....	2,834	2,834
Thailand	Baht	[13] .047985	.0480769	2,977	104,203	255	54	79	388
Tunisia	Dinar	[16] 1.90476	1.90476	106	3,703	.....	.....	.....	.....
Turkey	Lira	[13] .110132	.111111	[12] 2,971	[12] 104,000	.....	.....	8,889	8,889
United Kingdom	Pound sterling	2.7906	2.80	61,029	[25] 2,136,000	([19])	.....	100,462	100,462
Uruguay	Peso	[15] .041068	([11])	4,898	171,419	.....	.....	1,232	1,232
Venezuela	Bolivar	[13] .222222	.298507	11,450	400,758	.....	15,816	36,356	52,172
Yemen Arab Republic	Rial	[16] .70	.....	3	109	.....	2,069	3,651	5,720
Yugoslavia	Dinar	[16] .001333	([11])	[12] 486	[12] 17,000	.....	.....	.....	.....
Bank for International Settlements	Gold franc	[26] .32669	.....	[27] (-)1,429	[27] (-)49,992	.....	.....	.....	.....

See footnotes at end of table.

Gold and silver monetary stocks of principal countries of the world at end of calendar year 1964--Continued

Country or international institution	Monetary unit	Exchange rate: New York Dec. 1964 average, or internal rate as noted	Par value Dec. 1964 for members of the International Monetary Fund	Gold bullion and coin held by Government agencies		Silver bullion and coin--U.S. dollar value ($)			
				Number of fine troy ounces (000 omitted)	U.S. dollar value[1] (000 omitted)	Bullion held by Government agencies[2] (000 omitted)	Coin held by Government agencies[3] (000 omitted)	Coin (estimated) in circulation, including coin in commercial banks[3] (000 omitted)	Total silver (000 omitted)
European Fund	.....	.....	.....	[12] 1,229	[12] $43,000	.....	.....	.....	.....
International Monetary Fund	.....	.....	.....	62,267	2,179,348	.....	.....	.....	.....
Sum of items above	.....	.....	.....	1,224,401	42,854,089	$1,652,509	$105,152	$4,245,091	$6,002,752
Other	.....	.....	.....	[28] 5,885	[28] 205,911	([19])	([19])	([19])	([19])
World total	.....	.....	.....	[12] 1,230,286	[29] 43,060,000	.....	.....	.....	.....

[1] Gold is valued on the basis of the legal gold content of the United States dollar (symbol $). The dollar consists of 15-5/21 grains of gold nine-tenths fine. The equivalent value of fine gold is $35.00 per troy ounce = $1.125275986 per gram = and $1,125.275986 per kilogram.

[2] Value of silver bullion: United States, see footnote 5. Other countries, reported quantity valued at the Dec. 1964 price for commercial bars in New York which was $1.293 per troy ounce of 999/1000 fineness; the corresponding value of fine silver = $1.294294 per troy ounce = $0.041612 per gram = $41.612 per kilogram.

[3] Value of silver coin: United States, the face or nominal value. Other countries, the reported face or nominal value in the national monetary unit, converted to U.S. dollar value at the New York exchange rate where quoted, or at the par value established with the International Monetary Fund, or at internal rates for the dollar.

[4] Consists of regular Treasury and U.S. Exchange Stabilization Fund gold holdings.

[5] Amounts to 1,204,344,996 fine troy ounces of silver bullion held by the U.S. Treasury.

[6] U.S. silver coin held in the Treasury.

[7] U.S. silver coin held outside the Treasury; that is, held in the Federal Reserve Banks (central banks), in commercial banks, and in hands of the public.

[8] East African Currency Area on June 30, 1964 includes Aden, Kenya, Tanzania (union of the former Tanganyika and Zanzibar), and Uganda. Silver coins have been in process of withdrawal over a period of years (official exchange rate).

[9] The Algerian dinar replaced the Algerian franc as monetary unit by Law No. 64-111 of April 10, 1964. The dinar is at par with the French franc.

[10] Par value not yet established.

[11] Par value previously established not applicable in Dec. 1964.

[12] Approximate.

[13] Selling rate.

[14] Demonetized coin.

[15] Free rate.

[16] Official rate.

[17] Less than 500.

[18] Export rate.

[19] Data not available.

[20] Data for Dec. 1963 were as follows: Silver bullion, $6,825,000; silver coin held by Government, $4,354,000; silver coin in circulation, $75,393,000; total silver, $86,572,000.

[21] Malayan silver coins were demonetized as from Dec. 31, 1952.

[22] Cross rate between the Nepalese and Indian rupees and the U.S. dollar.

[23] Includes coins of Panama and the United States.

[24] Includes coins circulating in 1964 in Rhodesia, Zambia (formerly Northern Rhodesia), and Malawi (formerly Nyasaland).

[25] Source: International Financial Statistics.

[26] Corresponds to gold franc unit of 0.29032258 grams fine gold (Article 5 of the Statutes).

[27] Represents gold in bars and coins and other gold assets minus gold deposit liabilities. Most of the gold deposited with the BIS is included in the gold reserves of individual countries.

[28] Represents difference between estimated world total shown below and sum of items above.

[29] World total gold stocks: Source of U.S. dollar value, Federal Reserve Bulletin, in which reserves are rounded to millions of dollars. Ounces are computed from the rounded dollar value. World total does not include holdings of the U.S.S.R., other Eastern European countries, and China Mainland.

WORLD MONETARY UNITS IN 1964[1]

Country	Basic unit		Divisional (fractional) unit		Remarks
	Name	Symbol or abbreviation	Name	Symbol or abbreviation	
United States of America	Dollar	$	Cent		
Afghanistan	Afghani	Af	Pul		
Africa, East	East African shilling	EA sh. or s.	Cent	cts.	Area includes Kenya, Tanzania, Uganda, and Aden. 20 sh. = 1 pound sterling.
Africa, Equatorial	CFA Franc	CFA fr.	Centime		One CFA franc = .02 metropolitan franc[2].
Africa, West	Pound	£	Shilling, penny (pence).	s. & d.	Area includes Gambia and Sierra Leone. 1£ = 20 s. = 240 d.
Africa, West--Monetary Union of	CFA Franc	CFA fr.	Centime		One CFA franc = .02 French franc. Area includes the Republics of Ivory Coast, Dahomey, Upper Volta, Mauritania, Niger, Senegal, and Togo.
Algeria	Dinar	DA	Centime	Cme	Effective April 11, 1964, the monetary unit became the dinar.
Argentina	Peso	m$n.	Centavo	ctv.	m$n refers to national money (paper). There is also a gold peso unit, oro sellado (o$s), equivalent for customs purpose to 2.2727 m$n.
Australia	Pound	£	Shilling, penny (pence).	s. & d.	1£ = 20 s. = 240 d. The decimal system of currency will be adopted in Feb. 1966. The monetary unit, the dollar ($), will be divided into 100 cents(c).
Austria	Schilling	S or Sch	Groschen (groschen)	g	
Belgium	Franc	F or BF	Centime	c	
Bermuda	Pound	£	Shilling, penny(pence).	s. & d.	1£ = 20 s. = 240 d.
Bhutan	Rupee	Re (Rs.)	Half rupee, pice		1 rupee = 16 annas; 1 anna = 4 pice; 1 pice = 3 pies. Indian money principal circulating medium.
Bolivia	Peso boliviano	$b	Boliviano		Effective January 1, 1963 the monetary unit became the peso boliviano. 1 peso boliviano = 1,000 bolivianos.
Brazil	Cruzeiro	Cr $	Centavo		
British Guiana	British West Indian Dollar.	BWI $	Cent		4.80 BWI $ = 1 pound sterling.
British Honduras	Dollar	BH $	Cent		4 BH $ = 1 pound sterling.
Burma	Kyat	K	Pya	P	The decimal system was adopted in 1952.
Burundi	Franc	FBu	Centime		On May 19, 1964, the Bank of the Kingdom of Burundi, the central bank, began issuing Burundi franc currency.
Cambodia	Riel	₰	Sen (sen)		Official conventional sign of the riel is barred Cambodian letter "ro", as follows ₰. Typewriters and fonts which do not include this character may use a barred Latin "J" as follows ₰.
Canada	Dollar	$	Cent	¢	
Caribbean Territories, Eastern Group	British West Indian Dollar.	BWI $	Cent		Area includes Barbados, British Guiana, the Leeward Islands, Trinidad and Tobago[3], and the Windward Islands. The decimal system was adopted in 1955. 4.80 BWI $ = 1 pound sterling.
Ceylon	Rupee	Re (Rs.)	Cent	ct.	

See footnotes at end of table.

WORLD MONETARY UNITS IN 1964[1]--Continued

Country	Basic unit		Divisional (fractional) unit		Remarks
	Name	Symbol or abbreviation	Name	Symbol or abbreviation	
Chile	Escudo	E°	Centésimo, Milésimo		The escudo = 100 centesimos = 1,000 milesimos. New unit established January 1, 1960.
China, Republic of	New Taiwan Dollar	NT $	Cent		
Colombia	Peso	$ or P	Centavo	c., ¢, or Ctv.	
Congo, Democratic Rep. of the (Leopoldville)	Franc congolais	FC or CF	Centime		
Costa Rica	Colón (Colones)	₡ or ₡	Céntimo	¢	
Cyprus	Pound	£	Mil		1£ = 1,000 mils.
Denmark	Krone (Kroner)	Kr. or kr.	Øre (øre)		
Dominican Republic	Peso	RD $	Centavo	Ct.	
Ecuador	Sucre	S/.	Centavo		
Egypt, United Arab Republic	Pound	L.E.	Piastre, millieme	P.T. & Mill.	One pound = 100 piastres = 1,000 milliemes.
El Salvador	Colón (Colones)	₡ or ₡	Centime	¢	
Ethiopia	Dollar	Eth. $ or E $	Cent	c.	
Fiji	Pound	£	Shilling, penny (pence).	s. & d.	There are 1.11 pounds per pound sterling. 1£ = 20 s. = 240 d.
Finland	Markka (Markkaa)	mk	Penni (pennia)	p.	A new markka equal to 100 old markkaa was introduced on January 1, 1963. For clarity the old markka is abbreviated as vmk (vanha markka).
France	Franc	F	Centime	Cme	A new franc equal to 100 old francs was introduced on January 1, 1960. The word "new" was eliminated January 1, 1963.
French Guiana	Franc	F or fr.	Centime	Cme	Effective January 1, 1963 the monetary unit became the "new" franc at parity with the metropolitan franc.
French Polynesia	CFP Franc	CFP fr.	Centime		One CFP Franc = .055 metropolitan franc.
French Somaliland	Djibouti Franc	DJ. fr.	Centime		
Germany, Federal Republic	Deutsche Mark*	DM	Pfennig*	Pf.	*For both singular and plural forms.
Ghana	Pound	£G	Shilling, penny (pence).	sh. & d.	1£ = 20 sh. = 240 d. Effective July 19, 1965, Ghana will adopt the decimal currency system. The monetary unit, the cedi, will be divided into 100 pesewas.
Greece	Drachma	Dr.	Lepton (lepta)		
Greenland	Krone (Kroner)	Kr. or kr.	Øre (øre)		
Guatemala	Quetzal (Quetzales)	Q or Q	Centavo	¢	
Guernsey	.....	.....	.....	.....	Local coins; 8 doubles = 1 penny. Pound sterling system.
Guinea, Rep. of	Guinea Franc	FG			
Haiti	Gourde	G	Centime	¢	
Honduras	Lempira	L.	Centavo	¢	
Hong Kong	Dollar	HK $	Cent		16 Hong Kong dollars = 1 pound sterling.
Iceland	Króna (Krónur)	kr. or Kr.	Eyrir (aurar)	Plural aur. or au.	
India	Rupee	Re. (Rs.)	Paisa	p.	
Indonesia	Rupiah (Rupiah)	Rp.	Sen (sen)		

See footnote at end of table.

WORLD MONETARY UNITS IN 1964[1]--Continued

Country	Basic unit		Divisional (fractional) unit		Remarks
	Name	Symbol or abbreviation	Name	Symbol or abbreviation	
Iran	Rial	Rl. (Rls.)	Dinar	D.	
Iraq	Dinar	ID	Fils (fils)		One dinar = 1,000 fils. Fils is not abbreviated.
Ireland, Republic of	Pound	£	Shilling, penny (pence)	s. & d.	1£ = 20 s. = 240 d.
Israel	Pound	I£	Agora (agorot)	Ag.	Effective January 1, 1960, the Israel pound was divided into 100 agorot (formerly the pound equaled 1,000 prutot).
Italy	Lira (Lire)	L. or Lit.	Centesimo (centesimi)		
Jamaica	Pound	£	Shilling, penny (pence).	s. & d.	1£ = 20 s. = 240 d.
Japan	Yen (Yen)	¥	Sen (sen)		
Jersey					Pound sterling system; local coins, threepence, penny, and halfpenny.
Jordan	Dinar	JD.	Fils (fils)		One dinar = 1,000 fils.
Korea, Republic of	Won (Won)	W or ₩	Chon (chon)		Effective June 10, 1962 the unit of currency is the won divided into 100 chon. The ratio of hwan to won is 10 to 1.
Kuwait	Dinar	KD	Fils (fils)		A new currency in 1961. 1 dinar = 1,000 fils. 100 fils = 1 dirham.
Laos	Kip (Kip)	K, k	Centime, AT, or Pi		
Lebanon	Pound	L£ or LL	Piastre	LP	
Liberia	Dollar (Liberian or U.S.).	$	Cent	¢	
Libya	Pound	₤L	Piastre, millieme	P, Pias, Mil	One pound = 100 piastres = 1,000 milliemes. The piastre will be discontinued effective Oct. 1, 1965. One millieme will continue to equal one thousandths part of a pound.
Luxembourg	Franc (Luxembourg or Belgian).	fr. or F	Centime	Ct.	
Malagasy Republic	Malagasy franc	FMG	Centime		Effective July 1, 1963 the monetary unit became the Malagasy franc. One Malagasy franc = .02 metropolitan franc.
Malawi	Pound	£ M	Shilling, penny, (pence).	s. & d.	The Malawi pound was first issued on November 16, 1964.
Malaysia	Dollar	$	Cent	c.	Malayan dollar is on a sterling exchange standard fixed at 2 shillings, 4 pence. Currency area includes Malaysia and Brunei.
Maldive Islands	Lari				A new currency in 1960.
Mauritius	Rupee	Re	Cent		13-1/3 rupees = 1 pound sterling.
Mexico	Peso	$	Centavo	¢	
Monaco	New Franc (French)	NF	Centime	Cme	Local coins and metropolitan French money.
Morocco	Dirham	DH	Franc		One dirham = 100 francs. The dirham replaced the Moroccan franc as monetary unit in October 1959.

See footnote at end of table.

WORLD MONETARY UNITS IN 1964[1]--Continued

Country	Basic unit		Divisional (fractional) unit		Remarks
	Name	Symbol or abbreviation	Name	Symbol or abbreviation	
Muscat	Rial		Baiza		
Nepal	Rupee or Dabal	Rs.	Pice or paisa		
Netherlands	Guilder or Florin	f. or fl., g.	Cent	ct.	
Netherlands Antilles (Curacao)	Guilder or Florin	f., fl., or NAfl.	Cent	ct.	1 Netherlands Antilles guilder = 1.919555 Netherlands guilders.
New Caledonia	CFP Franc	CFP fr.	Centime		One CFP Franc = .055 metropolitan franc.
New Zealand	Pound	NZ£	Shilling, penny (pence).	s. & d.	1£ = 20 s. = 240 d. The decimal system of currency will be adopted in 1967.
Nicaragua	Córdoba	C$	Centavo	¢	
Nigeria	Pound	£N	Shilling, penny (pence).	sh. & d.	1£ = 20 sh. = 240 d.
Norway	Krone (Kroner)	Kr.	Öre (öre)		
Pakistan	Rupee	Rs.	Paisa	Ps.	Effective January 1, 1961 Pakistan adopted the decimal system.
Panama, Republic of	Balboa	B/.	Centesimo	¢	U. S. money also circulates.
Paraguay	Guarani (Guaranies)	₲	Céntimo		
Peru	Sol (Soles)	S/.	Centavo	ct.	
Philippines	Peso	₱	Centavo	c	
Portugal	Escudo	Esc. or $	Centavo		Symbol ($) is placed between escudos and centavos. (Example: 1$00).
Portuguese East Africa, Mozambique	Escudo	Esc. or $	Centavo	Cent. or Ct.	....Do....
Portuguese Macao	Pataca	$	Avo		
Portuguese Timor	Escudo	Esc. or $	Centavo		....Do....
Portuguese West Africa, Angola	Escudo	Esc. or $	Centavo		....Do....
Portuguese West Africa, Cape Verde	Escudo	Esc. or $	Centavo		....Do....
Portuguese West Africa, Guinea	Escudo	Esc. or $	Centavo		....Do....
Portuguese West Africa, San Tome and Principe	Escudo	Esc. or $	Centavo		....Do....
Reunion	CFA Franc	CFA fr.	Centime		One CFA Franc = .02 metropolitan franc.
Rhodesia	Pound	£	Shilling, penny (pence).	s. & d.	1£ = 20 s. = 240 d.
Rwanda	Franc	RF			
Saint-Pierre et Miquelon	CFA Franc	CFA fr.	Centime		One CFA Franc = .02 metropolitan franc.
Saudi Arabia	Riyal	SR	Girsh or gursh		There are 20 girsh in one riyal and 5 halalah in one girsh by Decree No. 6 of December 31, 1959.
Seychelles	Rupee	Re	Cent		13-1/3 rupees = 1 pound sterling.
Sierra Leone	Leone	Le.	Cent		A new decimal monetary unit first issued on Aug. 4, 1964.
Somali Republic	Somali Shilling	Sh. So.	Centesimo (centesimi)		

See footnote at end of table.

WORLD MONETARY UNITS IN 1964[1]--Continued

Country	Basic unit		Divisional (fractional) unit		Remarks
	Name	Symbol or abbreviation	Name	Symbol or abbreviation	
South Africa, Republic of	Rand (Rand)	R	Cent	c	On February 14, 1961, South Africa adopted the decimal system. The rand is equivalent to one-half the former South African pound.
Spain	Peseta	Pta. (Pts.)	Centimo	Cts.	
Sudan	Pound	£ S, LSd, or LS.	Piastre, millieme	m/m	One Sudanese pound = 100 piastres = 1,000 milliemes.
Surinam	Guilder	Sf	Cent	ct (cts)	1 Surinam guilder = 1.919555 Netherlands guilders.
Sweden	Krona (Kronor)	Kr. or kr.	Öre (öre)		
Switzerland	Franc	Fr.	Centime	Ct.	
Syrian Arab Republic	Pound or Lira	L.S.	Piastre	P.S.	
Thailand	Baht (Baht)	B	Satang	stg.	The baht is sometimes referred to as the tical.
Tonga	Pound	£	Shilling, penny (pence).	s. & d.	1.25 £ = 1 pound sterling.
Trinidad and Tobago	Dollar	TT$	Cent		See footnote 3.
Tunisia	Dinar	D	Millime	M	1 Dinar = 1,000 millimes. The Dinar replaced the Franc as monetary unit during latter part of 1958.
Turkey	Lira or Pound	TL.	Piastre or Kuru	Krs.	
United Kingdom	Pound sterling	£	Shilling, penny (pence).	s. & d.	1£ =20 s. = 240 d.
Uruguay	Peso	$	Centesimo	cts.	
Vatican City	Vatican Lira (Lire)	L.	Centesimo (centesimi)		
Venezuela	Bolívar (Bolívares)	Bs.	Centimo		
Viet-Nam	Piastre	VN $ or Pr	Centime		
Yemen Arab Republic	Rial	Y.R.	Buqsha		There are 40 buqshas in one rial.
Yugoslavia	Dinar (Dinara)	Din.	Para (para)		
Zambia	Pound	£ Z	Shilling, penny, (pence).	s. & d.	1 £ Z = 20 s. = 240 d. A new monetary unit which was first issued on Nov. 16, 1964.

[1] The decimal system of money with one whole unit divided into fractional units is in effect for each country shown except as otherwise indicated in the remarks column. The form, capitalization, position, etc., of units and their symbols or abbreviations may vary from that shown according to custom, usage, type of machines used, or for other reasons. Plural forms regularly are made by adding the letter "s", unless otherwise specified. CFA is the abbreviation for Colonies Francaises d'Afrique, and CFP is the abbreviation for Colonies Francaises du Pacifique. The terms do not necessarily refer to political status.

[2] Area includes the Republics of Cameroun, Gabon, Chad, Congo (Brazzaville), and the Central African Republic. (Africa, Equatorial).

[3] Effective December 14, 1964, the Central Bank of Trinidad and Tobago began issuing a new currency, the Trinidad and Tobago dollar (TT$) which is at par with the West Indian dollar.

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