Minerals Yearbook

1972

Volume I

METALS, MINERALS, AND FUELS

Prepared by staff of the

BUREAU OF MINES

UNITED STATES DEPARTMENT OF THE INTERIOR ● Rogers C. B. Morton, Secretary

BUREAU OF MINES ● Thomas V. Falkie, Director

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, and park and recreation areas, and for the wise use of all those resources. The Department also has a major responsibility for American Indian reservation communities and for the people who live in Island Territories under U.S. administration.

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Foreword

For 91 years, the Federal Government, through the medium of the Minerals Yearbook or its predecessor volumes, has reported annually on mineral industry activities. This edition of the Minerals Yearbook presents the record on worldwide mineral industry performance during 1972. In addition to statistical data, the volumes provide sufficient background information to interpret the year's developments. The content of the individual volumes is as follows:

Volume I, Metals, Minerals, and Fuels, contains chapters on virtually all metallic, nonmetallic, and mineral fuel commodities important to the domestic economy. In addition, it includes a general review chapter on the mineral industries, a statistical summary, and a chapter on technologic trends.

Volume II, Area Reports: Domestic, contains chapters on the mineral industry of each of the 50 States, the U.S. island possessions in the Pacific Ocean and the Caribbean Sea, the Commonwealth of Puerto Rico, and the Canal Zone. This volume also has a statistical summary, identical to that in Volume I.

Volume III, Area Reports: International, contains the latest available mineral data on more than 130 foreign countries and discusses the importance of minerals to the economies of these nations. A separate chapter reviews minerals in general and their relationships to the world economy.

The Bureau of Mines continually strives to improve the value of the Yearbook for its users, and toward that end, the constructive comments and suggestions of readers will be welcomed.

THOMAS V. FALKIE, *Director.*

Acknowledgments

Volume I, Metals, Minerals, and Fuels, of the Minerals Yearbook summarizes the significant data pertaining to mineral commodities obtained as a result of the mineral intelligence gathering activities of the divisions and offices of the Assistant Directorate—Mineral Supply.

The collection, compilation, and analysis of the data on the domestic minerals and mineral fuel industries were performed by the staffs of the Divisions of Ferrous Metals, Fossil Fuels, Nonferrous Metals, and Nonmetallic Minerals. Statistical data were compiled by the statistical staffs of these Divisions from information supplied by mineral producers, processors, and users in response to production and consumption canvasses, and their voluntary response is gratefully acknowledged. The information obtained from individual firms by means of confidential surveys has been grouped to provide statistical aggregates. Data on individual firms are presented only if available from published or other nonconfidential sources or when permission of the companies has been granted. Other material appearing in this volume was obtained from the trade and technical press, industry contacts, and numerous other sources.

Statistics on U.S. imports and exports, world production, and foreign country trade were compiled in the Office of Technical Data Services. The foreign trade data for the United States were obtained from reports of the Bureau of the Census, U.S. Department of Commerce. World production and trade data came from numerous sources, including reports from the Foreign Service, U.S. Department of State.

The Office of Technical Data Services also provided general direction on the preparation and coordination of the chapters in this volume and reviewed the manuscripts to insure statistical consistency among the tables, figures, and text, between this volume and other volumes, and between this edition and those of former years.

Acknowledgment is also particularly made of the splendid cooperation of the business press, trade associations, scientific journals, international organizations, and other Federal agencies that supplied information.

The Bureau of Mines has been assisted in collecting mine-production data and the supporting information appearing in the Minerals Yearbook by numerous cooperating State agencies. These organizations are listed in the acknowledgment to Volume II.

ALBERT E. SCHRECK, *Editor-In-Chief*

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Silver

By J. R. Welch [1]

Domestic mine output of silver was down 10% to 37.2 million ounces. This was 4.3 million ounces less than in 1971, the drop being mainly attributable to an extensive fire at the Sunshine mine in Idaho. Imports exceeded exports in 1972 by 35.7 million ounces, and consumption increased by 17% to 151.1 million ounces (exclusive of coinage). Silver prices fluctuated widely but displayed a rising trend throughout 1972. On January 3 the price was 138.7 cents per ounce, which was the low for the year. A high of 204.8 cents per ounce was reached on December 26, and at yearend the price was 204.2 cents.

While U.S. silver consumption for industrial uses increased significantly, its usage in coinage remained about the same as that in 1971 at 2.3 million ounces.

The use of silver for all industrial purposes increased, except for use in bearings. Silver used in commemorative coins and medals rose sharply to an estimated 11.5 million ounces. Trading volume on the New York Commodity Exchange (COMEX) was up 32% over that of 1971. Treasury stocks declined 5% to 45.81 million ounces compared with 48.00 million ounces at the end of 1971. COMEX stocks declined 37.89 million ounces (33%), and during the same period, the stocks of the Chicago Board of Trade increased by 9.78 million ounces (75%). Industrial stocks declined to 152.46 million ounces compared with 185.34 million ounces at the end of 1971.

[1] Physical scientist, Division of Nonferrous Metals.

Table 1.—Salient silver statistics

	1968	1969	1970	1971	1972
United States:					
Mine production—thousand troy ounces	32,729	41,906	45,006	41,564	37,233
Value—thousands	$70,191	$75,040	$79,697	$64,258	$62,737
Ore (dry and siliceous) produced:					
Gold ore—thousand short tons	2,003	2,002	2,092	1,883	1,583
Gold-silver ore—do	199	216	104	167	180
Silver ore—do	701	755	674	673	447
Percentage derived from—					
Dry and siliceous ores	39	36	33	37	25
Base metal ores	61	64	67	63	75
Refinery production [1]—thousand troy ounces	37,199	43,769	49,451	37,242	38,366
Exports [2]—do	125,761	88,909	27,614	12,224	29,657
Imports, general [2]—do	70,709	71,876	62,300	57,962	65,406
Stocks Dec. 31:					
Treasury [3]—million troy ounces	256	104	25	48	46
Industry [4]—thousand troy ounces	166,356	198,790	210,150	r 185,335	152,461
Consumption:					
Industry and the arts—do	145,293	141,544	128,404	129,146	151,063
Coinage—do	36,833	19,407	709	2,474	2,284
Price [5]—per troy ounce	$2.144+	$1.790+	$1.771−	$1.542−	$1.685−
World:					
Production—thousand troy ounces	275,264	295,718	300,991	288,883	291,391
Consumption: [6]					
Industry and the arts—do	r 350,800	r 366,500	r 357,100	r 359,800	382,000
Coinage—do	89,300	r 40,000	r 33,600	r 27,300	40,500

r Revised.
[1] From domestic ores.
[2] Excludes coinage.
[3] Excludes silver in silver dollars.
[4] Includes silver in COMEX warehouses and silver registered to Chicago Board of Trade.
[5] Average New York price. Source: Handy & Harman.
[6] Free world only. Source: Handy & Harman.

Table 2.—Salient silver statistics

(Million troy ounces unless otherwise noted)

Year	U.S. mine production	Imports [1]	Exports [1]	U.S. consumption [2]	World production	World consumption [1 3]	Price (per troy ounce) [4]	World coinage [3]	Idaho production
1925	66.71	93.50	137.16	29.90	245.88	231.8	$0.69	20.3	7.74
1926	62.49	112.00	142.90	29.40	253.62	243.5	.62	10.8	7.56
1927	59.63	95.80	132.68	28.40	250.48	263.1	.57	6.5	8.90
1928	57.87	114.90	146.08	24.90	257.37	294.8	.58	13.6	9.00
1929	60.86	109.10	143.98	30.90	260.60	302.9	.53	25.0	9.41
1930	47.73	100.20	133.94	26.80	245.81	298.2	.38	20.1	9.42
1931	29.86	81.50	1,331.02	24.30	194.96	241.2	.29	21.1	7.22
1932	22.74	59.30	41.96	14.40	163.80	162.9	.28	47.9	6.72
1933	23.13	162.40	44.18	10.80	172.03	256.4	.35	11.5	6.99
1934	32.78	175.80	21.25	11.40	192.93	422.4	.48	21.0	7.39
1935	48.52	521.20	5.73	5.20	224.39	592.4	.64	17.6	10.24
1936	61.15	237.30	3.94	19.10	252.36	496.7	.45	10.7	14.54
1937	71.41	157.20	3.46	27.70	277.81	450.2	.45	28.3	19.59
1938	61.71	246.10	3.31	20.10	264.23	484.8	.43	25.5	18.99
1939	64.37	193.90	21.94	44.60	266.31	435.6	.39	8.9	17.22
1940	70.44	166.10	9.40	44.40	269.24	NA	.35	NA	17.55
1941	67.05	134.30	8.40	72.43	251.51	NA	.35	NA	16.67
1942	54.09	108.00	1.41	101.40	242.12	NA	.38	NA	14.65
1943	41.46	62.80	34.38	118.00	196.13	NA	.45	NA	11.70
1944	34.47	51.30	137.25	120.10	172.62	NA	.45	NA	9.93
1945	29.02	50.60	70.05	126.30	152.52	NA	.52	NA	8.14
1946	22.92	61.60	39.79	87.00	127.53	NA	.80	NA	6.49
1947	35.82	83.80	21.21	98.50	154.90	NA	.72	NA	10.35
1948	38.10	84.98	5.43	105.29	173.18	NA	.74	NA	11.45
1949	34.68	95.79	3.00	88.00	179.25	132.5	.72	83.8	10.05
1950	42.46	108.05	4.60	110.00	203.04	157.4	.74	44.1	16.10
1951	39.76	81.00	6.39	105.00	199.15	165.0	.89	90.5	14.75
1952	39.45	75.52	2.00	96.50	215.02	142.1	.85	114.3	14.92
1953	37.57	81.50	1.02	106.00	221.61	168.3	.85	90.7	14.64
1954	36.94	90.90	1.69	86.00	215.78	160.8	.85	83.4	15.87
1955	37.20	84.52	4.90	101.40	225.15	192.8	.89	52.6	13.83
1956	38.72	162.83	5.50	100.00	225.54	215.9	.91	56.6	13.47
1957	38.16	206.12	10.30	95.40	230.55	212.6	.91	84.2	15.07
1958	34.11	165.97	2.73	85.50	236.30	190.5	.89	79.5	15.95
1959	31.19	69.09	9.18	101.00	230.46	212.9	.91	86.4	16.64
1960	30.77	60.66	26.59	102.00	235.21	224.6	.91	103.9	13.65
1961	34.79	50.26	39.83	105.50	236.96	239.5	.92	137.1	17.58
1962	36.80	76.36	13.06	110.40	245.77	258.5	1.09	127.6	17.77
1963	35.24	59.06	31.49	110.00	249.98	260.7	1.28	166.4	16.71
1964	36.33	51.67	109.40	123.00	243.55	299.2	1.29	267.1	16.48
1965	39.81	54.71	39.67	137.00	257.42	336.6	1.29	381.1	18.46
1966	43.67	63.03	85.54	183.70	266.73	355.1	1.29	129.5	19.78
1967	32.34	55.52	70.77	171.03	258.20	348.7	1.55	105.3	17.03
1968	32.73	70.71	125.76	145.29	275.26	350.8	2.14	89.3	15.96
1969	41.91	71.88	88.91	141.54	295.72	366.5	1.79	40.0	18.93
1970	45.01	62.30	27.61	128.40	300.99	357.1	1.77	33.6	19.11
1971	41.56	57.96	12.22	129.15	288.88	359.8	1.54	27.3	19.14
1972	37.23	65.41	29.66	151.06	291.39	382.0	1.69	40.5	14.25

NA Not available.
[1] Excludes coinage.
[2] Source: U.S. Bureau of the Mint, 1925–1966.
[3] Free world only. Source: Handy & Harman.
[4] Average New York price. Source: Handy & Harman.

Legislation and Government Programs.—There was no legislation pertaining to silver enacted during 1972. Public Law 91–607, enacted December 31, 1970, provided for the minting of 150 million 40% silver, clad Eisenhower dollars during 1971–75 to be sold at premium prices of $10 for proof coins and $3 for others and, in addition, for minting composite cupronickel Eisenhower dollars and Kennedy half-dollars for general circulation. This program proceeded as planned during 1972. In 1972, the Office of Minerals Exploration (OME) of the U.S. Geological Survey negotiated two contracts involving silver totaling $163,620. One prospect is located in the McGrath quadrangle in Alaska, and the other is located in Lander County, Nev. Silver remains one of the minerals eligible for government financial assistance of 75% of the allowable costs of exploration.

DOMESTIC PRODUCTION

Mine output of recoverable silver in the United States was 4.3 million ounces below that of 1971 mainly due to the underground fire in the Sunshine mine in Idaho. Base metal ores provided 75% of the total silver output, and silver ores provided 24%, with the remainder coming from gold and gold-silver production. Idaho's production decreased 26% compared with 1971 production and amounted to 38% of the U.S. production. Total output of silver in Arizona, Colorado, Montana, and Utah remained about the same as in 1971, and the combined production of these four States and Idaho was 86% of the domestic production.

The 25 leading silver producers contributed 85% of the total output. Four of the leading producers (1st, 2nd, 6th and 8th) mined silver ores alone, and the rest were base metal producers. Nine mines produced over 1 million ounces of silver each. Domestic mine output provided almost 25% of the silver consumed by industry and the arts.

In 1972, Hecla Mining Co., Wallace, Idaho, reported the production of 4.47 million ounces of silver, down about 30% from the 1971 output. The average selling price of its silver in 1972 was $1.67 per ounce, as compared with $1.54 per ounce in 1971 and $1.76 per ounce in 1970. Hecla's wholly owned Lucky Friday mine, located in Idaho's Coeur d'Alene district, produced 2.75 million ounces of silver, 19,500 tons of lead, and lesser amounts of zinc, copper, and gold by processing 192,000 tons of ore averaging 14.62 ounces of silver per ton. Ore reserves at the end of 1972 were up nearly 6% to 584,000 tons.

Hecla also owned approximately one-third of the ore produced by the Nation's leading silver producer, the Sunshine mine. During 1972, a major underground fire, which claimed the lives of 91 men, resulted in closure of the mine from May 2 until December 8, 1972. As a result, Hecla's share of the Sunshine production was 33,738 tons of ore assaying 27.32 ounces per ton, compared with 84,212 tons of ore assaying 27.34 ounces of silver per ton in 1971.

In addition to the Sunshine mine, Hecla owns a 30% interest in the Star Unit mine, also located in the Coeur d'Alene district. Hecla's share of production from this property was 208,000 ounces of silver, and substantial tonnages of lead and zinc.

During 1972, Hecla operated the Mayflower mine in the Park City district, Utah, under a leasing arrangement with the New Park Mining Co. Production totaled 114,604 tons of ore assaying 0.46 ounce of gold and 5.95 ounces of silver per ton, 3.22% lead, 2.01% zinc, and 1.35% copper. The mine was closed at yearend, and the agreement with New Park was terminated.

The Galena mine in the Coeur d'Alene district, Idaho, was operated by the American Smelting & Refining Co. (ASARCO). At the Galena mine, under lease from the Callahan Mining Corp., ASARCO produced 4,222,000 ounces of silver from 190,204 tons of ore averaging 22.75 ounces of silver per ton and 0.81% copper.

Kennecott Copper Corp. reported silver production of 4,335,074 ounces in 1972 from processing 58.5 million tons of copper ore. This compared with 3,711,141 ounces produced in 1971 from processing 59.3 million tons of copper ore.

The Bunker Hill Co. produced a total of 3.82 million ounces of silver in 1972, about the same as that in 1971. About 1.53 million ounces of the total was produced at the Crescent mine in 1972 compared with 1.70 million ounces in 1971.

Smelter and refinery reports in 1972 showed that 31.1 million ounces of silver was produced from old scrap and 31.8 million ounces was produced from new scrap compared with 1971 data for old and new scrap of 30.1 million and 16.5 million ounces, respectively. Refinery production, including silver from domestic and imported sources, totaled 140.4 million ounces in 1972 compared with 115.3 million ounces in 1971.

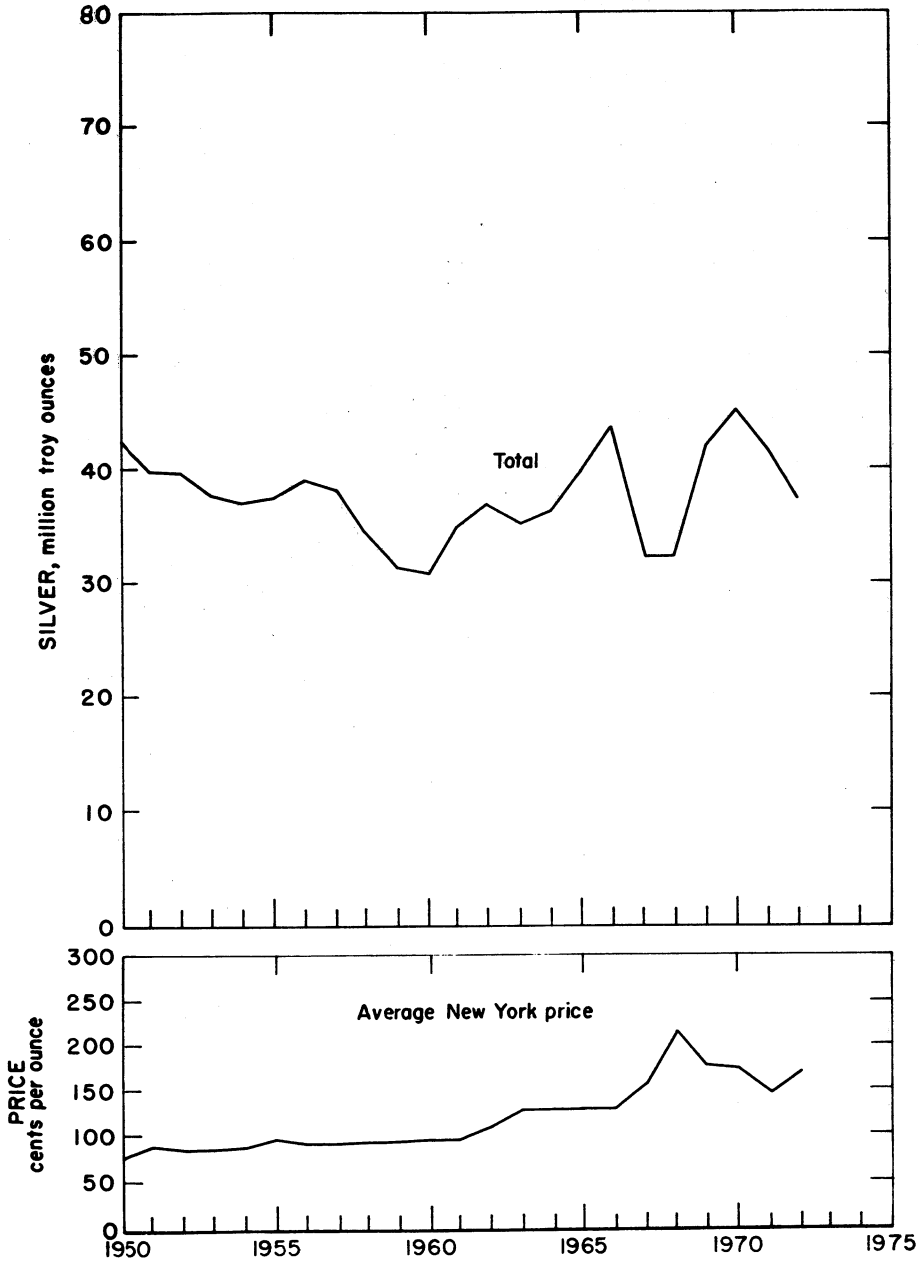

Figure 1.—Silver production in the United States and price per ounce.

CONSUMPTION AND USES

Consumption as measured by sales to consuming industries, compiled by the Bureau of Mines, showed a 17% increase compared with that of 1971. There were significant increases in use in sterling ware, photography, and contacts and conductors. Substantial increases were registered for use in catalysts, jewelry, and electroplated ware, and a large increase in usage was shown for commemorative medals and other collector items, estimated at 11.5 million ounces in 1972 compared with 6 million ounces in 1971. A slight decline was recorded for silver usage in bearings. Photographic materials accounted for about 25% of the total industrial consumption of silver in 1972; contacts and conductors, 24%; sterling ware, 18%; electroplated ware, 8%; brazing alloys and solders, 8%; miscellaneous, 4%; and batteries, 4%. The remaining 9% was used in jewelry, catalysts, dental and medical supplies, mirrors, and bearings.

Use of silver in coinage by the U.S. Bureau of the Mint declined slightly to 2.3 million ounces compared with 2.5 million ounces used in 1971. The silver consumed was used in the production of the 40% silver Eisenhower dollar.

Engelhard Minerals & Chemicals Corp. reported development of a new electrical heating device for defrosting the rear windows of cars. It was installed in some of the 1972 model cars produced in the United States, and more cars are expected to use the device in 1973 and 1974.[2]

A new nonacid silver solder brazing flux was reported to have been developed by Superior Flux & Manufacturing Co.; the flux did not generate free fluorides or other harmful fumes.[3]

STOCKS

The Treasury bullion stock outflow in 1972 totaled 2.3 million ounces, all of which was consumed in U.S. coinage use for the continued production of the Eisenhower silver dollar.

Yearend Treasury stocks were estimated at 45.8 million ounces in bullion, coin bars, and coinage metal fund silver. COMEX silver stocks at yearend 1972 were 77.6 million ounces compared with 115.4 million ounces a year earlier. Chicago Board of Trade stocks at yearend were 22.8 million ounces compared with 13.0 million ounces a year earlier. U.S. Defense Department stocks totaled 8.9 million ounces. Stocks of silver held by refiners, fabricators, and dealers decreased slightly to 52.1 million ounces. Altogether, yearend visible stocks totaled 207.1 million ounces compared with 241.2 million ounces at the end of 1971.

PRICES

Silver prices in New York in 1972, as quoted daily by Handy & Harman, in cents per troy ounce, varied widely, ranging from a low of 138.7 on January 3, 1972, to a high of 204.8 on December 26, 1972. The average price for silver during 1972 was 168.5 cents per ounce in New York.

Prices for spot delivery on the London Bullion Market (U.S. equivalent) ranged from a low of 137.3 cents per ounce on January 3, 1972, to a high of 203.3 cents per ounce on December 29, 1972, and averaged 167.7 cents for the year.

The price rise in the United States was such that by April the market had been brought to within a few cents of a 161.6 cents-per-ounce ceiling price stipulated by the Federal Price Commission as part of price-inflation control measures placed in effect earlier. By July silver prices had exceeded the ceiling price, with the result that a substantial amount of silver was exported. On August 10 the Cost of Living Council exempted silver from price controls. Thereafter, silver prices continued to rise through August but declined in September. In October the market stabilized but then resumed an upward trend

[2] American Metal Market. Silver Circuit Used in Defrost Unit. V. 79, No. 112, June 15, 1972, p. 14.

[3] American Metal Market. New Non-Acid Silver Brazing Solder Flux. V. 79, No. 228, Dec. 13, 1972, p. 6.

throughout the rest of the year and ended December at 204.2 cents per troy ounce.

Futures trading of silver continued on the COMEX, with the volume for the year at 7.9 billion ounces compared with 6.2 billion ounces in 1971. A monthly record trading of 1.26 billion ounces took place in December. December's closing prices for future delivery, in cents per ounce, were 204.0 (January 1973), 210.5 (September 1973), and 217.4 (May 1974). Silver futures trading was also active on the Chicago Board of Trade, where 3.8 billion ounces were traded in 1972. This was a 52.0% increase over the volume of contracts traded in 1971.

FOREIGN TRADE

Silver exports increased 143% in 1972 to 29.7 million ounces. This compares with 12.2 million ounces exported in 1971. About 37% of the silver exported went to the United Kingdom, 16% went to Switzerland, 16% to France, and 14% went to West Germany. Substantial quantities went to Japan, Belgium-Luxembourg, and Canada. Exports of waste, scrap, and sweepings went mainly to Belgium-Luxembourg, the United Kingdom, and West Germany, and bullion went mainly to the United Kingdom, Switzerland, France, and West Germany.

Silver imports increased in 1972 to 65.4 million ounces, about 13% more than the 58.0 million ounces imported in 1971. The main sources of imports were Canada (50%), Peru (25%), and Mexico (11%), with 21 other countries providing the remaining 14%.

Net imports were 35.7 million ounces in 1972 compared with 45.7 million ounces in 1971.

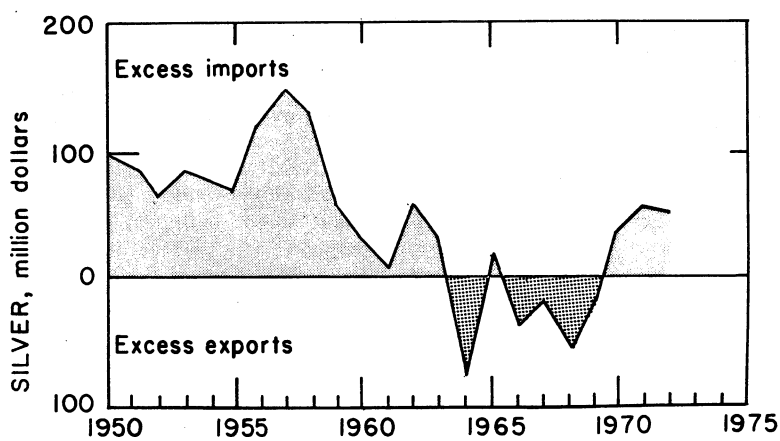

Figure 2.—Net exports or imports of silver, 1950–1972.

WORLD REVIEW

World output of silver amounted to 291.4 million ounces, about 2.5 million more than that of 1971. Peru showed the largest increase and the United States showed the largest drop, owing to the extended closure of the Sunshine mine in Idaho. Increases in production were also reported in Canada and Mexico. Western Hemisphere output of silver provided about 61% of the total world production.

World consumption in arts and industry was estimated at 382 million ounces, up about 22 million ounces over that consumed in 1971.[4] The United States showed

[4] Handy & Harman. The Silver Market, 1972. 57th Annual Rev., 1972, 23 pp.

the largest increase in consumption, from 129.1 million ounces in 1971 to 151.1 million ounces in 1972. Coinage requirements of silver for the world increased from 27.3 million ounces in 1971 to 40.5 million ounces in 1972. Total free world consumption exceeded production by 90.6 million ounces. This production–consumption gap was met by secondary recovery and from reduction of stocks. Handy & Harman estimated that total worldwide stocks amounted to 366 million ounces.

Canada.—Silver output of Canadian mines increased to an alltime high of 47.0 million ounces of silver in 1972. This was a 2% increase over the 1971 production of 46.0 million ounces and placed Canada again as the leading world producer of silver.

The world's largest single producer of silver, Ecstall Mining Ltd., owned by Texas Gulf Inc., produced 12.8 million ounces of silver in 1972. The silver produced was recovered as byproduct silver in copper, lead, and zinc concentrates from the company's Kidd Creek property, near Timmins, Ontario.

Cominco Ltd., the largest silver producer in British Columbia, derived its output from the lead-zinc-silver ore of its Sullivan mine at Kimberly, British Columbia, and from purchased ores and concentrates. Cominco was also one of Canada's leading producers of refined silver and in 1972 recovered about 5.6 million ounces at its Trail refinery.

Diamond drilling continued at the silver-lead property of Dynasty Exploration Ltd. and Atlas Explorations Ltd. in the Hess Mountain area of the Yukon Territory. Outcrop samples showed good values in silver, lead, and gold.

Agnico–Eagle Mines Ltd. continued an extensive underground development program at its Trout Lake mine in the Cobalt district of northwestern Ontario.

At United Keno Hill Mines Ltd., located near Elsa in the Yukon Territory, production was below that of 1971. In earlier years, this lead-silver-zinc mine was the largest silver producer in Canada. Silver production amounted to 2.5 million ounces compared with 2.9 million ounces in 1971. During the year, the Hector and Calumet mines were idled because of depleted ore reserves; however, potential ore zones were being explored at the nearby Townsite and Dixie properties.

Mill tuneup operations began in August at the 3,000-ton-per-day concentrator of Mattabi Mines Ltd. at its zinc-copper-lead-silver open pit property in the Sturgeon Lake area, 50 miles north of Ignace, Ontario. Ore reserves were reported at 13 million tons grading 7.6% zinc, 0.91% copper, 0.84% lead, and 3.13 ounces of silver per ton.

Dominican Republic.—Gold and Silver reserves on the site of the proposed Pueblo Viejo open pit mine in the Dominican Republic were more than twice what they were thought to be when the project was announced in early 1971, according to New York & Honduras Rosario Mining Co. The project was a joint venture of the New York & Honduras Rosario Mining Co. with J.R. Simplot Co. of Boise, Idaho. The mine was expected to produce 1.5 million ounces of silver and 225,000 ounces of gold per year beginning in 1974. The mine was estimated to have a 20-year reserve at the expected rate of output. Plans were made to construct a cyanide mill to process the ores. Further exploration and studies were to be made of the underlying sulfide zone.

Honduras.—During 1972 the El Mochito mine of the New York & Honduras Rosario Mining Co. supplied 314,476 tons of ore containing 11.72 ounces of silver and 0.009 ounce of gold per ton plus 8.03 lead and 9.37% zinc. The 1972 silver production amounted to 3.4 million ounces, about 3% less than that of 1971.

The exploration and development of the new San Juan ore body was accelerated, resulting in an increase of the reserves by 2.84 million tons. The ore grades 2.6 ounces of silver and 0.002 ounce of gold per ton, 2.68% lead, 6.93% zinc, and 0.32% copper.

Japan.—Mine production of silver in Japan was 10.02 million ounces in 1972, a 11% decrease from the 1971 production. Total consumption rose from 46.0 million ounces in 1971 to 54.4 million ounces in 1972. Refineries produced about 36.1 million ounces of refined silver during 1972. With Peru, Mexico, and Australia as its major suppliers (in that order), Japan imported 16.8 million ounces of silver in refined and unrefined form in 1972. Exports were small, totaling less than 100,000 ounces. Japanese Government stocks of sil-

ver were reported to have remained at 16.0 million ounces, unchanged from last year.[5]

Mexico.—Six projects were being explored by two Canadian companies: Tormex Mining Developers and Pure Silver Mines Ltd. (Canada). Possibly the most impressive was the Tormex Industries Peñoles Encantada silver-lead mine in the northern part of the country, 200 miles southeast of Chihuahua. Completion of the 1,000-foot main production shaft was scheduled in 1972. At yearend, proven ore reserves were estimated at 1.5 million tons grading 20 ounces per ton in silver and containing 20% lead. Pure Silver Mines Ltd. (Canada) was also bringing into production three underground mines—the Mother Lode, the Peregrina, and the Cebada—all near Guanajuato, northwest of Mexico City. Total ore reserves were estimated at 4 million tons averaging 11.6 ounces per ton in silver and 0.09 ounce per ton in gold.

The American Smelting & Refining Co. subsidiary, ASARCO Mexicana, S.A., (49% owned by ASARCO) produced 15.5 million ounces of silver during 1972, slightly under the 15.3 million ounces produced in 1971. The mines and plants of ASARCO Mexicana, S.A. operated normally during 1972 with the exception of the Chihuahua lead smelter, which continued to have technical problems. Mine development programs continued during the year. The first phase of the Taxco expansion, consisting of new hoisting and headframe installation, shaft sinking, and preparation of surface sites for the new mill, continued satisfactorily. Ciá. Mexicana de Cobre, S.A. continued studies relating to the financing and development of its La Caridad deposit located near Nacozari in the State of Sonora.

Peru.—Cerro de Pasco Corp. smelting facilities at La Oroya, about 118 miles east of Lima, produced 22,991,000 ounces of silver in 1972 (including silver in exported blister copper), of which 58% was from purchased ores. The Cerro de Pasco Corp., a totally owned subsidiary of Cerro Corp., operated six metal mines and their related concentrators, which were located in the central Andean region of Peru. These mines, the Cerro de Pasco, Cobriza, Yauricocha, San Cristobal, Casapalca, and Morococha, produced silver and other metals. At the Cerro de Pasco mine, which produced lead-zinc-silver ore from both open pit and underground operations, 1.9 million short tons of ore was treated per year. The total silver production refined in 1972 at Cerro's Peruvian operations increased about 20% over that in 1971.

United Kingdom.—Net exports of silver in the first 11 months of 1972 were 67.3 million ounces compared with 3.6 million ounces during the similar period of 1971. The principal destinations were Switzerland, which received 30.1 million ounces; Italy, 15.8 million ounces; West Germany, 12.9 million ounces; France, 11.5 million ounces; East Germany, 4.4 million ounces; Austria, 2.8 million ounces; Belgium, 1.0 million ounces; and 3.3 million ounces were sent to miscellaneous other countries. These unusually large amounts of exports from the United Kingdom resulted in a substantial reduction of stocks held in London. Consumption of silver for industrial purposes in the United Kingdom rose about 10% in 1972 to 27.5 million ounces.

TECHNOLOGY

At Bureau of Mines laboratories, work was conducted on the recovery of precious metals from electronic scrap. The objective was to devise an economical process to recover precious metals and copper from low-grade, complex electronic scrap generated in large quantities by military and civilian electronic operations. A process comprising incineration, caustic leaching to remove aluminum, smelting with siliceous slag, and electrolysis produced 99.9% pure copper metal and anode slimes assaying more than 7,000 ounces per ton of combined precious metals. Silver, gold, and copper recoveries were 93%, 95%, and 87%, respectively. Cost analysis indicated that an alternative process using direct smelting of the scrap to make products for sale to a custom smelter would provide better overall financial returns.[6]

Extraction of silver from silver mill tailings by an electrolytic oxidation procedure

[5] Handy & Harman. The Silver Market, 1972. 57th Annual Rev., 1972, p. 16.

[6] Dannenberg, R. O., J. M. Maurice, and G. M. Potter. Recovery of Precious Metals From Electronic Scrap. BuMines RI 7683, 1972, 19 pp.

was investigated.[7] Resulting silver extraction ranged from 77% to 90%, depending on the tailings treated. Power consumption was 52 to 90 kilowatt-hours per ton for the tailings investigated. Silver and mercury were recovered from leach solutions by precipitation on iron powder, followed by conventional distillation and fire refining.

The Bureau of Mines investigated sweated aluminum electronic scrap to develop methods for recovering the aluminum and for concentrating the other metals, including copper, lead, gold, and silver, into a product that can be separated by known methods.[8] Two molten-salt electrorefining processes were developed and tested. Over 94% of the aluminum was recovered, and the copper, lead, tin, silver, and gold were concentrated threefold in the anode product. The anode product was smelted to prepare a 96% copper bullion containing 690 ounces of silver and 65 ounces of gold with 98% recovery of these values.

A silver with unusual magnetic properties was a promising organic oxidation catalyst.[9] Discovered by researchers at Britain's Reading University, the material was reported to catalyze the ethylene-to-ethylene-oxide reaction with 15% better selectivity than existing commercial initiators while also showing better activity. It also gave encouraging results for oxidation of propylene and possibly was suited for other oxidations. A number of companies were testing the catalyst. The silver was paramagnetic, whereas ordinary silver is diamagnetic. It was produced by decomposing a compound called silver ketenide (C_2Ag_2O). Its catalytic life was being evaluated.

[7] Scheiner, B. J., D. L. Pool, and R. E. Lindstrom. Recovery of Silver and Mercury From Mill Tailings by Electrooxidation. BuMines RI 7660, 1972, 9 pp.

[8] Sullivan, T. A., R. L. de Beauchamp, and E. L. Singleton. Recovery of Aluminum, Base, and Precious Metals From Electronic Scrap. BuMines RI 7617, 1972, 16 pp.

[9] Chemical Engineering. V. 79, No. 25, Nov. 13, 1972, p. 70.

Table 3.—Mine production of recoverable silver in the United States, by month

(Thousand troy ounces)

Month	1971	1972
January	3,744	3,405
February	3,522	3,841
March	4,087	3,934
April	3,483	3,755
May	3,459	3,022
June	3,836	2,948
July	2,366	2,517
August	2,780	2,868
September	3,398	2,746
October	3,451	2,902
November	3,706	2,613
December	3,732	2,682
Total	41,564	37,233

Table 4.—Twenty-five leading silver-producing mines in the United States in 1972, in order of output

Rank	Mine	County and State	Operator	Source of silver
1	Galena	Shoshone, Idaho	American Smelting & Refining Co.	Silver ore.
2	Sunshine	----do	Sunshine Mining Co	Do.
3	Luck Friday	----do	Hecla Mining Co	Lead ore.
4	Utah Copper	Salt Lake, Utah	Kennecott Copper Corp	Copper, gold-silver ores.
5	Berkeley Pit	Silver Bow, Mont	The Anaconda Company	Copper ore.
6	Bulldog Mountain	Mineral, Colo	Homestake Mining Co	Silver ore.
7	Bunker Hill	Shoshone, Idaho	The Bunker Hill Co	Lead-zinc ore.
8	Crescent	----do	----do	Silver ore.
9	Burgin	Utah, Utah	Kennecott Copper Corp	Lead-zinc ore.
10	Buick	Iron, Mo	Amax Lead Co. of Missouri.	Lead ore.
11	Pima	Pima, Ariz	Pima Mining Co	Copper ore.
12	Twin Buttes	----do	The Anaconda Company	Do.
13	White Pine	Ontonagon, Mich	White Pine Copper Co	Do.
14	Sierrita	Pima, Ariz	Duval Sierrita Corp	Do.
15	Butte Hill Copper Mines.	Silver Bow, Mont	The Anaconda Company	Do.
16	Star Unit	Shoshone, Idaho	The Bunker Hill Co. and Hecla Mining Co.	Lead-zinc ore.
17	Mayflower	Wasatch, Utah	Hecla Mining Co	Copper-lead ore.
18	Idarado	Ouray and San Miguel, Colo.	Idarado Mining Co	Copper-lead-zinc ore.
19	Tyrone	Grant, N. Mex	Phelps Dodge Corp	Copper ore.
20	Copper Queen-Lavender Pit.	Chochise, Ariz	----do	Do.
21	San Manuel	Pinal, Ariz	Magma Copper Co	Do.
22	Dayrock	Shoshone, Idaho	Day Mines Inc	Lead ore.
23	Morenci	Greenlee, Ariz	Phelps Dodge Corp	Copper ore.
24	Copper Canyon	Lander, Nev	Duval Corp	Do.
25	Mission Unit	Pima, Ariz	American Smelting & Refining Co.	Do.

Table 5.—Production of silver in the United States in 1972, by State, type of mine, and class of ore, yielding silver, in terms of recoverable metal

State	Placer (troy ounces of silver)	Lode: Gold ore		Lode: Gold-silver ore		Lode: Silver ore	
		Short tons	Troy ounces of silver	Short tons	Troy ounces of silver	Short tons	Troy ounces of silver
Alaska	288	--	--	--	--	--	--
Arizona	--	--	--	[1] 30,285	[1] 7,079	W	W
California	248	[1] 4,755	[1] 33,926	W	W	--	--
Colorado	164	--	--	--	--	W	W
Idaho	--	--	--	--	--	434,263	8,689,944
Michigan	--	--	--	--	--	--	--
Missouri	--	--	--	--	--	--	--
Montana	--	W	W	[1] 6,273	[1] 41,273	12,953	112,267
Nevada	--	--	--	--	--	159	2,843
New Mexico	--	[1] 45,296	[1] 12,048	--	--	W	W
South Dakota	--	1,466,767	99,992	--	--	--	--
Utah	--	--	--	[1] 143,522	[1] 14,288	W	W
Other States [2]	--	66,461	215,470	--	--	8	655
Total	700	1,583,279	361,436	180,080	62,640	447,383	8,805,709
Percent of total silver	([3])	--	1	--	([3])	--	24

State	Lode—Continued: Copper ore		Lead ore		Zinc ore	
	Short tons	Troy ounces of silver	Short tons	Troy ounces of silver	Short tons	Troy ounces of silver
Alaska	--	--	--	--	--	--
Arizona	153,162,632	6,553,533	--	--	--	--
California	--	--	--	--	W	W
Colorado	3,789	3,331	--	--	249,098	119,313
Idaho	19,678	18,648	256,793	3,263,698	--	--
Michigan	8,250,351	785,100	--	--	--	--
Missouri	--	--	8,485,769	1,971,530	--	--
Montana	17,126,668	3,089,647	119	1,637	--	--
Nevada	8,511,860	592,508	--	--	--	--
New Mexico	19,928,805	840,879	--	--	--	--
South Dakota	--	--	--	--	--	--
Utah	W	W	--	--	--	--
Other States [2]	228,955	33,970	--	--	969,358	38,669
Total	207,232,738	11,917,616	8,742,681	5,236,865	1,218,456	157,982
Percent of total silver	--	32	--	14	--	([3])

State	Lode—Continued: Copper-lead, lead-zinc, copper-zinc, and copper-lead-zinc ores		Old tailings, etc.		Total	
	Short tons	Troy ounces of silver	Short tons	Troy ounces of silver	Short tons	Troy ounces of silver
Alaska	--	--	--	--	--	288
Arizona	100,172	61,424	83,934	30,764	153,377,023	6,652,800
California	[4] 13,187	[4] 89,828	--	[5] 51,465	17,942	175,467
Colorado	[6] 1,016,367	[6] 3,530,863	7,541	[5] 10,161	1,276,795	3,663,332
Idaho	683,401	2,278,435	--	--	1,394,135	14,250,725
Michigan	--	--	--	--	8,250,351	785,100
Missouri	--	--	--	--	8,485,769	1,971,530
Montana	--	--	55,420	80,228	17,201,433	3,325,052
Nevada	--	--	--	--	8,512,019	595,351
New Mexico	138,273	163,773	181	180	20,112,555	1,016,880
South Dakota	--	--	--	--	1,466,767	99,992
Utah	[4] 35,257,423	[4] 4,285,316	--	--	35,400,945	4,299,604
Other States [2]	2,087,335	103,217	12	4,320	3,352,129	396,301
Total	39,296,158	10,512,856	147,088	177,118	258,847,863	37,232,922
Percent of total silver	--	28	--	1	--	100

W Withheld to avoid disclosing individual company confidential data.
[1] Combined with other dry and siliceous ores to avoid disclosing individual company confidential data.
[2] Includes Illinois, Maine, New York, Oklahoma, Oregon, Tennessee, and Washington.
[3] Less than ½ unit.
[4] Combined with other base metal ores to avoid disclosing individual company confidential data.
[5] Includes byproduct silver recovered from tungsten ore in California and from fluorspar ore in Colorado and Illinois.
[6] Silver combined with copper-lead-zinc ores to avoid disclosing individual company confidential data.

Table 6.—Mine production of recoverable silver in the United States, by State

(Troy ounces)

State	1968	1969	1970	1971	1972
Alaska	3,900	2,030	2,189	868	288
Arizona	4,958,162	6,141,022	7,330,417	6,169,623	6,652,800
California	597,961	491,927	451,150	443,761	175,467
Colorado	1,646,283	2,598,563	2,933,363	3,389,748	3,663,832
Idaho	15,958,715	18,929,697	19,114,829	19,139,575	14,250,725
Maine	[1] 371,745	[1] 319,718	63,227	41,193	16,251
Michigan	472,813	1,009,022	891,579	670,052	785,100
Missouri	340,856	1,442,090	1,816,978	1,660,879	1,971,530
Montana	2,132,571	3,429,314	4,304,326	2,747,557	3,325,052
Nevada	645,192	884,155	718,011	601,470	595,351
New Mexico	224,866	465,591	781,952	782,441	1,016,880
New York	27,615	31,755	23,830	17,928	25,070
Oklahoma	(1)	(1)	[2] 325,887	[2] 362,646	[2] 269,262
Oregon	335	4,749	3,594	3,790	2,252
Pennsylvania	(1)	(1)	(2)	(2)	--
South Dakota	137,668	124,497	119,766	106,785	99,992
Tennessee	89,525	78,614	94,770	131,349	83,466
Utah	5,120,772	5,953,567	6,029,737	5,294,477	4,299,604
Washington	(1)	(1)	(2)	(2)	(2)
Total	32,728,979	41,906,311	45,005,605	41,564,142	37,232,922

[1] Production of Maine, Oklahoma, Pennsylvania, Washington, and Wyoming (1969) combined to avoid disclosing individual company confidential data.
[2] Production of Oklahoma, Pennsylvania (1968–71), Washington, Illinois (1971–72), and North Carolina (1971) combind to avoid disclosing individual company confidential data.

Table 7.—Silver produced in the United States from ore, old tailings, etc., in 1972, by State and method of recovery, in terms of recoverable metal

State	Total ore, old tailings etc., treated [1 2] (thousand short tons)	Ore and old tailings to mills					Crude ore, old tailings, etc., to smelters [1]	
		Thousand short tons [1 2]	Recoverable in bullion		Concentrates smelted and recoverable metal		Thousand short tons	Troy ounces
			Amalgamation (troy ounces)	Cyanidation (troy ounces)	Concentrates (short tons)	Troy ounces		
Alaska	--	--	--	--	--	--	--	--
Arizona	166,029	165,578	--	--	3,296,309	6,507,572	451	145,228
California	18	15	1,050	--	5,056	135,722	3	38,447
Colorado	1,277	1,269	1,440	--	191,127	3,652,740	8	9,488
Idaho	1,394	1,392	--	--	170,319	14,234,953	2	15,772
Michigan	8,291	8,291	--	--	231,061	785,100	--	--
Missouri	8,486	8,486	--	--	841,174	1,971,530	--	--
Montana	17,201	17,099	--	--	366,990	3,049,841	102	275,211
Nevada	21,336	21,282	--	--	350,804	589,626	54	5,725
New Mexico	20,236	20,127	--	--	702,000	1,004,227	109	12,653
South Dakota	1,467	1,467	--	99,992				
Utah	36,006	35,846	--	--	852,052	4,096,591	160	203,013
Other States [3]	7,019	7,019	--	--	444,080	393,965	(4)	2,336
Total	288,760	287,871	2,490	99,992	7,450,972	36,421,867	889	707,873

[1] Includes some nonsilver-bearing ore not separable.
[2] Excludes tonnage of fluorspar and tungsten ores from which silver was recovered as a byproduct.
[3] Includes Illinois, Maine, New York, Oklahoma, Oregon, Tennessee, and Washington.
[4] Less than ½ unit.

Table 8.—Silver produced at amalgamation and cyanidation mills in the United States and percentage of silver recoverable from all sources

Year	Bullion and precipitates recoverable (troy ounces)		Silver recoverable from all sources (%)			
	Amalgamation	Cyanidation	Amalgamation	Cyanidation	Smelting [1]	Placers
1968	92,021	53,666	0.28	0.16	99.55	0.01
1969	83,775	49,312	.20	.11	99.68	.01
1970	95,287	24,892	.21	.05	99.73	.01
1971	993	106,785	[2]	.26	99.74	[2]
1972	2,490	99,992	.01	.27	99.72	[2]

[1] Crude ores and concentrates.
[2] Less than ½ unit.

Table 9.—Silver produced at refineries in the United States, by source

(Thousand troy ounces)

Source	1971	1972
Concentrates and ores:		
Domestic	37,242	38,366
Foreign	31,449	39,151
Total	68,691	77,517
Old scrap [1]	30,075	31,090
New scrap	16,524	31,815
Total production	115,290	[2] 140,423

[1] Includes coin bullion purchased from GSA and refined to commercial-grade silver.
[2] Data may not add to total shown because of independent rounding.

Table 10.—U.S. consumption of silver, by end use

(Thousand troy ounces)

Final Use	1971	1972
Electroplated ware	10,909	12,716
Sterling ware [1]	22,729	27,163
Jewelry	3,447	4,870
Photographic materials	36,073	38,251
Dental and medical supplies	1,485	1,991
Mirrors	1,112	1,225
Brazing alloys and solders	12,085	12,214
Electrical and electronic products:		
Batteries	5,631	6,044
Contacts and conductors	27,954	36,434
Bearings	355	344
Catalysts	1,730	3,430
Miscellaneous [1 2]	5,636	6,381
Total net industrial consumption	129,146	151,063
Coinage	2,474	2,284
Total consumption	131,620	153,347

[1] Silver used in commemorative medals estimated at 6.0 million ounces in 1971 and 11.5 million ounces in 1972, distributed partly in sterling ware and partly in miscellaneous.
[2] Includes silver-bearing copper, silver-bearing lead anodes, ceramics, paints, etc.

Table 11.—Value of silver exported from and imported into the United States

(Thousand dollars)

Year	Exports	Imports
1970	49,139	103,757
1971	19,798	82,225
1972	49,260	101,580

Table 12.—U.S. exports of silver in 1972, by country

(Thousand troy ounces and thousand dollars)

Country	Ore and concentrates		Waste and sweepings		Refined bullion	
	Quantity	Value	Quantity	Value	Quantity	Value
Belgium-Luxembourg	10	12	1,517	2,472	1	2
Brazil	--	--	--	--	459	854
Canada	--	--	8	14	916	1,650
Colombia	--	--	--	--	48	77
France	--	--	2	5	4,604	7,350
Germany, West	20	45	648	1,111	3,571	5,497
Greece	--	--	--	--	22	39
Hong Kong	--	--	--	--	(1)	(1)
Israel	--	--	--	--	9	16
Italy	--	--	--	--	338	559
Jamaica	--	--	--	--	1	3
Japan	4	10	4	9	1,598	2,685
Netherlands	--	--	--	--	345	621
Nicaragua	--	--	--	--	1	1
Panama	--	--	--	--	1	1
South Africa, Republic of	(1)	(1)	--	--	--	--
Spain	--	--	17	26	--	--
Sweden	--	--	19	31	--	--
Switzerland	--	--	--	--	4,641	7,028
United Kingdom	17	40	698	1,124	10,135	17,972
Venezuela	--	--	--	--	3	6
Total	51	107	2,913	4,792	26,693	44,361

[1] Less than ½ unit.

Table 13.—U.S. general imports of silver in 1972, by country

(Thousand troy ounces and thousand dollars)

Country	Ore and concentrates		Waste and sweepings		Dore and precipitates		Refined bullion	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Argentina	14	20	--	--	--	--	903	1,426
Australia	2,780	4,080	--	--	--	--	--	--
Austria	--	--	--	--	--	--	(1)	(1)
Belgium-Luxembourg	--	--	--	--	--	--	165	274
Canada	15,206	24,126	511	833	4,579	7,684	12,481	20,260
Chile	780	298	--	--	--	--	--	--
Colombia	23	36	--	--	--	--	--	--
Germany, West	--	--	--	--	--	--	(1)	(1)
Greece	--	--	2	4	10	16	--	--
Honduras	2,398	2,235	--	--	287	450	2	4
Japan	167	318	--	--	47	71	49	75
Kenya	3	5	--	--	--	--	--	--
Korea, Republic of	--	--	--	--	--	--	82	142
Mexico	1,812	2,644	513	951	--	--	5,193	8,527
Netherlands	--	--	--	--	(1)	(1)	--	--
Nicaragua	73	93	--	--	8	13	--	--
Norway	24	33	--	--	--	--	--	--
Panama	--	--	--	--	--	--	8	14
Peru	9,484	14,444	--	--	--	--	6,787	10,838
Philippines	433	706	--	--	--	--	--	--
South Africa, Republic of	562	857	--	--	--	--	--	--
Switzerland	--	--	--	--	--	--	8	16
United Kingdom	59	84	--	--	--	--	2	3
Venezuela	--	--	1	(1)	--	--	--	--
Total	33,768	49,979	1,027	1,788	4,931	8,234	25,680	41,579

[1] Less than ½ unit.

Table 14.—World production of silver, by country [1]

(Thousand troy ounces)

Country [2]	1970	1971	1972 [p]
North and Central America:			
Canada	44,251	46,024	46,999
El Salvador	154	215	177
Haiti [e]	17	17	17
Honduras	3,816	3,642	3,595
Mexico	42,836	36,657	37,483
Nicaragua	217	261	[e] 275
United States	45,006	41,564	37,233
South America:			
Argentina	2,051	2,050	2,122
Bolivia [3]	6,816	5,369	5,659
Brazil	357	624	319
Chile	2,393	2,729	2,859
Colombia	76	68	70
Ecuador	70	[e] 70	[e] 70
Peru	39,835	38,398	40,188
Europe:			
Austria [4]	176	220	193
Czechoslovakia [e]	1,100	1,100	1,100
Finland	740	623	625
France	2,282	2,109	1,858
Germany, East [e]	4,800	5,000	5,000
Germany, West	[r] 1,800	1,800	1,736
Greece [4]	420	462	--
Hungary [e]	6	6	6
Ireland	2,171	1,432	[e] 1,500
Italy	[r] 1,063	1,236	2,166
Poland [e]	180	200	210
Portugal	[r] 280	264	242
Romania [e]	800	1,000	1,000
Spain [e 4]	1,640	1,640	1,640
Sweden [5]	3,949	3,895	[e] 3,900
U.S.S.R. [e]	38,000	39,000	40,000
Yugoslavia	3,417	3,354	3,582
Africa:			
Algeria	210	[r e] 200	[e] 190
Ghana	5	--	--
Morocco	681	1,698	[e] 1,866
Rhodesia, Southern [6]	70	91	126
South Africa, Republic of	3,527	3,378	3,294
South-West Africa, Territory of [7]	1,229	1,426	[8] 1,111
Tanzania	1	36	52
Tunisia	[r] 56	106	106
Zaire	[r] 1,479	1,470	2,078
Zambia [8]	185	194	109
Asia:			
Burma	[r] 620	685	1,155
China, People's Republic of [e]	800	800	800
India	50	121	142
Indonesia	283	285	279
Japan	[r] 11,030	11,293	10,021
Korea, North [e]	700	700	700
Korea, Republic of	1,494	1,543	1,770
Philippines	1,702	1,940	1,848
Taiwan	96	73	74
Oceania:			
Australia	25,992	21,703	22,796
Fiji	27	[e] 27	24
New Zealand	16	66	31
Papua and New Guinea	[r] 19	19	995
Total	[r] 300,991	288,883	291,391

[e] Estimate. [p] Preliminary. [r] Revised.

[1] Recoverable content of ores and concentrates produced unless otherwise noted.

[2] In addition to the countries listed Bulgaria, Guatemala, Thailand, Turkey, and several other African countries produce silver, but quantities are insignificant or not reported.

[3] Production by the state Mining Company (COMIBOL) plus exports of medium and small (private sector) mines.

[4] Smelter and/or refinery production.

[5] Series revised to indicate mine output; previous data represented metal production.

[6] Output of Inyati mine only.

[7] Recoverable content of Tsumeb Corp. Ltd. concentrates, as reported for year ending June 30 of 1970 and 1971. Data for 1972 represent calendar year production; production of silver for last 6 months of 1971 was 649 thousand troy ounces.

[8] Includes recovery from copper refinery sludges.