

GOLD and SILVER

Statistics for 1969, 1970 (Preliminary), and Other Years

ARIZONA, THE UNITED STATES, AND THE WORLD

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February, 1971

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# GOLD and SILVER - 1968-1969

## ARIZONA

### Gold

Arizona's gold production in the years 1968-1970 ranked fourth in value, after copper, molybdenum, and silver, among the metals produced by the State. The gold was mainly a by-product of the copper industry and production increased along with that of copper in 1968 and 1969. However, in 1970 the State's gold output increased very little while that of copper rose 14 per cent in quantity. The value of the gold output in 1969 was enhanced by higher prices following the establishment of the "two-tier" price system in March, 1968, but the value of the 1970 output declined 13.5 per cent due to a like drop from the average 1969 price. The 110,878 ounces produced in 1969 were valued at \$4,603,000 and the 111,000 in 1970 at \$3,983,000.

Arizona's production of recoverable gold for the years 1955-1970 is given in Table I, page 8.

Arizona ranked fourth among the states in gold production, as it has done since 1964. In 1965, Nevada replaced her in third place and then in 1967 replaced Utah in second, Utah dropping to third. South Dakota stayed well in the lead.

Seven of the twenty-five leading gold mines in the United States in 1969 were in Arizona. The seven are as follows:

Mine	Operator	Source of Gold	Rank		
			1967	1968	1969
New Cornelia	Phelps Dodge Corp.	Copper Ore	8	6	9
Copper Queen - Lavender Pit	Phelps Dodge Corp.	Copper Ore	9	7	8
San Manuel	Magma Copper Co.	Copper Ore	13	10	10
Morenci	Phelps Dodge Corp.	Copper Ore	17	13	14
Magma	Magma Copper Co.	Copper Ore	20	16	16
Iron King	Shattuck-Denn Mng. Corp. 1967 McFarland & Hullinger 1968	Lead-Zinc Ore	11	18	--
Christmas	Inspiration Cons. Copper Co.	Copper Ore	--	20	22
Ray Pit	Kennecott Copper Corp.	Copper Ore	--	--	25

Source: U.S. Bureau of Mines

In 1969, 98 per cent of Arizona's gold production was a by-product of the copper industry. The other 2 per cent came chiefly from ores and tailings from dry gold and silver mines. Comparative figures for 1968 were 93 per cent from

copper ores, 6 from lead-zinc, and 1 per cent from other ores. Table II, page 8 shows the ore sources and amounts of both gold and silver produced in the State in 1969. It shows a total of 7 lode gold mines which produced 512 tons of dry gold ore yielding 500 ounces of gold in the year.

In 1937 a total of 431 lode gold mines produced 616,000 tons of dry gold ore yielding 117,464 ounces - more than all Arizona mines produced in 1969.

### Silver

In 1966, Utah displaced Arizona as the second largest silver producing state, but in 1969 Arizona regained second place, Idaho having retained first, as it has for several decades.

Arizona's silver production for the years 1955-1970 is shown in Table I, page 8. Nearly all of it was a by-product of other than silver ores. The production in 1969 increased 19 per cent in quantity from 1968 but was 3 per cent below 1966, the highest year since 1942. However, 1969 was 55 per cent above 1966 in value and only 3 per cent above 1968 in value, the average Handy & Harman price of silver having increased from \$1.293 per fine Troy ounce in 1966 to \$2.145 in 1968, then dropped to \$1.791 in 1969.

In 1970, Arizona silver production increased to a preliminary figure of 6,991,000 ounces, 14 per cent above 1969 and 10 per cent above the 37 year record in 1966. The 1970 production value increased 15 per cent to \$12,684,000, according to preliminary figures shown in Table I.

In recent years silver has ranked third, following copper and molybdenum, among the metals produced in Arizona, but has accounted for less than 2 per cent of the total value of all minerals (see Table III).

Seven of the twenty-five leading silver mines in the United States are in Arizona. They are as follows:

Mine	Operator	Source of Silver	Rank		
			1967	1968	1969
Pima	Pima Mining Co.	Copper Ore	14	10	13
Mineral Park	Duval Corp.	Copper Ore	17	12	18
Copper Queen - Lavender Pit	Phelps Dodge Corp.	Copper Ore	19	13	11
Morenci	Phelps Dodge Corp.	Copper Ore	20	15	17
Mission	American Smelting & Refining Co.	Copper Ore	12	16	15
New Cornelia	Phelps Dodge Corp.	Copper Ore	21	22	22
Magma	Magma Copper Co.	Copper Ore	--	23	20
Iron King	Shattuck-Denn Mng. Corp. 1967	Lead-Zinc Ores	18	--	--

Source: U.S. Bureau of Mines

In 1969, 96 per cent of Arizona's silver production of 6,140,022 ounces came from copper ores, as shown by Table II, page 8. 18 dry silver and 8 dry silver-gold, lode ore mines accounted for 3 per cent, and other ores 1 per cent.



Corresponding percentages in 1968 were 95, 1 and 4.

In 1937, Arizona's year of maximum silver and gold production, 109 dry and siliceous silver ore producing mines and 29 dry gold-silver-lead mines combined produced 1,495,736 ounces of silver, equal to 16 per cent of the 1937 record silver production.

Most of the dry gold and silver ores mined since 1942 have been either sorted, higher grade ores shipped in small amounts or lower grade ores with high flux or slurry values desired by the smelters. Gold ores, with a fixed gold price, have had little if any promise of being profitably mined in Arizona in the face of multiplication of costs since the gold mine closing order of 1942. Costs also have increased since World War II much more rapidly than silver prices have, and very few mines which were mainly dependent upon dry silver ores, have been operated in Arizona in the period.

The following table shows Pima County to be well in the lead as a producer of gold, silver, and copper in 1968. Pinal was second in silver and copper but slightly below Cochise in gold output.

#### ARIZONA PRODUCTION OF GOLD, SILVER AND COPPER BY COUNTIES IN 1968

COUNTY	GOLD		SILVER		COPPER	
	Thousands of Ounces	%	Thousands of Ounces	%	Thousands of Tons	%
Pima	29.3	30.5	2,008	40.5	207.4	33.0
Pinal	23.5	24.5	785	15.8	143.3	22.8
Mohave	0.1	0.1	595	12.0	28.6	4.6
Cochise	24.1	25.1	548	11.1	47.8	7.6
Greenlee	9.4	9.8	519	10.5	106.9	17.0
Yavapai	5.6	5.8	259	5.2	21.7	3.5
Gila	3.9	4.1	216	4.3	69.8	11.1
Others	0.1	0.1	28	0.6	2.5	0.4
<b>TOTAL</b>	<b>96.0</b>	<b>100.0</b>	<b>4,958</b>	<b>100.0</b>	<b>628.0</b>	<b>100.0</b>

Following brief silver excitement in the Kofa Mountains of Yuma County in early 1969, silver and gold activities were quiet, but picked up a little in 1970 as Treasury sales of silver neared an end and gold markets picked up in the latter half of the year.

#### UNITED STATES

##### Gold

United States production of recoverable gold in 1969 was 1,733,176 Troy ounces, up 17 per cent from 1968. Table VI, page 13, shows that the increase was due mainly to increases of 44 per cent in Nevada and 30 per cent in Utah, the second and third ranking states. Production in South Dakota, the No. 1 state, was practically the same in 1969 as in 1968. These first three states plus

fourth ranking Arizona produced 92 per cent of the Nation's gold output.

By-product gold from base metal ores accounted for 40 per cent of the domestic production compared to 34 per cent in 1968 when copper production was set back by the copper strike of 1967-68. Copper ores themselves produced 33 per cent of the Nation's output in 1969.

The new Cortez mine in Nevada was chiefly responsible for the increase there, and was an important contributor to the domestic increase. The mine produced 166,000 ounces of gold in 1969.

Nevada will also account for the major part of the estimated increase to 1,790,000 ounces of domestic gold produced in 1970. Substantial 1970 increases also occurred in Colorado and Alaska.

1969 was the first full year of the "two-tier" price system. The free market price started the year at above \$42 per ounce; rose to a peak of \$44.25 on March 10; averaged above 43.5 for May-June; then gradually declined until October when the drop accelerated. The year's low was in December and it equalled the \$35 monetary figure. In 1970, it held above 35 and below 37 until October, when it rose above 39 then fell below 38 and hovered around 38 in November and December. The average for 1970 was \$36.41, and for 1969, \$41.51.

Salient United States gold statistics are given in Table V, page 11.

Domestic consumption of gold in 1969 increased 8 per cent to 7,109,000 ounces, an all-time record. The use in industry (other than jewelry, arts and dentistry, but including space and defense branches) increased 33 per cent to 2,560,000 ounces, 36 per cent of the total. Jewelry and arts used 3,839,000 ounces, 54 per cent of the total, and 2 per cent less than in 1968. Dentistry consumed the other 10 per cent. Table VII, page 14, gives the industrial use of gold annually from 1964 to 1969 and compares the first half of 1970 with that of 1969. The comparison shows a decline of 10 per cent in the first half of 1970. Jewelry and arts and dental uses accounted for three-fourths of the drop. The table shows an increase in industrial use of 69 per cent in the 5 year period. An increase of 44 per cent occurred in the first two years, the uses other than dentistry having large gains.

If the recent trends of production and consumption continue, domestic production must fall farther behind unless it is stimulated by a higher price or a less desirable subsidy.

Jewelry and arts consume over half of the gold used in industry. Most of it is alloyed, most commonly with copper. Electrical and electronic uses are next.

United States imports and exports of gold for the years 1967-1969 and the first ten months of 1970 are shown in Table IX, page 16. In 1967 and 1968 net exports were large, but in 1969 exports were small and net imports were 5,523,000 ounces. This was the first excess of imports since 1960 when an 18 year period of them expired and excess exports took over in substantial amounts until 1969. The first 10 months of 1970 had excess imports of 3,758,000 ounces, thus running at an annual rate below 1969, due to export of 698,000 ounces in the second quarter.

The United States stocks of monetary gold at the ends of the years 1952-1969, and October 1970, are given in Table VIII, page 15. Not shown are International Monetary Fund special drawing rights (SDR) which were initiated the first of 1970 with a U.S. allocation of \$867 million. Free world reserves of gold also are tabulated.

At the end of 1969, the U.S. monetary stocks of gold, including its gold in the Exchange Stabilization Fund, amounted to \$11.859 or 29 per cent of the Free World official reserves of \$41 billion. While this may appear a comfortable U.S. holding, Paul Bareau, in discussing the dangers of an overvalued dollar in his article on Gold in Mining Annual Review - June 1970, cautions about increasing United States balance of payments deficits and about "a limit to this willingness

by other countries, firstly to absorb dollars....and secondly, to share with Washington and New York sovereignty over their own domestic policy." He further cautions that when one or more central banks reaches the limit and "demands to see the golden color of the dollars in their reserves....it is well to bear in mind the fact that the dollars now in monetary reserves outside the United States amount to \$12 billion and that the Eurodollar pool, almost exclusively ultimately owned by non-residents, amounts to \$38 billion. These are total external short term liabilities of \$50 billion against which the gold held by the United States Treasury amounts to \$11.4 billion."

Officials of the United States Treasury, and others, have expressed belief that other forms of monetary reserves must supplement gold under the two-tier system, and that SDR's supply the need. However, they too acknowledge the basic importance of a stable dollar and the need to control inflation and balance of payment problems in the United States.

## Silver

Salient U.S. silver statistics for 1969-1970 are given in Table XI, page 18.

United States mine production of silver increased 28 per cent in 1969 to 41,906,311 ounces. Substantial increases occurred in all of the major producing states, 1969 being relatively free of strikes.

Five States - Idaho, Arizona, Utah, Montana, and Colorado, in order of rank, produced 88 per cent of the nation's new silver output in 1969. Idaho alone accounted for 45 per cent. Missouri, Michigan and Nevada accounted for 8 per cent and California, New Mexico, South Dakota and Tennessee provided nearly all of the rest. All of the major producing states, with the possible exception of Idaho, are expected to have increased production in 1970 - and to have kept the same ranking.

State by state silver production for 1969 is shown in Table XII, page 19.

Silver ores accounted for 35 per cent of the total; gold ores, 1 per cent; copper ores, 32 per cent; lead ores, 12; zinc and complex copper-lead-zinc, 18; and old tailings, etc., 2 per cent. The Sunshine mine of Sunshine Mining Co. in Idaho was the leading producer, followed by Kennecott's Utah Copper mine in Utah and Asarco's Galena and Hecla's Lucky Friday mines in Idaho.

The federal Bureau of Mines reports 62.5 million ounces of silver recovered from old scrap and nearly 32 million from new scrap in 1969. These 94.5 M ounces from scrap plus more than 746 million recovered from domestic and foreign ores and concentrates made a total production of over 199 million ounces in the year.

The Bureau also reports an estimated increase in 1970 mine production of 5 per cent to 44 million ounces, based upon a January-November total of 40,484,000 equal to an average of 36,800 ounces per month.

The Bureau of Mines early in 1969 published results of a study of potential U.S. silver reserves which gave an estimate of 4.9 billion ounces with economic conditions of 1964 and "silver prices ranging up to \$3.00 per ounce. About 1.35 billion ounces were in currently operating mines and 3.58 billion ounces in deposits requiring higher silver prices to be economically mined." Eighty-five per cent of the total reserves is in Nevada, Idaho, Montana, Utah and California.

The price of silver in 1969 continued to be influenced by speculative demand and was very erratic. It ranged from a high of \$2.025 on January 15th to 1.540 on June 27th, the lowest since the government ceiling went off in July 1967. In May, the Treasury took off the ban on melting of silver coins and announced that sales through General Services would continue at a reduced weekly rate of 1,500,000 ounces until its saleable stock of about 150,000,000 ounces was gone. Speculation fell off but the late June low lasted only a short time and the



price climbed to about \$2.00 early in November, then fell to around \$1.80 at year end.

The average price for the year was \$1.791 compared with \$2.145 in 1968 when speculation was much more active. High interest rates and declining stock markets had a cooling effect in 1969.

In 1970, the price went from \$1.80 at the start to a high of slightly above \$1.90 in February and held above 1.85 until late April when the stock market tumbled and took silver with it to a bottom of 1.575 in May. The price began to firm after the stock market bottomed out in July, and climbed to \$1.86 in late August. Treasury silver sales stopped on November 10th but the expectations of many speculators that silver would soar were not realized. Many therefore bailed out and the price again tumbled, to a low of \$1.572 for the year on December 10th. At year end it was \$1.635.

Grounds for higher prices remained, however. Free World industrial use in 1969 was 362.4 million ounces. Use in coinage was 43.7 million. New mine production was 245.8 million. With U.S. Treasury stocks, which helped to fill demand in 1969 and 1970, lacking, higher prices still are expected. Opinions vary considerably as to how much higher they are likely to go and when.

United States consumption of silver for 1967-August 1970, is set forth by end use in Table XIII, page 20. The 141.5 ounces used in 1969 in industry and arts was down 2.6 per cent from 1968 and 17.2 per cent from 1967. Use in jewelry, sterling and plated wares declined 26 per cent in 1969; photographic materials, the largest industrial use, was off only 0.5 per cent; electrical contacts and conductors, the next largest item, increased 34 per cent in 1969.

In the first 9 months of 1970, jewelry consumed at an annual rate of about a third more than in 1969; sterling ware slightly more and plated ware less; photographic materials 11 per cent less; and contacts and conductors 20 per cent less.

Use in coinage in 1969 was 19.4 million ounces, down 47 per cent from 1968 and 56 per cent below 1967. Coinage use in the first nine months of 1970 was only 575,000 ounces.

Photography, electrical contacts and conductors, sterling ware and brazing, alloys and solders, accounted for 80 per cent of the U.S. industrial use in 1969, and 77 per cent in the first 9 months of 1970.

United States imports and exports of silver in ores, concentrates, waste, and bullion, are given in Table XV, page 22, for the years 1961 through 1970 (1st 10 months). Imports in 1969 were 72 million ounces, the highest since 1962 and 2 per cent higher than in 1968. The monthly average for the first 10 months of 1970 was 13 per cent below that for the year 1969. Exports in 1969 were 89 million ounces, 29 per cent below the record year of 1968. The monthly average for the first 10 months of 1970 was 69 per cent below that for the year 1969.

The United States was a net exporter of silver in the years 1967-1969, but was a net importer by more than two to one in the first ten months of 1970. Canada and Peru accounted for 82 per cent of the 72 million ounces imported in 1969, Canada alone sending 66 per cent. The United Kingdom, Canada, Switzerland and Belgium-Luxembourg received 86 per cent of the 89 million ounces of U.S. exports in 1969. 41 per cent of the total went to the United Kingdom and 20 per cent to Canada.

Table XI, page 18 gives U.S. Treasury and industry stocks of silver for the ends of the years 1964-1969, the former being exclusive of coinage and the latter including silver in Commodity Exchange warehouses. Industry stocks at the end of September 1970 also are given, and were slightly above the 198 million ounces at the end of 1969. Large stocks of silver are privately owned and there is a wide range of opinion about the prices which may cause the owners to sell them.

## WORLD

### Gold

World production of gold in 1967-1969, including the amounts from the most important producing countries, is given in Table X, page 16. Nearly three-fourths of the total has been produced by the Republic of South Africa. The Soviet Republic was a poor second, followed by Canada and the United States.

A few years ago, a decrease in South African production was feared, but small increases occurred in 1968 and 1969 and the output is expected to rise slowly for several years. There still is anticipation of a higher price.

Paul Bareau's article (loc. cit.) reviews estimates by D.O. Lloyd-Jacob, based upon various studies commissioned by Consolidated Gold Fields. Lloyd-Jacob estimated world industrial use of gold in 1968 at a total of 41.4 million ounces. He gave jewelry as user of 75 per cent of the 1968 total, with Europe accounting for 41 per cent of the use in jewelry. He also gave Europe as user of 43 per cent of the total with the United States and Canada together consuming 17 per cent.

Lloyd-Jacob estimated an absolute shortage of gold by the mid-1970's and suggested that a real shortage might appear as early as 1971. Bareau commented, "The anticipation of this shortage suggests that we may see gold well clear of the floor price before the end of 1970." As it turned out, the London price was \$37.435 at the close of 1970, and the average for the year fell well below that for 1969.

### Silver

World production of silver is presented for the years 1967-1969 in Table XVI, page 22. The 1969 total of 288,601,000 ounces is a preliminary figure 5 per cent higher than the 1968 production. Amounts from the most important producing countries are given. The Free World continued to produce over 80 per cent of the world's newly mined silver. Western hemisphere countries supplied 61 per cent in 1969. Mexico replaced Canada in the lead in 1969 with 43 million ounces, followed by Canada and the United States with 42 million apiece. The U.S. had the greatest increase in 1969 - 9 million ounces. Mexico gained 3 million, Canada was 3.5 million lower.

World consumption of silver increased 15 million ounces to a 1969 total of 362 million, although consumption in coinage dropped 59 per cent to 24 million ounces. The Free World consumption exceeded production by 101 million ounces, the gap being filled mainly by U.S. Treasury sales, which ended in November 1970.

Handy and Harman in its annual review, The Silver Market, 1969, estimated Free World supplies of 431.7 million ounces in 1969, of which 45 million went into speculative holdings and inventory accumulations. Simon D. Strauss, in Mining Annual Review-1970, estimated a 1969 supply of 456.7 million ounces, the chief difference from H&H being 25 million ounces of largely illegal exports from India and Pakistan, part of which may have been included by H&H in "miscellaneous sources".



TABLE I - ARIZONA'S PRODUCTION OF RECOVERABLE GOLD AND SILVER <sup>1/</sup>  
for Years 1955-1970

GOLD			SILVER		
Year	Troy Ozs.	Value	Year	Troy Ozs.	Value
1955	127,616	\$4,467,000	1955	4,634,179	\$4,194,000
56	146,110	5,114,000	56	5,179,185	4,687,000
57	152,449	5,336,000	57	5,279,323	4,778,000
58	142,979	5,004,000	58	4,684,580	4,240,000
59	124,627	4,362,000	59	3,898,336	3,528,000
60	143,064	5,007,000	60	4,774,992	4,322,000
61	145,959	5,109,000	61	5,120,007	4,733,000
62	137,207	4,802,000	62	5,453,585	5,917,000
63	140,030	4,901,000	63	5,373,058	6,873,000
64	153,676	5,379,000	64	5,810,510	7,513,000
65	150,566	5,270,000	65	6,095,285	7,881,000
66	142,528	4,988,000	66	6,338,696	8,196,000
67	80,844	2,830,000	67	4,588,081	7,112,000
68	95,999	3,769,000	68	4,958,162	10,633,000
69	110,878	4,603,000	69	6,141,022	10,997,000
70p	111,000	3,983,000	70p	6,991,000	12,684,000

p Preliminary

<sup>1/</sup> Source: U.S. Bureau of Mines

TABLE II - MINE PRODUCTION OF GOLD AND SILVER IN ARIZONA IN 1969 <sup>1/</sup>  
By Class of Ore, In Terms of Recoverable Metal

Source	Number of Mines	Material Sold or Treated (Short Tons)	Gold (Troy Ounces)	Silver (Troy Ounces)
Lode ore:				
Dry gold	7	512	500	25
Dry gold-silver	8	63,565	139	4,245
Dry silver	18	104,272	153	83,110
Total	33	168,349	792	87,380
Copper	45	127,848,828	108,718	5,899,843
Copper-lead and lead-zinc <sup>2/</sup>	2	2,945	4	3,674
Copper-zinc	1	103,838	26	36,460
Lead	8	571	106	5,224
Total	56	127,916,182	108,854	5,945,201
Other "lode" material:				
Gold-silver tailings	1	59,199	533	21,211
Gold-silver cleanup <sup>3/</sup>		20	2	25
Silver tailings	1	32,142	341	85,723
Copper cleanup <sup>3/</sup>		178	6	213
Cleanup (lead and zinc), and uranium ore <sup>3/</sup>		4/ 217	345	1,269
Total	2	91,756	1,227	108,441
Total "lode" material	90	128,216,287	110,873	6,141,022
Placer	1	-----	5	-----
Total all sources	91	128,216,287	110,878	6,141,022

<sup>1/</sup> Source: U.S. Bureau of Mines.

<sup>2/</sup> Combined to avoid disclosing individual company confidential data.

<sup>3/</sup> From properties not classed as mines.

<sup>4/</sup> Excludes uranium ore tonnage.

TABLE III - VALUES OF ARIZONA'S MINERAL PRODUCTS (a)

Commodity	(Values in Millions)											
	1960		1966		1967		1968		1969		1970p	
COPPER	\$346	83.2%	\$535	86.0%	\$384	82.5%	\$526	85.1%	\$762	88.7%	\$1,068	92.1%
MOLYBDENUM	5	1.2	18	2.9	15	3.2	19	3.1	21	2.4	23	2.0
SAND & GRAVEL	14	3.4	20	3.2	18	3.9	14	2.2	18	2.1	12	1.0
SILVER	4	1.0	8	1.3	7	1.5	11	1.8	11	1.3	13	1.1
PETROLEUM	W	-	(b)	0.1	8	1.7	10	1.6	7	0.8	5	0.4
STONE	5	1.2	4	0.7	4	0.9	6	1.0	6	0.7	6	0.5
LINE	2	0.5	4	0.6	3	0.7	5	0.8	5	0.6	6	0.5
GOLD	5	1.2	5	0.8	3	0.6	4	0.6	5	0.5	4	0.4
URANIUM	6	1.4	3 (c)	0.5	1 (d)	0.2	2 (e)	0.3				
ZINC	9	2.1	5	0.8	4	0.9	1	0.2	3	0.3	3	0.3
LEAD	2	0.5	2	0.3	1	0.2	(b)	0.1	(b)		(b)	
OTHER	18	4.3	18	2.8	17	3.7	20	3.2	22	2.6	20	1.7
ALL MINERALS	\$416	100.0%	\$622	100.0%	\$465	100.0%	\$618	100.0%	\$859	100.0%	\$1,160	100.0%

p Preliminary W Withheld to avoid disclosing individual company confidential data.

(a) Source: U.S. Bureau of Mines (b) Less than ½ million. (c) Method of reporting changed.

(d) Estimated based on \$8.00 per pound F.O.B. Mill.

(e) Estimated based on \$8.00 per pound for A.E.C. sales and assumed price of \$6.50 per pound, commercial sales.

TABLE IV

COMPARISON OF ARIZONA'S MINE PRODUCTION OF RECOVERABLE GOLD AND SILVER,  
AND TOTAL MINERAL PRODUCTION VALUES, 1955 - 1970; WITH  
YEAR OF MAXIMUM GOLD AND SILVER PRODUCTION 1/

(In Thousands)					
Year	Gold Value	Silver Value	All Minerals Total Value	Gold % of Total	Silver % of Total
1937 <u>2/</u>	\$11,644	\$7,288	\$ 94,564	12.3	7.7
1955	4,467	4,194	378,277	1.2	1.1
56	5,114	4,687	485,751	1.1	1.0
57	5,336	4,778	372,641	1.4	1.3
58	5,004	4,240	314,520	1.6	1.3
59	4,362	3,528	326,862	1.3	1.1
1960	5,007	4,322	415,512	1.2	1.0
61	5,109	4,733	432,614	1.2	1.1
62	4,802	5,917	474,131	1.0	1.2
63	4,901	6,873	481,392	1.0	1.4
64	5,379	7,513	534,353	1.0	1.4
1965	5,270	7,881	580,092	0.9	1.4
66	4,988	8,196	622,079	0.8	1.3
67	2,830	7,112	465,255	0.6	1.5
68	3,769	10,633	617,543	0.6	1.7
69	4,603	10,997	859,303	0.5	1.3
1970p	3,983	12,684	1,159,863	0.3	1.1

p Preliminary

1/ Source: U.S. Bureau of Mines

2/ Year of Maximum Gold and Silver Production

TABLE V - SALIENT GOLD STATISTICS 1/

Thousands of Troy ounces (oz.T), short tons (s.t.), or \$'s (4/, 6/)

		1963	1964	1965	1966	1967	1968	1969	1970
UNITED STATES:									
Mine Production	oz.T	1,454	1,456	1,705	1,803	1,584	1,478	1,733	1,790e
Value		\$50,889	\$50,971	\$59,682	\$63,119	\$55,447	\$58,038	\$71,944	
Ore (dry and siliceous) produced:									
Gold ore	s.t.	2,459	2,631	3,113	3,447	3,076	2,780	3,393	
Gold-silver ore	s.t.	223	224	206	248	157	199	208	
Silver ore	s.t.	556	542	752	669	617	655	655	
Percentage derived from:									
Dry and siliceous ores		51	54	54	58	69	63	60	
Base-metal ores		36	37	40	37	27	34	69	
Placers		13	9	6	5	4	3	1	
Refinery production 3/	oz.T	1,469	1,469	1,675	1,802	1,526	1,539	1,717	
Imports, general	oz.T	1,281	1,169	2,905	1,200	930	5,944	5,861	4,511 7/
Exports 5/	oz.T	5,820	12,078	36,717	13,067	28,720	23,962	338	754 7/
Stocks Dec 31: Monetary 4/		\$15,596	\$15,471	\$13,806	\$13,235	\$12,065	\$10,892	\$11,859	\$11,495 8/
Industrial	oz.T	NA	2,329	2,656	2,734	3,086	3,617	4,158	
Consumption in industry and the arts	oz.T	2,920	4,203	5,276	6,062	6,294	6,604	7,109	
Price: Average per oz.T 2/		\$35.00	\$35.00	\$35.00	\$35.00	\$35.00	\$39.26	\$41.51	\$36.41
WORLD:									
Production	oz.T	43,147	44,841	46,225	46,580	45,736	46,154	46,418	
Official Reserves 6/		\$42,310	\$43,015	\$43,230	\$43,185	\$41,600	\$40,905	\$41,015	

NA Not Available e Estimate

1/ Source: U.S. Bureau of Mines

2/ U.S. Treasury price through March 15, 1968, and Englehard selling quotations March 20, 1968, through 1970.

3/ From domestic ores.

4/ Figures for monetary stocks represent millions. They include gold in the Exchange Stabilization Fund.

5/ Excludes doinage

6/ Millions of dollars. Held by Free World central banks and governments.

7/ First 10 months of 1970.

8/ Oct. 31.

## G O L D

### Physical Properties - Uses

Gold is a heavy, soft, yellow, ductile, malleable metallic element in group I of the periodic system; symbol, Au; valences, 1 and 3; atomic number, 79; atomic weight, 196.967; specific gravity, 19.32 (at 20°C); melting point, 1063°C; boiling point, 2,966°C; specific electrical resistivity, 2.42 microhms per cubic centimeter; soluble in aqua regia, in potassium cyanide solutions, and in hot sulfuric acid. It occurs as native gold and in tellurides.

Gold was one of the first metals used by man. Its workability, beauty, resistance to tarnish and corrosion, and scarcity, accounted for its early use in jewelry, ornaments, and money. It has been sought throughout most of man's existence over most of the world, and has influenced the course of history.

Most of the world's gold is retained in monetary reserves of the individual countries but much is hoarded or is used in the arts or in industry. It is commonly alloyed with varying percentages of copper and silver. White gold is usually an alloy with nickel. Gold used in dentistry is alloyed with platinum or palladium.

The use of gold in jewelry and other arts such as gold plating, gilding and decorating of china is familiar. Less known are its important industrial uses. Substantial amounts are going into the aircraft and aerospace industries in brazing alloys and on thermal control surfaces. Some parts for the communications industry are made of alloys containing gold or of metals clad with it, and such use is growing. Its functional reliability more than offsets its relative high price. Other long established uses are in amalgams, anodes and laboratory ware.



TABLE VI - MINE PRODUCTION OF RECOVERABLE GOLD  
IN THE UNITED STATES, BY STATES

State	(Troy ounces)				
	1965	1966	1967	1968	1969
Alaska	42,249	27,325	22,948	21,262	21,227
Arizona	150,566	142,528	80,844	95,999	110,878
California	62,885	64,764	40,570	15,682	7,904
Colorado	37,228	31,915	21,181	22,638	25,777
Idaho	5,078	5,056	4,838	3,227	3,403
Montana	22,772	25,009	9,786	13,385	24,189
Nevada	229,050	366,903	434,993	317,382	456,294
New Mexico	9,506	9,295	5,188	6,630	8,952
Oregon	499	281	186	23	875
Pennsylvania <u>1/</u>	90,674	85,000	73,337	54,453	47,020
South Dakota	628,259	606,467	601,785	593,052	593,146
Tennessee	122	141	181	140	126
Utah	426,299	438,736	288,350	334,419	433,385
Washington <u>1/</u>	----	----	----	----	----
Wyoming	3	----	----	----	<u>1/</u>
Total	1,705,190	1,803,420	1,584,187	1,478,292	1,733,176

1/ Production of Pennsylvania, Washington, and Wyoming (1969) combined to avoid disclosing individual company confidential data.

TABLE VII

ESTIMATED INDUSTRIAL USE OF GOLD IN THE UNITED STATES CALENDAR YEARS 1964-1969  
AND FIRST HALF 1970

	(Thousands of fine troy ounces)						First Half 1969	First Half 1970
	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>		
<u>Estimated Total Purchases of Gold</u> <u>by U.S. Industry</u>	<u>4203</u>	<u>5276</u>	<u>6062</u>	<u>6294</u>	<u>6604</u>	<u>7109</u>	<u>3271</u>	<u>2940</u>
Converted into Fabricated Products	4008	4949	5984	5942	6073	6568	3123	3249
Increase in Inventories	195	327	78	352	531	541	148	-309
<u>Allocation of Purchases by Industry</u> <u>Group</u>	<u>4203</u>	<u>5276</u>	<u>6062</u>	<u>6294</u>	<u>6604</u>	<u>7109</u>	<u>3271</u>	<u>2940</u>
Jewelry and Arts	2690	3429	3758	3840	3908	3839	1663	1436
Dental	462	369	424	566	711	710	353	330
Industrial, Including Space and Defense	1051	1478	1880	1888	1925	2560	1255	1174

Office of Domestic Gold and Silver Operations  
October 14, 1970

TABLE VIII - GOLD MONETARY STOCKS 1/

(In Billions of Dollars)

End of Year	U.S. Monetary Stocks	U.S. % of Free World	Free World Official Reserves <u>2/</u>
1952	\$ 23.2	64.1	\$ 36.2
1953	22.0	60.3	36.2
1954	21.7	58.1	37.35
1955	21.7	58.4	37.15
1956	21.9	58.1	37.7
1957	22.85	58.7	38.9
1958	20.6	51.6	39.9
1959	19.5	48.0	40.6
1960	17.8	44.0	40.5
1961	16.9	41.1	41.1
1962	16.1	38.7	41.4
1963	15.6	36.9	42.3
1964	15.5	36.0	43.0
1965	13.806	32.0	43.2
1966	13.235	30.6	43.2
1967	12.065	29.0	41.6
1968	10.892 <u>3/</u>	26.6	40.9
1969	11.859 <u>3/</u>	29.0	41.0
Oct. 1970	11.495 <u>3/</u>		

1/ Source: U.S. Bureau of Mines2/ Held by Free World Banks & Governments Dec. 313/ Includes gold in the Exchange Stabilization Fund

TABLE IX  
U. S. IMPORTS AND EXPORTS OF GOLD 1/  
For 1967-1969, and First Three Quarters of 1970

Years	Imports Troy Ounces	Exports Troy Ounces
1967	929,869	28,719,982
1968	5,944,515	23,962,391
1969	5,861,387	338,301
1970:		
1st Quarter	1,134,495	20,988
2nd Quarter	1,058,306	698,384
3rd Quarter	1,923,165	27,944
October	396,001	6,925
10-Month Total	4,511,967	754,241

1/ Source: U.S. Bureau of Mines .

TABLE X - WORLD PRODUCTION OF GOLD 1/

	Thousands of Troy Ounces		
	1967	1968	1969p
World Totals	45,737	46,154	46,418
Most Important Producing Countries:			
So. Africa, Rep. of	30,534.7	31,168.8	31,275.9
U.S.S.R. <u>e/</u>	5,700.0	5,900.0	6,250.0
Canada	2,962.0	2,688.0	2,433.5
U.S.	1,584.2	1,478.3	1,733.2
Australia	805.3	787.4	716.1
Ghana	762.6	727.1	706.6
Philippines	490.6	527.4	571.1
Rhodesia, Southern	519.9	499.9	480.0 <u>e/</u>
Japan	253.0	238.5	252.7
Columbia	257.7	239.6	218.9

e/ Estimate      p Preliminary

1/ Source: U.S. Bureau of Mines

## S I L V E R

### Physical Properties - Uses

Symbol Ag; atomic weight 107.88; specific gravity 10.5; melting point 960.6°C; valence 1; hardness (Mohs' scale) 2.5-3; cleavage none; color silver white, gray to black when tarnished; brilliant when polished; highest reflectivity known; highly malleable, ductile and resistant to corrosion; highest electrical and thermal conductivity, resistivity  $1.62 \times 10^{-6}$  ohm-cm.

Silver has been used by primitive man and his descendants in jewelry and other art objects, because of its beauty; by the Romans and other nations since as a basis for or a part of their monetary system, because of its beauty and scarcity; and in industrial uses, because of its unique properties.

Due to the sensitivity of certain silver salts to light, they are used in photographic materials. This is the greatest industrial use for silver in the United States. Silver's use in electrical and electronic equipment is next, followed by sterling ware, brazing alloys, electroplated ware, jewelry and miscellaneous industrial purposes.

The use of silver in coinage of the United States has been greatly reduced in recent years.



TABLE XI - SALIENT SILVER STATISTICS 1/

Thousands of troy ounces (oz.T), short tons (s.t.), or \$'s

		1964	1965	1966	1967	1968	1969	1st 9 Mos. 1970
UNITED STATES:								
Mine Production	oz.T	36,334	39,806	43,669	32,345	32,729	41,906	33,276e
Value		\$46,980	\$51,469	\$56,464	\$50,135	\$70,191	\$75,040	
Ore (dry and siliceous) produced:								
Gold ore	s.t.	2,631	3,113	2,580	2,315	2,003	2,002	
Gold-silver ore	s.t.	224	205	248	157	199	216	
Silver ore	s.t.	644	902	1,069	904	701	755	
Percentage derived from:								
Dry & siliceous ores		32	35	33	39	39	36	
Base-metal ores		68	65	67	61	61	64	
Imports, General 2/	oz.T	51,674	54,709	63,032	55,520	70,709	71,876	47,915
Refinery Production 3/	oz.T	37,000	39,000	48,358	30,268	42,052	62,676	43,628
Exports 2/	oz.T	109,395	39,665	85,538	70,769	125,761	88,909	22,235
Stocks Dec 31: Treasury 4/	oz.T	1,218,000	804,000	594,000	351,000	256,000	104,000	
Industry 5/	oz.T	----	----	57,244	83,358	166,356	198,490	198,964
Consumption								
Industry and Arts	oz.T	123,000	137,000	183,696	171,031	145,293	141,546	98,584
Coinage	oz.T	203,000	320,321	53,852	43,851	36,833	19,408	575
Price per oz.T 6/		\$1.293	\$1.293	\$1.293	\$1.550	\$2.145	\$1.791	\$1.771 7/
WORLD:								
Production	oz.T	248,545	257,415	266,731	258,203	275,075	288,601	
Consumption 8/								
Industry & the arts	oz.T	299,200	336,600	355,100	348,600r	347,300	362,400	
Coinage 9/	oz.T	267,100	381,100	130,700	89,200	59,500	24,300	

e Estimate

1/ Source: U.S. Bureau of Mines and others.

2/ Excludes coinage.

3/ From domestic ores.

4/ Excludes silver in silver dollars.

5/ Includes silver in Comex warehouses.

6/ Average New York price.

7/ Am. Met. Mkt. for year 1970.

8/ Free World only: Source, Handy and Harman (H&amp;H) 1965 U.S. Bureau of Mines 1966-69.

9/ Free World only, Source: H&amp;H

TABLE XII - MINE PRODUCTION OF RECOVERABLE SILVER  
IN THE UNITED STATES, BY STATES

State	(Troy ounces)				
	1965	1966	1967	1968	1969
Alaska	7,673	7,193	5,787	3,900	2,030
Arizona	6,095,285	6,338,696	4,588,081	4,958,162	6,141,022
California	196,787	189,989	144,515	597,961	491,927
Colorado	2,051,105	2,085,534	1,817,699	1,646,283	2,598,563
Idaho	18,456,809	19,776,785	17,033,330	15,958,715	18,929,697
Kentucky	1,931	1,086	568	-----	-----
Maine	-----	-----	-----	371,745	1/ 319,718
Michigan	457,851	483,000	301,992	472,813	1,009,022
Missouri	299,522	-----	226,168	340,856	1,442,090
Montana	5,207,031	5,319,785	2,066,464	2,132,571	3,429,314
Nevada	507,113	867,567	565,755	645,192	884,155
New Mexico	287,472	242,620	157,495	224,866	465,591
New York	11,441	21,590	31,103	27,615	31,755
Oklahoma	358,477	2/ 368,788	2/ 279,898	1/	1/
Oregon	8,801	343	31	335	4,749
Pennsylvania	2/	2/	2/	1/	1/
South Dakota	128,971	109,885	121,258	137,668	124,497
Tennessee	94,142	100,716	130,078	89,525	78,614
Utah	5,635,570	7,755,411	4,874,640	5,120,772	5,953,567
Washington	2/	2/	2/	1/	1/
Wyoming	52	-----	-----	-----	1/
Total	39,806,033	43,668,988	32,344,862	32,728,979	41,906,311

1/ Production of Maine, Oklahoma, Pennsylvania, Washington, and Wyoming (1969) combined to avoid disclosing individual company confidential data.

2/ Production of Oklahoma, Pennsylvania, and Washington combined to avoid disclosing individual company confidential data.

TABLE XIII - U.S. CONSUMPTION OF SILVER, BY END USE 1/

	Troy Ounces - Thousands			
	1967	1968	1969	1970 (1st 9 Mos.)
Electroplated ware	17,897	15,279	12,706	8,218
Sterling ware	30,269	28,349	20,291	15,302
Jewelry	5,751	4,538	3,011	4,197
Photographic Materials	50,306	41,607	41,380	27,717
Dental and Medical Supplies	2,690	3,094	1,591	1,318
Mirrors	2,174	1,745	1,510	1,107
Brazing, Alloys and Solders	15,390	15,124	16,549	12,092
Electrical and Electronic Products:				
Batteries	11,405	5,764	3,799	4,869
Contacts and Conductors	26,777	25,805	34,555	20,645
Catalysts	5,847	2,310	4,081	1,376
Bearings	600	451	481	317
Miscellaneous <u>2/</u>	1,925	1,228	1,592	1,426
Total Net Industrial Consumption	171,032	145,293	141,546	98,584
Coinage	43,851	36,833	19,408	575
TOTAL CONSUMPTION	214,883	182,126	160,954	99,159

1/ Source: U.S. Bureau of Mines2/ Includes silver-bearing copper, silver-bearing lead anodes, ceramic paints, etc.

TABLE XIV - AVERAGE PRICES OF SILVER - NEW YORK

In cents per Troy ounce 0.999 Fine

Yearly Averages <u>2/</u>		Monthly Averages		
Year	Price	Month	1969 <u>1/</u>	1970 <u>2/</u>
1955	89.099	January	197.886	187.650
56	90.826	February	183.972	189.579
57	90.820	March	182.571	188.848
58	89.044	April	177.810	185.286
59	91.202	May	176.095	167.000
		June	164.548	163.936
1960	91.375	July	161.833	168.659
61	92.449	August	165.262	183.000
62	108.521	September	178.548	180.162
63	127.912	October	187.250	174.581
64	129.300	November	192.313	176.035
		December	180.174	163.477
1965	129.300			
66	129.300			
67	154.968	Average	179.067	177.082 <u>3/</u>
68	214.460			
69	179.067			
70	177.082 <u>3/</u>			

1/ Year Book of the American Bureau of Metal Statistics, for 1969

2/ E/MJ

3/ American Metal Market

TABLE XV - UNITED STATES IMPORTS AND EXPORTS OF SILVER 1/

(In Thousands of Troy Ounces)

Year	U.S.	
	Imports	Exports
1961	50,256	39,828
62	76,359	13,057
63	59,062	31,485
64	51,674	109,395
65	54,709	39,665
66	63,032	85,538
67	55,520	70,769
68	70,709	125,761
69	71,876	88,908
1970-1st 10 Mos.	52,218	22,822

1/ Source: U.S. Bureau of MinesTABLE XVI - WORLD PRODUCTION OF SILVER 1/

	Thousands of Troy Ounces		
	1967	1968	1969p
World Totals	258,203	275,075	288,601
Most Important Producing Countries:			
Mexico	38,273	40,031	42,904
Canada	37,206	45,389	41,929
U.S.	32,119	32,729	41,906
Peru	32,107	36,362	34,147
Australia	19,842	21,281	24,667
U.S.S.R. <u>e/</u>	35,000	35,000	37,000
Japan	10,800	10,693	10,804
Bolivia	4,515	5,180	6,013
Honduras	4,009	4,397	3,905
Germany, East <u>e/</u>	4,800	4,800	4,800
Sweden	3,455	3,524	3,683
So. Africa, Rep. of	3,064	3,337	3,335
Chile	3,156	3,739	3,133
Yugoslavia	3,075	2,577	3,456

e/ Estimate      p Preliminary1/ Source: U.S. Bureau of Mines