COPPER INDUSTRY

STATISTICS FOR 1968 COMPARED WITH OTHER YEARS

ARIZONA, UNITED STATES AND WORLD

COMPILED BY ARIZONA DEPARTMENT OF MINERAL RESOURCES

Fairgrounds, Phoenix, Arizona

Frank P. Knight, Director

Lester R. Brown, Jr., Statistical Consultant

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C O N T E N T S

COPPER

PHYSICAL PROPERTIES *

Symbol - Cu. Atomic Weight - 63.54. Specific Gravity - 8.96

Melting Point - 1981.4°F. Boiling Point - 4700°F

Electrical Resistivity - Microhm-cm. - 1.673

Tensile Strength (H.D. - 60,000 #/sq. in.) (annealed - 30,000)

Crystal Structure - Face-centered cubic. Valence - 1 & 2

Copper ranks next to iron as a metal of commercial importance. It has the best conductivity of any base metal; for example, measured on the ordinary basis of conductivity per unit of cross sectional area, aluminum's conductivity is only 61 per cent of that of copper, but 3.5 times that of iron. Copper is therefore the most important metal in the electrical field. Copper has enough strength for minor structural purposes (such as sheet-metal work, electrical manufactures, etc.), is easily rolled and drawn into wire, has great resistance to weathering, and is of moderate cost compared to competitive materials. In addition to these properties, copper is widely used alloyed with zinc to form brass, which is easily worked, offers good resistance to weathering and most solutions (principal exceptions are certain acids and alkalies), and is fairly strong and elastic; and alloyed with tin to form bronze, of note for its resilience. It has good thermal conductivity, so finds many uses in heat-transfer units, such as cooling fins and water heaters. In addition, a large percentage of copper may be recovered as scrap after it has outlived the usefulness for which it was originally intended. Of the total copper consumed in the United States it has been estimated that about 60 per cent eventually returns to use as copper or copper alloys.

* U.S.B.M.'s "MATERIALS SURVEY"

The Copper Industry in 1968

The long strike, started in July 1967 and ended late in March 1968, paralyzed most of the copper industry of the United States. Most of the mines quickly resumed production, but did not return to the pre-strike rate of operations until August 1968. Had production continued at the 1966 rate through 1967-1968, the United States would have turned out 700,000 more tons of copper. However, the strike loss is estimated to be 854,970 tons because of inability to fully use during the strike period and for the balance of 1968, capacity increases available after 1966. Arizona's share of the 700,000 tons is slightly above one-half.

World mine production outside of the United States continued to climb and its 1968 figure of 4,687,648 tons was an all time record for the tenth consecutive year. Most countries of the world increased their copper output in 1968. Outstanding gains were made in the Philippines and Peru. Free World production exclusive of the United States followed the pattern of world production, making a record (3,605,603 tons) for the tenth consecutive year also.

United States mine production of 1,204,621 tons in 1968 was 26.3 percent above 1967 and only 15.7 percent below the record year of 1966, in spite of the first quarter strike and the second quarter period of recovery. The U.S. mine production includes copper recovered from (1) precipitates from leaching; (2) ores in which other metals predominate, and (3) copper ores sold or treated. The tonnage of the ores in (3) was 170,054,065, and it contained 1,027,578 tons of recoverable copper, or an average of 0.60 percent. Arizona, Utah, Nevada, and Montana ranking 1st, 2nd, 3rd and 4th respectively in ore tonnages, averaged 0.57, 0.61, 0.56 and 0.60 percent copper respectively. 0.60 percent is only 12 pounds per short ton and a deposit of such a copper content was regarded as waste rock only a few years ago. Michigan ranked 5th in ore tonnage, but 3rd in copper recovered, its average grade being 0.93 percent. It was the only major producing state which produced more copper in 1968 than in 1966, although Nevada came very close. New Mexico ranked 6th in ore tonnage and 6th in copper recovered, its grade being 0.77 percent.

The production of secondary scrap copper in the United States was 1,218,340 tons equal to 101 percent of domestic mine output compared to 122 percent for 1967 and 93 percent in 1966. 57 percent of the total was "new" scrap, 43 percent was "old".

Arizona's production is discussed more in detail in the Arizona section of this report. In general, it followed the trends of the United States production - 25.2 percent above 1967 and 15.1 percent below 1966.

World consumption of refined copper in 1968 was 7,041,300 tons, slightly below the record year of 1966. The Free World outside of the United States consumed a record 3,772,100 tons, 11 percent above 1966, and the Soviet Sphere a record of 1,388,900. Japanese consumption increased notably.

United States consumption of refined copper, 1,880,300 tons, was 2.9 percent below that of 1967 and 20.3 percent below that of 1966, a record year. 1968 production

of primary and secondary copper was 87.1 percent of the total consumption of the United States, vs 87.2 percent for the decade ending in 1968. Mine production was 64.1 percent of new refined consumption.

United states imports of primary copper (698,555 tons) were chiefly from South America, Canada and Africa. Over one-half of the United States exports (321,484 tons) went to Europe where Italy, The United Kingdom, France and West Germany, were the four large importers. Brazil, Japan and India were the only other countries taking over 10,000 tons. The United States imports exceeded the exports by 377,071 tons compared with 413,819 tons excess in 1967 and 279,421 in 1966.

United States stocks of refined copper, blister, and materials in process of refining at the end of 1968 were 320,000 tons, 30 percent higher than at the end of 1967, and 2 percent more than at the end of 1966, according to the United States Bureau of Mines. The Copper Institute reported refined stocks outside the U.S.A. as 316,090 tons at the end of 1968, vs 56,609 tons in the United States, and 272,202 and 293,167 tons at the ends of 1967 and 1966 respectively.

The majority of the producers suspended price quotations during the strike. The smaller producers who kept operating raised prices somewhat but not to the level of the merchants who raised from around 45 cents early in the strike to above 80 cents in February and March of 1968. Their prices dropped rapidly from their pre-strike figure. The producers' figure held to the end of the year when Copper Range raised to 45 cents and the other producers announced 2¢ raises to 44-44-1/4 cents. Prices on the London Metal Exchange dropped to around 49 cents in mid-1968 and finished the year at around 54 cents.

Suspension of the copper tariff ended June 30, 1968 and a 1.5 cent duty became effective. At the end of 1968 the duty again was suspended but with a new peril point of 36 cents in addition to the old figure of 24 cents. At the 36 cent price, a duty in line with GATT and subsequent adjustments would be imposed and at the 24 cent price a duty of 2 cents per pound would return.

Employment in the copper industry was at an all-time high in the third quarter of 1968. At the beginning of 1969, the industry was optimistic about the first half of the year and expected no serious trouble in the second half.

At the time of this writing the outlook for copper for the next year or two is, as usual, uncertain, with demand perhaps more uncertain than supply. Capacity increases totaling 1,832,350 tons are scheduled or planned to be ready by 1973. However, some predict a demand twice the present amount by 1985.1/ The copper industry of the world faces a tremendous challenge of supplying the future demands of an exploding population.

1/ Refer to: The Copper Mining Industry 1966-1970, by B. H. Gerwin, Arizona Department of Mineral Resources.

TABLE I

SALIENT U. S. COPPER STATISTICS [1/]

YEARS 1966, 1967 and 1968

Unit: Short Tons

	1966	1967	1968
Arizona Mine Production - Tons Copper	739,569	501,741	627,961
U. S. Mine Production Tons Copper	1,429,152	954,064	1,204,621
World Mine Production Tons Copper	5,800,341r	5,518,502r	5,892,269
Refined Stocks - Beginning of Period	35,000	43,000	27,000
Refined Stocks - End of Period	43,000	27,000r	48,000
Refinery Production (From Domestic Ores)	1,353,087	846,551	1,160,925
Refinery Production (From Foreign Ores)	357,897	286.431	276,461
Secondary Copper Recovered from Scrap as Unalloyed Copper	509,084	423,054r	433,041
IMPORTS:			
Copper from Ore, Matte, Regulus	41,942	32,971r	27,559
Blister Copper	349,917	269,322r	270,718
Refined Copper	162,602	330,571r	400,278
Total Imports - Crude and Refined	554,461	632,864r	698,555
EXPORTS:			
Copper in Ores, etc.	2,149	59,692	80,739
Refined Copper	273,071	159,353	240,745
Total Exports - Crude and Refined	275,220	219,045	321,484
EXCESS IMPORTS OVER EXPORTS	279,241	413,819r	377,071
CONSUMPTION:			
New Refined (Apparent Consumption)	1,593,000	1,320,000	1,576,000
Total Refined (Actual)	2,359,954	1,935,592	1,880,300
U.S.Mine Prod. % of Appar't Consumption	89.7	72.3	76.4
Average E & M J Price of Copper	36.170¢	38.226¢ [a/]	41.847¢ [b/]

r - Revised

1/ From the U. S. Bureau of Mines and the American Bureau of Metal Statistics.

a/ Based on first 8 mos. of 1967. Calculated average suspended Sept. thru Dec.

b/ Based on last 9 mos. of 1968. Calculated average suspended Jan. thru Mar.

TABLE II

MINE PRODUCTION OF RECOVERABLE COPPER IN THE UNITED STATES

1966 - 1968, BY STATES, IN SHORT TONS [1]

State	1966	1967	1968	Rank in 1968
Alaska	[2]	[2]	[2]	
Arizona	739,569	501,741	627,961	(1)
California	1,078	788	1,182	
Colorado	4,237	3,993	3,451	
Idaho	4,961	4,210	3,525	(10)
Michigan	73,449	58,458	74,805	(5)
Missouri	3,913	3,215	5,494	(8)
Montana	128,061	65,483	69,480	(6)
Nevada	78,720	50,771	77,213	(4)
New Mexico	108,614	75,008	90,769	(3)
Oklahoma	[2]	[2]	[2]	
Oregon	[2]	- - -	[2]	
Pennsylvania	3,178	4,401	4,850	(9)
Tennessee	15,410	14,600	14,196	(7)
Utah	265,383	168,609	228,245	(2)
Washington	34	21	22	
Other States [3]	2,545	2,766	3,428	
TOTAL	1,429,152	954,064	1,204,621	

1/ U. S. Bureau of Mines
2/ Included under "Other States". Combined to avoid disclosing individual company confidential data.
3/ Includes Alaska, Maine, Oklahoma, and Oregon.

TABLE III

ARIZONA. UNITED STATES, AND WORLD MINE PRODUCTION OF COPPER, In Short Tons

E. & M. J. DOMESTIC PRICE OF COPPER

By Years 1912 - 1968 Incl.

	ARIZONA			UNITED STATES		WORLD	E.&.M.J.
Year	Tons	% of U. S. Prod.	% of World Prod.	Tons	% of World Prod.	Tons	Price Per Pound
Beginning of Records 1874 thru 1911	1,757,554	@ 14.403¢ per Lb.		= $506,283,002*			
1912	182,519	29.2	16.2	624,547	55.5	1,125,656	16.341¢
1913	203,962	33.0	18.6	617,755	56.2	1,099,366	15.269
1914 1/	196,509	34.2	19.0	574,216	55.5	1,034,487	13.602
1915 1/	229,986	30.9	19.6	744,036	63.4	1,173,150	17.275
1916 1/	360,917	36.0	23.2	1,002,938	64.6	1,553,498	27.202
1917 1/	356,083	37.6	22.2	947,717	59.1	1,602,914	27,180
1918 1/	382,428	40.0	24.2	955,011	60.5	1,579,246	24.628
1919	269,050	44.4	24.6	606,167	55.3	1,095,697	18.691
1920	279,128	45.6	26.4	612,275	58.0	1,056,014	17.456
1921 2/	92,517	39.7	15.1	233,095	38.0	613,987	12.502
1912 to 1921	2,553,099	36.9	21.4	6,917,757	58.0	11,934,015	r20.649
1922	200,022	41.5	21.4	482,292	48.2	935,374	13.382¢
1923	309,464	41.9	22.8	738,870	54.5	1,355,327	14.421
1924	338,876	42.2	23.0	803,083	54.5	1,472,712	13.024
1925	356,678	42.5	22.6	839,059	53.2	1,576,998	14.042
1926	361,648	41.9	22.7	862,638	54.0	1,596,147	13.795
1927	341,095	41.3	20.5	824,980	49.5	1,666,694	12.920
1928	366,138	40.5	19.2	904,898	47.5	1,903,672	14.570
1929	415,314	41.6	19.3	997,555	46.4	2,150,587	18.107
1930 3/	288,095	40.9	16.2	705,074	39.7	1,775,805	12.982
1931 3/	200,672	37.9	13.0	528,875	34.2	1,545,425	8.116
1922 to 1931	3,178,002	41.3	19.8	7,687,324	48.1	15,978,741	r13.902

Source: U.S. Geological Survey: Mineral Resources; U.S.B.M. Minerals Yearbooks.

* Arizona Metal Production 1936, Elsing and Heineman, Ariz. Bureau of Mines.

(continued)

TABLE III (Continued)

Year	ARIZONA Tons	ARIZONA % of U. S. Prod.	ARIZONA % of World Prod.	UNITED STATES Tons	UNITED STATES % of World Prod.	WORLD Tons	E.& M. J. Price Per Pound
1932 3/	91,246	38.3	8.0	238,111	20.9	1,138,676	5.555¢
1933 3/	57,021	29.9	4.9	190,643	16.4	1,159,000	7.025
1934 3/	89,041	37.5	6.3	237,401	16.8	1,415,353	8.428
1935 3/	139,015	36.0	8.4	386,491	23.5	1,647,939	8.649
1936 3/	211,275	34.4	11.1	614,516	32.4	1,899,263	9.474
1937	288,475	34.3	11.2	841,998	32.8	2,567,916	13.167
1938 4/	210,797	37.8	9.3	557,763	24.5	2,274,045	10.000
1939 5/	262,117	36.0	10.6	728,320	29.4	2,481,277	10.965
1940 5/	281,169	32.0	10.5	878,086	32.7	2,688,510	11.296
1941 5/	326,317	34.1	11.2	958,149	33.0	2,903,458	11.797
1932 to 1941	1,956,473	34.7	9.7	5,631,478	27.9	20,175,437	r10,564
1942 5/	393,387	36.4	12.9	1,080,061	35.5	3,039,041	11.775¢
1943 5/	403,181	37.0	13.2	1,090,818	35.6	3,064,394	11.775
1944 5/	358,303	36.8	12.5	972,549	33.9	2,866,000	11.775
1945	287,203	37.2	12.0	772,894	32.2	2,400,000	11.775
1946	289,223	47.5	14.1	608,737	29.6	2,056,000	13.820
1947	366,218	43.2	14.6	847,563	33.9	2,500,000	20.958
1948 6/	375,121	44.9	14.4	834,813	32.1	2,600,000	22.038
1949 6/	359,010	47.7	14.4	752,750	30.1	2,500,000	19.202
1950	403,301	44.4	14.4	909,343	32.5	2,760,000	21.235
1951	415,870	44.8	14.3	928,330	32.0	2,900,000	24.200
1942 to 1951	3,650,817	41.5	13.7	8,797,858	33.0	26,685,435	r17,104

(Continued)

TABLE III (continued)

Year	ARIZONA Tons	ARIZONA % of U.S. Prod.	ARIZONA % of World Prod.	UNITED STATES Tons	UNITED STATES % of World Prod.	WORLD Tons	E & M J Price per Pound
1952	395,719	42.8	13.1	925,359	30.6	3,020,000	24.200¢
1953	393,525	42.5	12.9	926,448	30.4	3,050,000	28.798
1954 7/	377,927	45.2	12.2	835,472	27.0	3,100,000	29.694
1955	454,105	45.5	13.3	998,570	29.2	3,420,000	37.491
1956	505,908	45.7	13.4	1,104,156	29.1	3,790,000	41.818
1957	515,854	47.5	13.3	r1,086,859	27.9	3,890,000	29.576
1958	485,839	49.6	12.9	979,329	25.9	3,780,000	25.764
1959	430,297	52.2	10.7	824,846	r20.4	r4,040,000	31.182
1960	538,605	49.9	r11.6	1,080,169	r23.2	r4,650,000	32.053
1961	587,053	50.4	12.1	1,165,155	24.0	4,850,000	29.921
1952 to 1961	4,684,832	r47.0	12.5	r9,926,363	r26.4	r37,590,000	31.236¢
1962	644,242	52.4	12.7	1,228,421	r24.2	r5,085,000	30.600¢
1963	660,977	54.5	r13.0	1,213,166	r23.8	r5,088,000	30.600
1964	690,988	55.4	r13.1	1,246,780	r23.6	r 5,291,000	31.960
1965	703,377	52.0	r12.7	1,351,734	r24.5	r5,528,000	35.017
1966	8/739,569	51.7	r12.6	8/1,429,152	r24.7	r5,789,000	36.170
1967	9/501,741	52.6	r 9.2	9/ 954,064	r17.6	r5,436,000	38.226*
1968	9/627,961	52.1	10.5	9/1,204,621	20.1	10/5,983,000	41.847**
1962 to 1968	4,568,855	53.0	12.0	8,627,938	22.6	r38,200,000	34.771¢
1874 to 1968	ARIZONA ONLY	22,349,632 Tons at 22.842¢ per pound =					$10,210,334,020

r - Revised

* Based on first 8 months of 1967.

** Based on last 9 months of 1968.

TABLE III Continued

NOTES: 1/ World War I 1914 - 1918.

2/ Post World War I Recession. Lasted about one year.

3/ Depression began in 1930; was at its worst in 1933; gradually improved till 1937.

4/ Recession in 1938. Recovery in 1939 caused by War demand.

5/ World War II began in 1939; copper consumption reached its height in 1944.

6/ In the year 1948 and the early months of 1949, copper was being produced in the United States at the rate of 68,000 short tons per month, imports were at the rate of 18,000 tons of blister copper and 27,000 tons of refined copper, and exports were at the rate of 12,000 tons per month. The price of copper averaged 22.5 cts. during this period, varying from 21-3/8 to 23-3/8 cts.

In March 1949 the copper import tax was suspended, and during the months following the suspension, domestic demand fell drastically, and for four months net domestic consumption of copper was at or below the level of domestic production, even though the latter was severely curtailed. During this period, imports continued at practically the same rate. The price of copper dropped from 23-3/8 cts. to 16-1/2 cts. per pound. Many mines were forced to close down, and the large low-cost producers curtailed production. The average monthly production dropped from a high of 78,000 to a low of 56,000 tons.

7/ Curtailment early in the year, and a series of strikes in August and September caused a loss in production of over 100,000 tons. Reduced consumption in the U. S. was offset by an appreciable rise in the use of copper outside of this country, chiefly Europe. Result: a short supply of copper at the end of the year.

8/ 1966, Highest annual production in history.

9/ The 1967 Copper Strike started July 16, 1967, ending in March 1968.

10/ American Bureau of Metal Statistics Yearbook for 1968, p11.

TABLE IV

MINE PRODUCTION RECOVERABLE COPPER

UNITED STATES PRODUCTION OF SECONDARY UNALLOYED COPPER

AND WORLD CONSUMPTION OF REFINED COPPER
(Primary and Secondary)

Short Tons

	MINE PRODUCTION RECOVERABLE 1/				SECONDARY COPPER PRODUCTION
Year	United States	Remainder of Free World (By Difference)	Soviet Sphere	TOTAL WORLD	United States 1/
1957	1,086,859	2,300,541r	502,600r	3,890,000	248,015
1958	979,329	2,257,071r	543,600r	3,780,000	255,121
1959	824,846	2,630,354r	584,800r	4,040,000r	261,588
1960	1,080,169	2,883,731r	686,100r	4,650,000	300,259
1961	1,165,155	2,911,145r	773,700r	4,850,000r	290,805
1962	1,228,421	2,961,479r	895,100r	5,085,000r	301,374
1963	1,213,166	3,037,175r	837,659r	5,088,000r	314,643
1964	1,246,780	3,156,499r	894,721r	5,298,000r	366,197
1965	1,351,734	3,241,307r	955,959r	5,549,000r	462,811
1966	1,429,152	3,355,548r	1,015,300r	5,800,000r	509,084
1967	954,064	3,501,636r	1,063,300r	5,519,000r	423,054r
1968	1,204,621	3,605,603	1,081,776	5,892,000	433,041

	WORLD CONSUMPTION OF REFINED COPPER			
Year	United States 1/	Remainder of Free World (By Difference)	Soviet Sphere 2/	TOTAL WORLD 2/
1957	1,352,124r	2,102,617r	511,500	3,966,241
1958	1,250,677r	2,266,112r	557,800	4,074,589
1959	1,463,031	2,415,341	821,296	4,699,668
1960	1,349,896	2,840,034	839,664	5,029,594
1961	1,462,830	3,033,270r	1,038,300r	5,534,400r
1962	1,599,676r	2,922,024r	1,091,200	5,612,900
1963	1,744,273r	3,061,327r	1,147,500	5,953,100
1964	1,825,281r	3,525,119r	1,174,000r	6,524,400r
1965	2,004,623	3,499,377r	1,231,300r	6,735,300r
1966	2,359,954	3,400,346r	1,300,700r	7,061,000r
1967	1,935,592	3,433,908r	1,344,900r	6,714,400r
1968	1,880,300	3,772,100	1,388,900	7,041,300

r Revised
1/ U.S. Bureau of Mines Minerals Yearbooks
2/ American Bureau of Metal Statistics Yearbooks

TABLE V

WORLD MINE PRODUCTION OF COPPER (CONTENT OF ORE) RECOVERABLE WHERE INDICATED, BY CONTINENTS AND PRINCIPAL COUNTRIES IN THOUSAND SHORT TONS [1/ 2/]

Years 1965, 1966, 1967 and 1968

	1965	1966	1967	1968p
NORTH AMERICA:				
U.S.A. [3/]	1,352	1,429	954	1,205
Canada [3/]	508r	508r	603	608
Mexico	61r	62r	62r	67
Others	22r	21r	20r	22
	1,943r	2,020r	1,639r	1,902
SOUTH AMERICA:				
Chile	668r	731r	732r	729
Peru [3/]	199r	194	200	235
Others	9	9r	14r	13
	876r	934r	946r	977
EUROPE:				
U.S.S.R. [4/]	770r	825r	880r	880
Yugoslavia	69	69	70	70
Others	163	159r	169r	181
	1,002r	1,053r	1,119r	1,131
ASIA:				
China, mainland e	99	99	88r	99
Cyprus e	22	20r	17	19
Japan	118	123	131r	132
Philippines	69r	81	94r	126
Turkey	37r	40	35r	32
Others	44r	49r	48r	48
	389r	412r	413r	456
AFRICA:				
Zambia	767	687	730	733
Congo (Kinshasa)	318	348	352	353
Republic of So.Africa	67	137	141	140
Others	87r	84r	84r	86
	1,239	1,256	1,307	1,312
OCEANIA:				
Australia	101r	123r	101r	118
Fiji (exports)	--	--	--	1 e
	101	123	101	119
TOTAL WORLD [5/]	5,550r	5,798r	5,525r	5,897

e Estimate p Preliminary r Revised

1/ U. S. Bureau of Mines

2/ Czechoslovakia, Hungary, Kenya, and Malaya also produce copper but production data are not available.

3/ Recoverable

4/ Output from U.S.S.R. in Asia included with U.S.S.R. in Europe.

5/ Totals may not add, due to rounding.

TABLE VI

NEW (PRIMARY) REFINED COPPER WITHDRAWN FROM SUPPLY ON DOMESTIC ACCOUNT

YEARS 1963 - 1968

Unit: Short Tons

	1963	1964	1965
Ref. Prod. of New Cu from U.S.Ores	1,219,342	1,259,852	1,335,660
Ref. Prod. of New Cu from Foreign Ores	377,009	396,543	376,133
Total Ref. Prod. of New Copper	1,596,351	1,656,395	1,711,793
Imports of Refined Copper	119,165	137,707	137,443
Stocks at beginning of period	71,000	52,000	37,000
Total Available Supply	1,786,516	1,846,102	1,886,236
Exports of Refined Copper	311,479	316,230	324,965
Stocks at end of period	52,000	37,000	35,000
Total	363,479	353,230	359,965
Withdrawn on Domestic Acc. (Apparent Cons.)	1,423,000	1,493,000	1,526,000
Reported Actual Consumption	1,744,273	1,825,281	2,004,623

	1966	1967	1968
Ref. Prod. of New Cu from U.S.Ores	1,353,087	846,551	1,160,925
Ref. Prod. of New Cu from Foreign Ores	357,897	286,431	276,461
Total Ref. Prod. of New Copper	1,710,984	1,132,982	1,437,386
Imports of Ref. Copper	162,602	r 330,571	400,278
Stocks at beginning of period	35,000	43,000	27,000
Total Available Supply	1,908,586	r1,506,553	1,864,664
Exports of Refined Copper	273,071	159,353	240,745
Stocks at end of period	43,000	r 27,000	48,000
Total	316,071	r 186,353	288,745
Withdrawn on Domestic Acc. (Apparent Cons.)	1,593,000	r1,320,200	1,575,919
Reported Actual Consumption	2,359,954	1,935,592	1,880,300

r - Revised
Source: U. S. Bureau of Mines Minerals Yearbooks

TABLE VII

IMPORTS OF PRIMARY COPPER INTO UNITED STATES

1966, 1967, 1968
1963, 1964, 1965

Short Tons

	1966	1967	1968
Ore Matte - Regulus (Copper Content	41,942	32,971r	27,559
Canada	8,097	r 7,229	7,214
Chile	818	691	- -
Mexico	83	r 145	219
Peru	r 6,863	r 6,615	4,637
Phillippines	21,034	r16,058	14,543
Republic of So. Africa	228	- -	- -
Australia	1,202	r 708	942
Other Countries	r 3,617	r 1,525	4
Blister Copper (Copper Content)	349,917	r269,322	270,718
Mexico	7,925	r 2,937	5,067
Chile	182,662	r141,629	136,320
Peru	95,975	r 84,329	89,033
Republic of So. Africa	50,088	r 38,866	38,243
Other Countries	13,267	r 1,561	2,055
Refined Cathodes and Shapes	162,602	r330,571	400,278
Canada	85,723	r140,602	135,115
Chile	21,326	r 30,791	42,860
United Kingdom	14,104	r 20,468	22,572
Zambia	- -	r 9,577	22,898
Other Countries	r41,449	r129,133	176,833
TOTAL PRIMARY IMPORTS	554,461	r632,864	698,555
TOTAL PRIMARY EXPORTS (refined & ore Concts & matte)	275,220	219,045	321,484
EXCESS IMPORTS	279,241	r413,819	377,071

YEARS	1963	1964	1965
TOTAL PRIMARY IMPORTS	r536,527	r581,591	r506,936
TOTAL PRIMARY EXPORTS	r312,689	r321,625	340,475
EXCESS IMPORTS	r223,838	r259,966	r166,461

r - Revised
Source: U. S. Bureau of Mines Minerals Yearbooks

TABLE VIII

EXPORT OF COPPER FROM THE UNITED STATES

1966, 1967 and 1968

Short Tons

	1966	1967	1968
Ore, Concts. & Matte	2,145	59,692r	80,739
Refined Ingots, Bars, Etc.	273,072	159,353r	240,745
Argentina	4,855	241	267
Australia	21	69	47
Belgium	1,463	2,796	7,334
Brazil	39,170	6,917	31,335
Canada	10,352	4,786	5,739
Denmark	1,165	661	1,060
Finland	56	- -	- -
France	34,332	18,821	30,402
Germany, West	31,466	19,495	29,502
Greece	- -	1	672
India	11,718	6,416	15,217
Italy	52,160	27,201	38,993
Japan	24,444	29,214	18,824
Korea	- -	1,799	2,142
Netherlands	5,021	3,289	9,294
Norway	3,691	2,408	1,859
Spain	- -	- -	794
Sweden	4,456	1,126	3,830
Switzerland	2,742	1,341	2,313
United Kingdom	39,123	26,587	37,773
Yugoslavia	- -	- -	1,057
Other Countries	6,837	r 6,186	2,291
Total Exports (Crude and Refined)	275,217	r219,045	321,484

Source: American Bureau of Metal Statistics Yearbook 1968 pp 36-37

r -Revised

TABLE IX

STOCKS OF REFINED COPPER REPORTED BY

U.S.B.M AND COPPER INSTITUTE*

Short Tons

END OF PERIOD	IN U.S.A.		OUTSIDE U.S.A.
	U.S.B.M.	COPPER INSTITUTE	COPPER INSTITUTE
Year 1959	18,000	64,763	228,243
1960	98,000	139,272	288,510
1961	49,000	79,755	332,479
1962	71,000	117,441	358,856
1963	52,000	76,934	394,143
1964	37,000	45,594	277,303
1965	35,000	60,811	327,723
1966	43,000	65,707	293,167
1967	27,000r	55,350	272,202
1968	48,000	56,609	316,090

* Inventory data of the Bureau of Mines and Copper Institute always differ owing to somewhat different bases. After Jan. 1, 1947 the differences were due chiefly to the method of handling metal in process of refining (included as "refined" by Copper Institute and as "unrefined" by the U.S.B.M.), and to other minor variations in interpretation until May, 1951. Then the Institute's inventory data began to include tonnages delivered to U. S. consumers at foreign ports. Bureau of Mines figures are on the basis of metal physically held at primary smelting and refining plants in the U. S. In the Bureau's classification cathodes to be used chiefly for casting into shapes are considered stocks in process and not refined stocks.

TABLE X

STOCKS OF REFINED COPPER, BLISTER, AND MATERIALS IN PROCESS

REPORTED BY UNITED STATES BUREAU OF MINES

Short Tons

END OF PERIOD	REFINED	BLISTER & MATERIALS IN PROCESS OF REFINING 1/	TOTAL
Year 1959	18,000	253,000	271,000
1960	98,000	261,000	359,000
1961	49,000	236,000	285,000
1962	71,000	246,000	317,000
1963	52,000	252,000	304,000
1964	37,000	246,000	283,000
1965	35,000	246,000	281,000
1966	43,000	270,000	313,000
1967	27,000r	220,000r	247,000r
1968	48,000	272,000	320,000

1/ Includes copper in transit from smelter in the U.S. to refineries therein.

TABLE XI

REFINED COPPER CONSUMED IN U. S. 1965-1968

BY CLASSES OF CONSUMERS 1/

Unit: Short Tons

Class of Consumer	Cathodes	Wire Bars	Ingots and Ingot Bars	Cakes and Slabs	Billets	Other	Total
1965:							
Wire mills	100	1,212,234	10,286	- -	- -	812	1,223,432
Brass mills	121,815	35,312	156,107	195,742	230,816	114	739,906
Chemical plants	- -	- -	1,701	- -	- -	723	2,424
Secondary smelt.	3,506	- -	2,670	2	- -	279	6,457
Foundries	2,918	70	11,806	- -	448	1,266	16,508
Miscellaneous 2/	1,126	26	7,047	3/	719	6,978	15,896
Total	129,465	1,247,642	189,617	195,744	231,983	10,172	2,004,623
1966:							
Wire Mills	2,698	1,356,428	10,811	- -	22	883	1,370,842
Brass Mills	180,350	39,503	211,500	234,156	262,834	147	928,490
Chemical Plants	- -	- -	1,586	- -	- -	732	2,318
Secondary smelt.	9,408	- -	9,968	111	- -	204	19,691
Foundries	2,101	57	15,678	3/	395	1,261	19,492
Miscellaneous 2/	1,407	52	9,489	3/	774	7,399	19,121
Total	195,964	1,396,040	259,032	234,267	264,025	10,626	2,359,954
1967:							
Wire mills	6,058r	1,226,370r	6,964r	- -	- -	844r	1,240,236r
Brass mills	152,310r	28,090	115,640r	153,146r	200,906r	282r	650,374r
Chemical Plants	- -	- -	1,386r	- -	- -	1,014r	2,400r
Secondary smelt.	4,908r	- -	3,816r	- -	- -	254r	8,978r
Foundries & Misc. 2/	3,557r	173r	21,331r	3/	1,119r	7,424r	33,604r
Total	166,833r	1,254,633r	149,137r	153,146r	202,025r	9,818r	1,935,592
1968							
Wire mills	16,632	1,164,933	6,716	- -	- -	993	1,189,274
Brass mills	141,836	26,610	140,658	122,367	220,504	475	652,450
Chemical plants	- -	- -	520	- -	- -	1,123	1,643
Secondary smelt.	3,583	- -	2,583	- -	- -	188	6,354
Foundries & Misc. 2/	2,460	134	19,150	3/	1,083	7,752	30,579
Total	164,511	1,191,677	169,627	122,367	221,587	10,531	1,880,300

r Revised

1/ U.S. Bureau of Mines

2/ Includes iron and steel plants, primary smelters producing alloys other than copper, consumers of copper powder and copper shot, and misc. manufacturers.

3/ In 1965, included with "Other" to avoid disclosing individual company confidential data. In 1966 and after, included with "Billets".

TABLE XII

U. S. PRODUCTION AND CONSUMPTION OF COPPER

short tons

Year	Mine Production	Secondary Production*	Total Production	Total Actual Consumption	Total Production As % of Consumption
1949	752,750	250,089	1,002,839	1,129,686	88.8
1950	909,343	260,704	1,170,047	1,424,434	82.2
1951	928,330	186,462	1,114,792	1,416,865	78.7
1952	925,359	173,904	1,099,263	1,479,732	74.3
1953	926,448	242,855	1,169,303	1,494,215	78.3
1954	835,472	212,241	1,047,713	1,254,729	83.5
1955	998,570	246,928	1,245,498	1,502,004	82.9
1956	1,104,156	273,060	1,377,216	1,521,389	90.5
1957	1,086,141	248,015	1,334,156	1,347,815	99.0
1958	979,329	255,121	1,234,450	1,250,677	98.7
Totals 1949-58	9,445,898	2,349,379	11,795,277	13,821,546	
10 Yr. Avg.	944,590	234,938	1,179,528	1,382,155	85.3
1959	824,846	261,588	1,086,434	1,463,031	74.3
1960	1,080,169	300,259	1,380,428	1,349,896	102.3
1961	1,165,155	290,805r	1,455,960r	1,462,830	99.5r
1962	1,228,421	301,374	1,529,795	1,599,676	95.6
1963	1,213,166	314,643	1,527,809	1,744,273	87.6
1964	1,246,780	366,197	1,612,977	1,825,281	88.4
1965	1,351,734	462,811	1,814,545	2,004,623	90.5
1966	1,429,152	509,084	1,938,236	2,359,954	82.1
1967	954,064	423,054r	1,377,118r	1,935,592	71.1r
1968	1,204,621	355,000	1,559,621	1,871,653	83.3
Total 1959-68	11,698,108	3,584,815	15,282,923	17,616,809	
10 Yr. Avg.	1,169,811	358,482	1,528,292	1,761,681	86.8

* Unalloyed copper. r Revised

Source: U. S. Bureau of Mines

TABLE XIII

COPPER MINING EMPLOYMENT, WAGES, AND HOURS IN THE U. S. AND ARIZONA

FOR THE YEARS 1965 THROUGH 1968

Averages for Base Period 1947-1949, Years 1966-1968 and the Full Months of the Strike period in 1967-1968 are Given

Period	"A" Average Number Employees Monthly Averages		"B" Average Weekly Earnings Monthly Averages		"C" Average Weekly Hours Monthly Averages		"D" Average Hourly Earnings Monthly Averages	
	Arizona1/	U.S.2/	Arizona3/	U.S.4/	Arizona3/	U.S.4/	Arizona3/	U.S.4/
1965	14,200	29,900	$146.11	$136.71	45.01	43.40	$3.246	$3.150
1966	15,200	32,350	150.06	142.26	45.20	43.45	3.320	3.219
1967	12,200r	24,050r	141.46	136.59	42.60	42.25	3.318	3.231
Jan-Jul	15,657r	32,729r	149.35	142.83	44.54	43.54	3.352	3.279
Aug-Dec	7,260r	11,900r	130.40	127.95	39.88	40.44	3.270	3.164
1968	14,100	30,258	149.21	156,43	43.02	45.90	3.468	3.400
Jan-Mar	7,533	12,267	118.47	129.06	36.73	40.20	3.223	3.210
Apr-Dec	16,322	36,256	160.09	165.56	45.11	47.80	3.549	3.463
Strike Aug.67-Mar.68	7,363	12,038	$125.93	$128.37	38.70	40.35	$3.253	$3.181
Base 1947-49	10,700	27,100	$ 64.20	$ 63.11	44.83	44.10	$1.432	$1.431
1966-68	13,833	28,886	$146.91	$145.09	43.61	43.87	$3.369	$3.283

r Revised

1/ Arizona estimates of copper mining employees include all full and part-time wage and salary workers who worked or received pay during the pay period which includes the 12th of the month. Proprietors, self-employed, unpaid family workers, domestics, and members of the armed forces are excluded.

2/ The U.S. Figures are those reported for "All Employees".

3/ Estimates of hours and earnings of the Arizona Copper Mining Industry are based upon a sample of full and part-time production and related employees whose payroll and hours are reported for the pay period which includes the 12th of the month.

4/ The U.S. figures relate to Production workers in mining.

Sources: "Employment and Earnings and Monthly Report on the Labor Force," U. S. Department of Labor, Bureau of Labor Statistics; "Arizona Current Employment Development,"&"Arizona Average: Earnings and Hours in Selected Industries," both published by the Employment Security Commission of Arizona.

(continued)

TABLE XIII (continued)

Period	"E" Man Hours "A" x "C" x No. Weeks Arizona	"E" Man Hours "A" x "C" x No. Weeks U.S.	"F" Total Earnings "E" x "D" Arizona	"F" Total Earnings "E" x "D" U.S.	Average Earnings Per Man "F" ÷ "A" Arizona	Average Earnings Per Man "F" ÷ "A" U.S.
1965	33,235,384	67,478,320	$107,882,056	$212,556,708	$7,597	$7,109
1966	35,726,080	73,091,590	118,610,586	235,281,828	7,803	7,273
1967	27,025,440	52,837,850	89,670,410	170,719,093	7,350	7,099
Jan-July	21,153,217	43,225,381	70,905,583	141,736,024	7,764	7,424
Aug-Dec	6,273,174	10,426,863	20,513,279	32,990,595	6,781	6,654
1968	31,542,264	72,219,794	109,388,572	245,547,300	7,758	8,115
Jan-Mar	3,596,932	6,410,729	11,592,912	20,578,440	6,157	6,710
Apr-Dec	28,715,132	67,588,436	101,910,003	234,058,754	8,325	8,608
Strike) Aug 67) Mar 68)	9,870,106	16,837,592	$ 32,106,191	$ 53,569,035	$6,547	$6,675
Base 1947-49 Avg.)	24,943,412	62,145,720	$ 35,718,966	$ 88,930,525	$3,338	$3,282
1966-68)	31,369,371	65,895,898	$105,683,411	$216,336,233	$7,640	$7,489

Period	"G" Tons of Copper Ores Sold or Treated, Mine Production * In Short Tons Arizona	"G" Tons of Copper Ores Sold or Treated, Mine Production * In Short Tons U.S.	"H" Mine Production of Recoverable Copper * In Pounds Arizona	"H" Mine Production of Recoverable Copper * In Pounds U.S.
1966	101,558,298	186,966,042	1,359,481,200	2,499,863,100
1967	74,289,203	127,066,097	901,853,500	1,608,078,200
1968	101,293,963	170,054,065	1,146,313,600	2,055,156,700
1966-68 Avg.	92,380,488	161,362,068	1,135,882,767	2,054,366,000
Base 1947-1949	38,082,754	82,875,490	641,029,770	1,511,500,639

	Tons of Copper Ore * Produced Per Man Hour Arizona	Tons of Copper Ore * Produced Per Man Hour U.S.	Pounds of Copper * Produced Per Man Hour Arizona	Pounds of Copper * Produced Per Man Hour U.S.
1966-1968 Avg.	2.9449	2.4487	36.2099	31.1759
Base 1947-1949 Avg.	1.5268	1.3336	25.6994	24.3219
% Increase in 18 years	92.88	83.62	40.90	28.18
Increase per year	5.16	4.65	2.27	1.57

* Does not include copper precipitate source material or cement copper produced.

TABLE XIV

SUMMARY OF ESTIMATED COPPER MINING EMPLOYMENT, WEEKLY EARNINGS, WEEKLY HOURS, HOURLY EARNINGS, IN ARIZONA AND UNITED STATES, BY YEARS 1947 to 1968 INCLUSIVE

	NO. OF EMPLOYEES		WEEKLY EARNINGS		WEEKLY HOURS		HOURLY EARNINGS	
	Arizona[1]	U.S.[2]	Arizona[3]	U.S.[4]	Arizona[3]	U.S.[4]	Arizona[3]	U.S.[4]
1947	10,700	25,700	$ 59.40	59.27	45.0	44.8	$ 1.32	$ 1.32
1948	10,900	27,800	65.99	65.81	45.2	45.2	1.46	1.46
1949	10,500	27,300	66.98	63,96	44.3	42.3	1.512	1.512
1947-49 Avg.	10,700	27,100	$ 64.20	$63.11	44.83	44.1	$ 1.432	$ 1.431
1950	9,500	25,800	75.80	72.05	46.5	45.0	1.63	1.601
1951	10,100	25,900	83.01	78.37	47.7	46.1	1.74	1.70
1952	10,700	26,500	90.31	85.73	47.06	45.6	1.92	1.88
1953	11,400	28,600	96.03	91.60	46.73	45.8	2.055	2.00
1954	11,900	27,400	96.60	87.33	45.31	42.6	2.132	2.05
1955	11,800	27,200	104.90	95.70	47.0	44.1	2.232	2.17
1956	13,300	34,400	112.07	100.95	47.1	43.7	2.377	2.31
1957	14,000	32,500	106.22	98.23	43.8	41.1	2.425	2.39
1958	13,500	28,400	95.40	94.62	39.8	39.1	2.399	2.42
1959	11,100	22,400	108.15	106.25	42.8	42.5	2.526	2.50
1960	12,733	29,600	116.83	114.75	43.69	43.3	2.674	2.65
1961	13,117	27,000	126.29	119.03	44.8	43.6	2.817	2.73
1962	13,350	28,500	129.29	120.98	44.3	42.9	2.920	2.82
1963	13,393	27,800	133.81	124.48	44.6	43.1	3.003	2.89
1964	13,275	27,000	140.97	130.42	45.0	42.9	3.113	3.04
1965	14,200	29,900	146.11	136.71	45.0	43.4	3.246r	3.15
1966	15,200r	32,350r	150.06	142.26r	45.2	43.5	3.32	3.22
1967	12,200r	24,050r	141.46	136.59	42.6	42.3	3.32	3.23
1968	14,100	30,258	149.21	156.43	43.0	45.9	3.47	3.40

1/ See Footnote 1/ Table XIII
2/ See Footnote 2/ Table XIII
3/ See Footnote 3/ Table XIII
4/ See Footnote 4/ Table XIII

r - Revised

Sources: "Employment and Earnings and Monthly Report on the Labor Force", U.S. Department of Labor, Bureau of Labor Statistics; "Arizona Current Employment Development" and "Arizona Average: Earnings and Hours in Selected Industries," both published by the Employment Security Commission of Arizona.

TABLE XV

UNITED STATES COPPER MINING - OUTPUT OF COPPER ORE; AMOUNT AND VALUE OF COPPER, GOLD, AND SILVER RECOVERED THEREFROM[1/]

Year	Tons Copper Ore Annual Rate	Gold Ounces & Value	Silver Ounces & Value	Copper[2/] Pounds & Value	Pounds Copper Per Ton of Ore & Price [3/]	Value of Copper, Gold & Silver
1947 to 1949	82,875,491	479,589	7,785,382	1,511,500,640	18.2	
		$16,785,615	$7,045,770	$ 314,664,195	20.818¢	$338,495,580
1959	103,715,843	367,455	6,838,927	1,533,867,852	14.8	
		$12,860,925	$6,189,229	$ 478,290,674r	31.182¢r	$497,340,828r
1960	134,994,082	539,249	9,469,133	1,970,387,781	14.6	
		$18,873,715	$8,569,565	$ 631,568,395r	32.053¢r	$659,011,675r
1961	142,721,798	532,215	10,385,661	2,145,224,433	15.0	
		$18,627,525	$9,601,544	$ 641,872,603r	29.921¢r	$670,101,672r
1962	150,216,710	483,243	10,944,522	2,239,326,000	14.9	
		$16,913,505	$11,874,806	$ 685,233,756r	30.600¢r	$714,022,067r
1963	146,449,540	438,537	10,309,897	2,178,498,800	14.9	
		$15,348,795	$13,187,595	$ 666,620,633r	30.600¢r	$695,157,023r
1964	155,200,464	430,630	11,470,890	2,280,880,781	14.7	
		$15,072,050	$14,831,861	$ 688,734,761r	31.960¢r	$718,638,672r
1965	173,286,198	567,531	12,801,638	2,430,879,000	14.0	
		$19,863,585	$16,552,518	$ 851,220,899r	35.017¢r	$887,637,002r
1966	186,966,042	547,327	13,230,411	2,499,863,100	13.37	
		$19,156,445	$17,106,921	$ 904,200,483	36.170¢	$940,463,849
1967	127,066,097	321,398	8,351,423	1,608,078,200	12.66	
		$11,248,930	$12,942,033	$ 614,703,973	38.226¢	$638,894,936
1968	170,054,065	405,863	9,532,341	2,055,156,700	12.09	
		$15,934,506[4/]	$20,443,059	$ 860,021,424	41.847¢	$896,398,989

r Revised

1/ U. S. Bureau of Mines

2/ Does not include precipitate copper

3/ E & M J Annual Average Metal Prices, Domestic Refinery, E&MJ, Mar. 1969 p78.

4/ Calculated average annual price, $39.2608/Troy Ounce.

Arizona's Copper Industry

Ever since 1910, the mines of Arizona have produced each year more copper than any other state in the Union. In 1968, as in each of the previous 7 years the state has produced more copper than all of the other states combined. State records were made in each year from 1960 to 1966 when a tonnage of 739,569 was reached. 1968 production returned to within 85 percent of 1966 due to production at high levels, beginning in August, which offset some of the strike losses earlier in the year. A new record is expected for 1969.

1968 production amounted to 627,961 short tons valued at $525,566,000 and was 25 percent above the 1967 total of 501,741. Phelps Dodge Corporation's 4 mines accounted for 212,707 tons or 34 percent of the state's total. Data for the other large producers of the state is given in Table XIX.

The recoverable copper content of the Arizona copper ores (disregarding precipitate copper) has declined from 0.76 percent in 1959 to 0.57 percent in 1968, a drop of 25 percent. The ability to mine the present low grade ores is due to the greatly increased scale of mining, with improved, enlarged equipment and advanced technology, all enabled by huge investments of risk capital.

The value of Arizona's 1968 copper output was 85 percent of the total value of all minerals produced in the state. The copper ores also yielded all of the molybdenum output, worth $19,207,000 and practically all of the gold and silver, worth $3,769,000 and $10,633,000 respectively. The total of this copper, molybdenum, gold and silver from the copper mines is approximately $558 million or 90 percent of the total.

In spite of the strike, expansion plans of major producers were near or on schedule at the end of 1968. Anaconda Company's Twin Buttes and Duval Corporation's Sierrita large copper projects south of Tucson were scheduled to start production in late 1969. The projects called for stripping of 250 and 110 million tons respectively of overburden prior to mining of ore. Kennecott's Ray Mines Division nearly completed its $35 million copper silicate ore leaching project at Ray, and completed its companion project a 750 ton sulphuric acid plant at Hayden utilizing sulphur gases from the Kennecott smelter there. Inspiration completed its wire rod fabricating plant at Miami and became the state's first integrated, mine to semi-manufacture, copper operation. Magma Copper purchased for $27 million the Kalamazoo property adjacent to its San Manuel deposit, from Quintana Minerals, Ltd.; and announced a $100 million project of expansion at its Superior and San Manuel properties.

Arizona is expected to continue to be the greatest producer of copper in the United States, as the United States is expected to continue to be the greatest producer among the countries of the world.

TABLE XVI

ARIZONA COPPER MINING - OUTPUT OF COPPER ORE; AMOUNT AND VALUE OF COPPER, GOLD, SILVER, AND MOLYBDENUM RECOVERED THEREFROM 1/

Year	Tons of Copper Ore Annual Rate	Gold Ounces & Value	Silver Ounces & Value	(Thousands) Molybdenum 2/ Pounds & Value	Copper 3/ Pounds & Value	Pounds Copper Per Ton of Ore & Price 4/	Value of Copper, Gold, Silver & Molybdenum
1947 to 1949	38,082,754	79,612	2,603,485	474	723,353,767	19.0	
		$2,786,420	$2,356,154	$ 349 5/	$150,588,843	20.818¢	$156,080,417
1959	53,121,545	96,153	2,724,701	3,181	803,087,000	15.1	
		$3,365,355	$2,484,982	$4,019	$250,418,588	31.182¢	$260,287,925
1960	66,032,439	115,602	3,689,622	4,359	993,370,700	15.0	
		$4,046,070	$3,339,108	$5,211	$318,405,110r	32.053¢r	$331,001,288
1961	71,918,991	129,184	4,380,458	4,878	1,092,360,900	14.6	
		$4,521,440	$4,049,690	$6,232	$ 326,845,305r	29.921¢r	$ 341,648,435
1962	78,868,147	117,362	4,571,370	4,412	1,200,945,700	15.2	
		$4,107,670	$4,959,936	$5,864	$ 367,489,384r	30.600¢r	$382,420,990
1963	80,615,132	121,177	4,494,239	5,553	1,217,337,700	15.1	
		$4,241,195	$5,743,132	$7,584	$ 372,505,336	30.600¢	$390,073,663
1964	86,132,039	133,983	4,915,362	6,296	1,279,898,700	14.9	
		$4,689,405	$6,355,563	$9,532	$ 409,055,625r	31.960¢r	$429,632,593
1965	92,859,535	133,830	5,352,850	9,399	1,308,809,700	14.1	
		$4,684,050	$6,921,235	$15,880	$ 458,305,893r	35.017¢r	$485,791,178
1966	101,558,298	127,431	5,595,644	10,161	1,359,481,200	13.39	
		$4,460,085	$7,235,168	$17,812	$ 491,724,350	36.170¢	$521,231,603
1967	74,289,203	66,933	3,996,587	9,261	901,853,500	12.14	
		$2,342,655	$6,193,431	$15,385	$ 344,742,519	38.226¢	$368,663,605
1968	101,293,963	89,419	4,697,394	12,127	1,146,313,600	11.32	
		$3,510,661 6/	$10,074,031	$19,207	$ 479,697,852	41.847	$512,489,544

1/ U.S.Bureau of Mines

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2/ Molybdenum content of recovered concentrate.

3/ Does not include precipitate copper.

4/ E&MJ Annual Average Metal Prices, Domestic Refinery, E&MJ, Mar. 1969 p78.

5/ Calculated from values of molybdenum concentrates shipped from U.S.Mines, U.S.Bureau of Mines, Minerals Yearbook,1949.

6/ Calculated average annual price, $39.2608/Troy Ounce.

TABLE XVII

ARIZONA MINE PRODUCTION OF COPPER, LEAD, ZINC, GOLD AND SILVER

1858 - 1968 Incl. - In Terms of Recoverable Metals

	COPPER		LEAD		ZINC	
	Short Tons	Value (thousands)	Short Tons	Value (thousands)	Short Tons	Value (thousands)
1874 - 1967	21,721,671	$ 9,684,768	649,601	$ 128,578	1,015,354	$ 247,685
1968	627,961	525,566	1,704	450	5,441	1,469
Total 1874-1968	22,349,632	$ 10,210,334	651,305	$ 129,028	1,020,795	$ 249,154

	GOLD		SILVER		
	Ounces	Value (thousands)	Ounces	Value (thousands)	TOTAL VALUE
1858 - 1967	13,544,013	$ 361,550	398,092,809	$ 325,790	$ 10,808,609,000
1968	95,999	3,769	4,958,000	10,633	541,887,000
Total 1858-1968	13,640,012	$ 365,319	403,050,809	$ 336,423	$ 11,350,496,000

Est. Value of Other Metals & Non-Metallics Produced thru 1967	$ 813,039,000	
Est. Value of Other Metals & Non-Metallics Produced in 1968	75,662,000	
Est. Value of Metals & Non-Metals produced thru 1968		$ 888,701,000
Grand Total Estimated Value of Arizona Mineral Production thru 1968		$ 12,239,197,000

Source: U.S. Bureau of Mines.

TABLE XVIII

MINE PRODUCTION OF GOLD, SILVER, COPPER, LEAD AND ZINC IN ARIZONA, 1968, BY CLASSES OF ORE OR OTHER SOURCE MATERIALS, IN TERMS OF RECOVERABLE METALS *

	Number of mines 1/	Material sold or treated (short tons)	Gold (troy ounces	Silver (troy ounces)	Copper (pounds)	Lead (pounds)	Zinc (pounds)
Lode ore:							
Dry gold	1	73	68	65	600	- -	- -
Dry gold-silver	6	59,762	109	3,441	1,004,100	- -	- -
Dry silver	21	43,982	6	35,800	233,800	17,400	- -
Total	28	103,816	183	39,306	1,238,500	17,400	- -
Copper	44	101,293,963	89,419	4,697,394	1,146,313,600	- -	754,300
Copper-zinc	2	22,090	4	6,175	1,076,400	3,400	3,212,400
Lead	6	498	- -	2,999	2,700	90,500	500
Lead-zinc	2	98,566	5,274	186,506	161,200	3,270,300	6,885,500
Zinc	2	194	- -	89	200	1,900	27,700
Total	56	101,415,311	94,697	4,893,163	1,147,554,100	3,366,100	10,880,400
Other "lode" material:							
Gold-silver tailings	1	22,762	854	11,920	55,600	- -	- -
Silver tailings	1	22,071	135	7,909	72,300	- -	- -
Copper cleanup	2/	1,162	54	1,633	260,800	- -	- -
Copper precipitates	15	78,570	- -	- -	106,604,800	- -	- -
Lead cleanup, lead tailings, and uranium ore 3/	4/1	5/ 178	72	4,231	135,900	24,500	1,600
Total	18	124,743	1,115	25,693	107,129,400	24,500	1,600
Total "Lode" Material	87	101,643,870	95,995	4,958,162	1,255,922,000	3,408,000	10,882,000
Placer	1	- -	4	- -	- -	- -	- -
Total all sources	88	101,643,870	95,999	4,958,162	1,255,922,000	3,408,000	10,882,000

1/ Detail will not necessarily add to totals because some mines produce more than one class of material.
2/ From properties not classed as mines.
3/ Combined to avoid disclosing individual company confidential data.
4/ Excludes properties not classed as mines and the count of uranium mine from which copper and silver were recovered as byproducts.
5/ Excludes uranium ore tonnage.

* Source: U.S. Bureau of Mines.

TABLE XIX

COPPER PRODUCTION RECORD OF LARGE ARIZONA COPPER MINES

YEARS 1967 and 1968

	1967		1968	
	Tons Copper Ore Mined	Pounds Copper Recovered	Tons Copper Ore Mined	Pounds Copper Recovered
PHELPS DODGE:				
Morenci	11,051,857	136,288,341	15,474,029	190,550,991
Precipitate Copper		27,780,084		23,162,309
New Cornelia	6,078,092	80,236,846	9,018,377	117,087,616
Lavender Pit	3,175,540	35,054,211	4,715,382	42,519,649
Precipitate Copper		4,317,485		6,882,147
Copper Queen	386,166	28,745,488	622,597	44,808,595
Precipitate Copper		125,440		402,401
Sub-Total	20,691,655	312,547,895	29,830,385	425,413,708
KENNECOTT - Ray	4,947,755	69,458,480	6,746,163	89,071,942
Precipitate Copper		21,188,293		21,741,698
Sub-Total	4,947,755	90,646,773	6,746,163	110,813,640
MIAMI:				
Miami		8,726,235		11,076,950
Copper Cities	2,429,706	22,315,647	3,359,097	29,218,381
" " Dump Leach		2,792,459		4,355,962
Castle Dome		2,122,387		2,430,667
Sub-Total	2,429,706	35,956,728	3,359,097	47,081,960
INSPIRATION:	4,013,543	50,774,445	6,167,134	63,282,621
Precipitate Copper		3,478,498		6,441,542
Christmas Division	856,926	8,988,344	1,173,407	15,282,665
Precipitate Copper				---
Ox-Hide Mine				
Precipitate Copper			**1,070,230**	**743,763**
Sub-Total	4,870,469	63,241,287	8,410,771	85,750,591
MAGMA:				
San Manuel	7,891,854	107,925,695	11,367,640	144,148,653
Precipitate Copper				
Superior	219,510	19,100,841	333,607	29,412,021
Sub-Total	8,111,364	127,026,536	11,701,247	173,560,674

Continued

TABLE XIX (continued)

COPPER PRODUCTION RECORD OF LARGE ARIZONA COPPER MINES (Continued)

YEARS 1967 and 1968

	1967		1968	
	Tons Copper Ore Mined	Pounds Copper Recovered	Tons Copper Ore Mined	Pounds Copper Recovered
A. S. & R. CO:				
Silver Bell	3,807,300	44,717,114	3,907,900	43,665,411
Precipitate Copper		5,017,427		4,908,962
Mission Unit	4,603,600	71,428,849	6,009,700	76,118,920
Precipitate Copper				
San Xavier Unit				
Siliceous flux ore	2,447	27,195	41,873	397,197
Sub-Total	8,413,347	121,190,585	9,959,473	125,090,490
PIMA MINING CO:				
Pima	9,913,553	98,586,052	13,060,328	128,973,406
Precipitate Copper				none
Sub-Total	9,913,553	98,586,052	13,060,328	128,973,406
BAGDAD COPPER CORP:	2,090,601	25,683,196	2,099,223	22,218,258
Precipitate copper		11,065,786		14,258,460
Sub-Total	2,090,601	36,748,982	2,099,223	36,476,718
DUVAL:				
Esperanza	4,982,038	42,065,058	5,473,156	44,301,678
Precipitate Copper		6,132,419		4,477,979
Mineral Park	5,687,478	47,282,120	6,226,284	50,357,689
Precipitate Copper		7,004,597		7,051,189
Sub-Total	10,669,516	102,484,194	11,699,440	106,188,535
TOTALS	72,137,966	988,429,032	96,866,127	1,239,349,722
Other Copper Producers	2,236,744	15,052,968		
GRAND TOTAL	74,374,710	1,003,482,000		1,255,922,000r

Source: Company Reports. Grand Totals from U. S. Bureau of Mines.

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TABLE XX

SUMMARY OF TOTAL COVERED EMPLOYMENT & WAGES IN ARIZONA COPPER MINING

1948 - 1968 INCLUSIVE

COPPER MINING	Average No. Covered Employees	Covered Wages	Average Annual Wage	Average Weekly Wage	Tons Copper Ores
1948	11,493	$ 41,318,524	$ 3,595	$ 69.13	39,072,204
1949	11,001	40,612,224	3,692	71.00	37,365,611
1950	10,181	41,994,321	4,125	79.33	41,757,273
1951	10,754	47,825,698	4,447	85.52	42,784,388
1952	11,365	54,950,235	4,835	93.14	44,472,522
1953	12,068	62,742,982	5,199	99.98	45,187,838
1954	12,502	65,518,853	5,241	100.79	43,072,894
1955	12,399	71,293,263	5,750	110.58	52,189,728
1956	14,008	83,568,996	5,966	114.73	60,468,580
1957	14,652	85,125,320	5,809	111.71	59,571,834
1958	14,100	74,726,972	5,300	101.93	56,255,809
1959	11,568	72,095,130	6,232	119.85	53,121,545
1960	13,764	90,312,848	6,562	126.19	66,032,439
1961	14,275	97,271,286	6,814	131.04	71,918,991
1962	14,408	101,920,108	7,074	136.04	78,868,147
1963	14,303	104,291,588	7,292	140.23	80,615,132
1964	14,720	113,792,031	7,730	148.65	86,132,039
1965	15,239	122,163,124	8,016	154.16	92,859,535
1966[1/]	17,018r	137,187,611	8,061r	155.02r	101,558,298
1967	13,426	108,427,206	8,076	155.31	74,289,203
1968	15,734	136,089,579	8,649	166.33	101,293,963

r - Revised

Sources: Arizona Employment Security Commission and the U. S. Bureau of Mines

1/ Beginning with 1966, the number of covered employees includes the portion of copper smelter employees carried in Manufacturing.

TABLE XXI

AVERAGE NUMBER OF COVERED EMPLOYEES, TOTAL WAGES, AVERAGE ANNUAL WAGE AND AVERAGE WEEKLY WAGE

Base Period 1947-1949 and Years 1966, 1967 and 1968

ARIZONA INDUSTRIES COVERED BY SOCIAL SECURITY

	Average No. of Employees 1/	Total Wages	Average Annual Wage	Average Weekly Wage
		Base Period 1947-1949		
Copper Mining Only 2/	11,278	$ 39,432,008	$ 3,496	$ 67.23
Copper Smelting 3/	1,500	5,175,000	3,450	66.35
All Mining & Smelting	12,778	$ 44,607,008	$ 3,491	$ 67.13
Other Mining & Quarrying	1,592	4,913,010	3,085	59.33
All Mining,Quarrying & Smelting	14,370	$ 49,520,018	$ 3,446	$ 66.27
Manufacturing (Excl.Smelting)	12,639	36,910,624	2,920	56.15
Construction	10,844	35,424,826	3,267	62.83
Trans.& Utilities (Excl.R.R.s)	10,530	29,948,944	2,844	54.69
Wholesale - Retail Trade	36,213	91,916,860	2,538	48.81
Services (Misc. (Incl. Agri.)	18,643	43,103,526	2,312	44.46
TOTALS AND AVERAGES	103,239	$286,824,798	$ 2,778	$ 53.42
		YEAR 1966		
Copper Mining Only 2/	16,069	$ 130,130,488	$ 8,098	$ 155.73
Copper Smelting 3/	949	7,057,123	7,436	143.00
All Copper Mining & Smelting	17,018	$ 137,187,611	$ 8,061	$ 155.02
Other Mining & Quarrying	1,524	10,251,832	6,727	129.37
All Mining, Quarrying & Smelting	18,542	$ 147,439,443	$ 7,952	$ 152.92
Manufacturing (Excl. Smelting)	76,243	517,622,518	6,789	130.57
Construction	24,113	189,448,964	7,857	151.10
Trans. & Utilities (Excl.R.R.s)	22,249	151,780,720	6,822	131.19
Wholesale - Retail Trade	95,489	433,319,691	4,538	87.27
Services Misc. (Incl. Agri.)	68,702	322,389,754	4,693	90.25
TOTALS AND AVERAGES	305,338	$1,762,001,090	$ 5,771	$ 110.97

Source: Arizona Employment Security Commission

(Continued)

TABLE XXI (Continued)

	Average No. of 1/ Employees	Total Wages	Average Annual Wage	Average Weekly Wage
YEAR 1967				
Copper Mining Only 2/	12,761	$ 103,324,280	$ 8,097	$ 155.71
Copper Smelting 4/	665	5,102,926	7,674	147.58
All Copper Mining & Smelting	13,426	$ 108,427,206	$ 8,076	$ 155.31
Other Mining & Quarrying	1,363	9,646,675	7,078	136.12r
All Mining, Quarrying & Snelting	14,789	$ 118,073,881	$ 7,984	$ 153.54
Manufacturing (Excl.Smelting)	78,011	554,221,621	7,104	136.62
Construction	23,535	190,096,812	8,077	155.33
Trans. & Utilities (Excl.R.R.s)	22,990	162,796,174	7,081	136.17r
Wholesale - Retail Trade	98,117	463,417,889	4,723	90.83
Services Misc. (Incl. Agri.)	71,117	349,470,467	4,914	94.50
TOTALS AND AVERAGES	308,559	$1,838,076,844r	$ 5,957r	$ 114.56r
YEAR 1968				
Copper Mining Only 2/	14,906	$ 129,262,538	$ 8,672	$ 166.77
Copper Smelting 5/	828	6,827,041	8,245	158.56
All Copper Mining & Smelting	15,734	$ 136,089,579	$ 8,649	$ 166.33
Other Mining & Quarrying	1,179	8,693,338	7,373	141.79
All Mining, Quarrying & Smelting	16,913	$ 144,782,917	$ 8,560	$ 164.62
Manufacturing (Excl. Smelting)	83,555	625,968,789	7,492	144.08
Construction	26,680	224,007,626	8,396	161.46
Trans. & Utilities (Excl.R.R.s)	23,851	178,990,171	7,505	144.33
Wholesale - Retail Trade	102,655	510,816,657	4,976	95.69
Services Misc. (Incl. Agri.)	76,600	400,111,753	5,223	100.44
TOTALS AND AVERAGES	330,254	$2,084,677,913	$ 6,312	$ 121.38

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1/ This number includes all covered employees on payroll, and is not restricted to production workers only, on which the average hourly and weekly earnings report.
2/ This number includes all copper mining and milling employees and some copper smelting employees not reported under Manufacturing by the Employment Security Commission.
3/ Smelting Employment has been segregated from Manufacturing as reported by the Employment Security Commission.
4/ Total covered Smelting Employees - 1,265 in 1967.
5/ Total covered Smelting Employees - 1,558 in 1968.

TABLE XXII

MINERAL PRODUCTION IN ARIZONA IN 1968[1/]

	Quantity	Value (Thousands)
Clays . . . . . Thousand short tons	77	$ 347
Coal (Bituminous) . . . . . thousand short tons	W	W
Copper(recoverable content of ores, etc.) short tons	627,961	525,566
Gem stones	NA	149
Gold(recoverable content of ores, etc.) . . . troy ounces	95,999	3,769
Helium [2/] . . . . . thousand cubic feet	64,800	1,600
Iron Ore (usable) . . . thousand long tons, gross weight	16	124
Lead (recoverable content of ores, etc.). . . short tons	1,704	450
Lime . . . . . thousand short tons	260	4,561
Mercury . . . . . 76-pound flasks	192	103
Molybdenum (content of concentrate) thousand pounds	12,127	19,207
Natural gas (marketed). . . . . million cubic feet	881	142
Petroleum (crude) . . . . . thousand 42-gallon barrels	3,370	9,606
Pumice . . . . . thousand short tons	1,033	974
Sand and Gravel . . . . . thousand short tons	13,981	14,423
Silver(recov. content of ores,etc.) " troy ounces	4,958	10,633
Stone . . . . . thousand short tons	3,293	6,239
Tungsten concentrate (60% WO_3 basis) short tons	1	3
Uranium (recoverable content U_3O_8) thousand pounds	295	1,923[3/]
Zinc (recoverable content of ores,etc.) short tons	5,441	1,469
Value of items that cannot be disclosed: Asbestos, cement, diatomite, feldspar, gypsum, mica (scrap), perlite, pyrites, vanadium, vermiculite, zeolite, and values indicated by sympol W	XX	16,261
Total	XX	$ 617,549
Total 1957-59 constant dollars	XX	464,544[p/]

NA - Not Available XX - Not applicable p/ Preliminary
W - Withheld to avoid disclosing individual company confidential data; included with "Value of items that cannot be disclosed".

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
2/ Bureau of Mines estimate from non-company sources.
3/ Estimated based on $8.00 per pound for sales to the Atomic Energy Commission and an assumed price of $6.50 per pound for commercial sales.

Source: U. S. Bureau of Mines