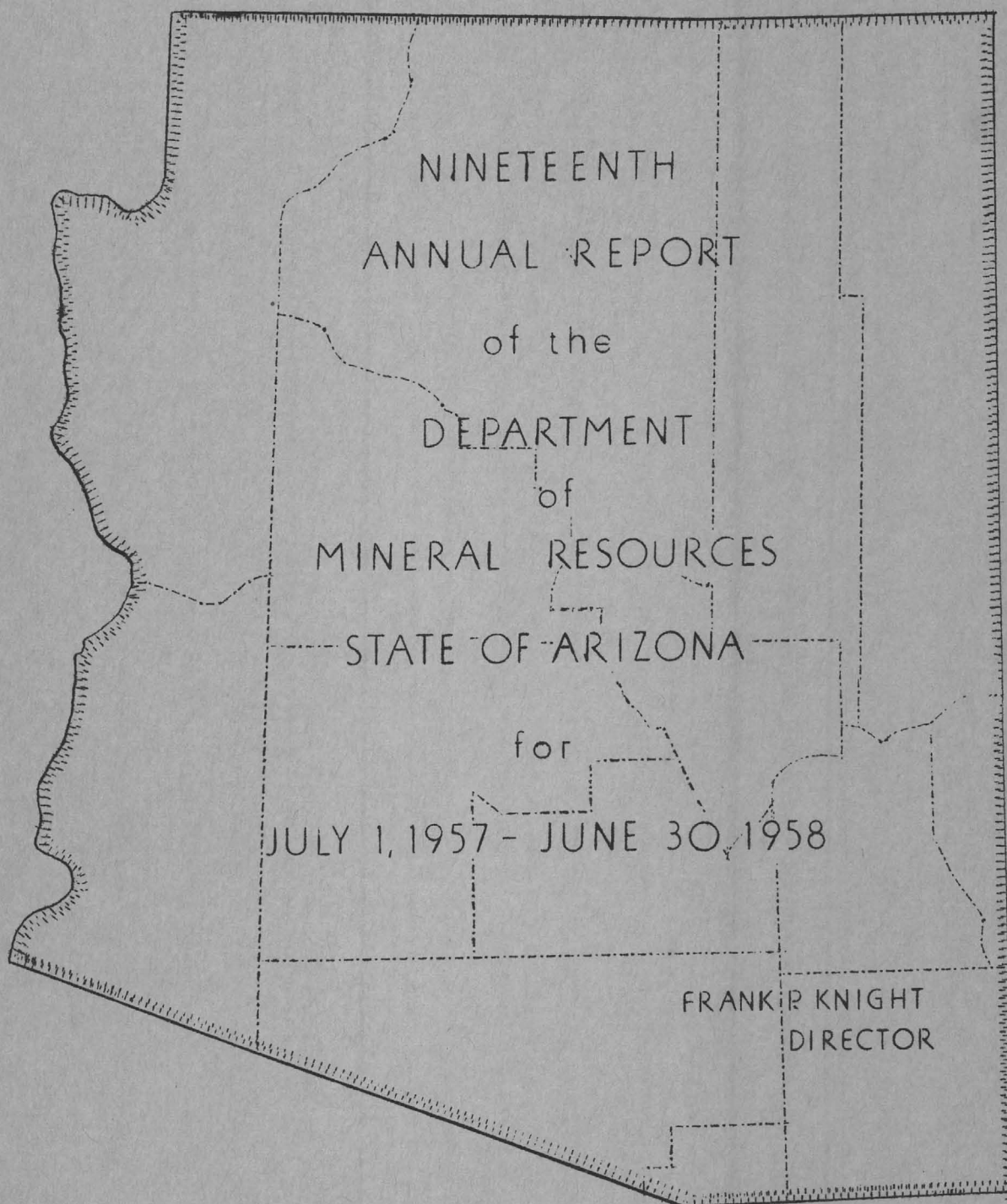


OFFICIAL FILE



DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

BOARD OF GOVERNORS:

Charles F. Willis, Phoenix - Chairman  
(term expires January 31, 1961)

T. J. Long, Globe  
(term expires January 31, 1962)

Stanley M. Secrist, Tucson  
(term expires January 31, 1960)

Raymond L. Dye, Kingman

PERSONNEL:

Frank P. Knight - Director  
W. C. Broadgate - Special Assistant  
A. L. Flagg - Museum Curator  
Travis P. Lane - Field Engineer, Northern District  
Axel L. Johnson - Field Engineer, Southern District  
Lewis A. Smith, Field Engineer, Central District  
Frank J. Tuck - Statistical Engineer  
Mrs. Glenn W. Pare - Administrative Assistant  
Mrs. George L. Dunagan - Stenographer  
Mrs. Pauline L. Halloren - Secretary

OFFICES:

Mineral Building, State Fairgrounds, Phoenix  
(Main Office)

Chamber of Commerce Building, Tucson  
(Branch Office)

The many favors of the Tucson Chamber of Commerce, including the use at no cost to the State of its office space, are gratefully acknowledged.

To the Honorable Ernest W. McFarland  
Governor of Arizona  
Capitol Building  
Phoenix, Arizona

Dear Governor McFarland:

I am pleased to submit herewith the Annual Report  
of the Department of Mineral Resources covering  
the fiscal year 1957-1958.

Respectfully,

*Frank P. Knight*

FRANK P. KNIGHT,  
Director

EXCERPTS FROM THE LAW CREATING THE ARIZONA

DEPARTMENT OF MINERAL RESOURCES

"Aid in the promotion and development of the mineral resources of the State.

Conduct studies of the economic problems of prospectors and operators of small mines with a view to assisting in their solution.

Assist in discovering sources of supply for persons desiring to buy minerals.

List and describe available mining properties.

Make mineral resource surveys and conduct such other investigations as may interest capital in the development of the State's mineral resources.

Serve as a bureau of mining information in conjunction with the Arizona Bureau of Mines.

Publish and disseminate such information and data as may be necessary or advisable to attain its objectives.

Cooperate with the State Land Department to encourage mining activity on state lands.

Cooperate with the Corporation Commission in its investigations and administration of laws relating to the sale of mining securities.

Cooperate with the Arizona Bureau of Mines, and turn over to said Bureau such problems as the field work of the division may show to be within the scope of the activities of said Bureau.

Cooperate with federal and other agencies having for their purposes the development of mines and minerals.

Work against all congressional acts favoring reciprocal or duty free imports of foreign materials.

Do such other things as may assist the more extensive exploration and development of the Mineral Resources of the State."

Based on U. S. Bureau of Mines reports for 1957 output, Arizona ranked first in copper production in the United States (including Alaska), as it has done for the last forty-eight years. It ranked third in silver, fifth in gold, sixth in zinc and seventh in lead. It's relative standing among Western states is shown on the next page.

Arizona production and value of the five principal metals in 1957 were as follows: (final figures)

515,854 tons copper	@	30.1 ¢/lb	\$ 310,544,108
12,441 tons lead	@	14.3 ¢/lb	3,558,126
33,905 tons zinc	@	11.6 ¢/lb	7,865,960
152,449 ozs gold	@	\$35.00/oz	5,335,715
5,279,323 ozs silver	@	90.5+¢/lb	4,778,054
			<hr/>
			\$ 332,081,963
			<hr/>

This compares with the following actual figures for 1956:

505,908 tons copper	@	42.5 ¢/lb	\$ 430,021,800
11,999 tons lead	@	15.7 ¢/lb	3,767,686
25,580 tons zinc	@	13.7 ¢/lb	7,008,920
146,110 ozs gold	@	\$35.00/oz	5,113,850
5,179,185 ozs silver	@	90.5+¢/oz	4,687,424
			<hr/>
			\$ 450,599,680
			<hr/>

# ARIZONA'S METAL PRODUCTION

Source: United States Bureau of Mines

	GOLD ozs.	SILVER ozs.	COPPER lbs.	LEAD lbs.	ZINC lbs.	TOTAL VALUE
1948	109,487	4,837,740	750,242,000	59,798,000	108,956,000	\$ 196,207,948
1949	108,993	4,790,736	718,020,000	67,136,000	141,316,000	177,894,134
1950	118,313	5,325,441	808,602,000	52,766,000	120,960,000	201,033,694
1951	116,093	5,120,985	831,740,000	34,786,000	105,998,000	235,289,045
1952	112,355	4,701,330	791,438,000	33,040,000	94,286,000	220,686,278
1953	112,824	4,351,429	787,050,000	18,856,000	55,060,000	242,572,489
1954	114,809	4,298,811	755,854,000	16,770,000	42,922,000	237,818,952
1955	127,616	4,634,179	908,210,000	19,634,000	45,368,000	355,928,786
1956	146,110	5,179,185	1,011,816,000	23,998,000	51,160,000	450,599,680
1957	152,449	5,279,323	1,031,708,000	24,882,000	67,810,000	332,081,963

## RELATIVE 1957 PRODUCTION

	United States	Arizona	Arizona %	Arizona's Place	Leading State in the U.S.A. State	Production
Gold - ozs.	1,768,624 P	152,449	8.62	5th	So. Dakota	556,400 P
Silver - ozs.	37,895,336 P	5,279,323	13.93	3rd	Idaho	15,067,420
Copper - tons	1,086,141	515,854	47.50	1st	Arizona	515,854
Lead - tons	338,216	12,441	3.68	6th	Missouri	126,345
Zinc - tons	531,735	33,905	6.38	5th	Tennessee	58,063

P - Preliminary

MINERAL PRODUCTION<sup>1/</sup> OF LARGE AND SMALL MINING COMPANIES IN ARIZONA IN 1957\*

Large Mining Companies:<sup>2/</sup>

		<u>Production</u>	<u>Value</u>
Copper	(lbs)	1,029,000,000	\$ 309,729,000
Gold	(ozs)	123,000	4,305,000
Silver	(ozs)	4,000,000	3,620,000
Molybdenum	(lbs)	2,385,000	3,071,000
TOTAL VALUE OF LARGE MINE PRODUCTION		- - - -	\$ 320,725,000

Small Mining Companies:

Copper	(lbs)	2,708,000	815,108
Gold	(ozs)	29,449	1,030,715
Silver	(ozs)	1,279,323	1,158,054
Lead	(lbs)	24,882,000	3,558,126
Zinc	(lbs)	67,810,000	7,865,960
Manganese concentrate (35% or more Mn)(long tons)		80,000	6,626,000
Tungsten concentrate (60% WO <sub>3</sub> basis)(short tons)		5	8,000
Beryllium concentrate		5	2,000
Mercury (76-pound flask)		28	7,000
Uranium ore (tons)		286,000	6,277,000
Vanadium (recoverable content of ores, etc)(lbs)		81	5/
Lime (short tons)		138,000	2,127
Clays <sup>3/</sup> (short tons)		118,000	177,000
Mica (scrap) (short tons)		2,000	17,000
Perlite (short tons)		16,000	114,000
Pumice (short tons)		397,000	640,000
Sand & Gravel (short tons)		10,287,000	9,222,000
Stone (short tons)		2,101,000	2,982,000
Coal (short tons)		9,000	63,000
Gem Stones		4/	75,000
Gypsum (short tons)		5/	5/

Value of items that cannot be disclosed:

Asbestos, bentonite, cement, feldspar, fluorspar(1957), nitrogen compounds (1957), pyrites (1957), and values indicated by footnote 5/.

					10,441,000
TOTAL VALUE OF SMALL MINE PRODUCTION	<sup>6/</sup>	-	-	-	\$ 51,916,000

GRAND TOTAL VALUE OF MINERAL PRODUCTION	<sup>6/</sup>	-	-	-	\$ 372,641,000
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PERCENTAGE DUE TO SMALL MINES	-	-	-	-	13.93%
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<sup>1/</sup> Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

<sup>2/</sup> Large copper Producers: Phelps Dodge, Kennecott, Inspiration, Miami, Copper Cities, Magma, San Manuel, A.S.&R.Co's Silver Bell Mine, Pima, and Bagdad.

<sup>3/</sup> Excludes bentonite; value included with "Items that cannot be disclosed".

<sup>4/</sup> Weight not recorded

<sup>5/</sup> Figure withheld to avoid disclosing individual company confidential data; value included with "Items that cannot be disclosed".

<sup>6/</sup> Total has been adjusted to eliminate duplication in the value of raw materials used in the manufacture of cement and lime.

\* Compiled from U.S.Bureau of Mines Area Report, July 23, 1958.

As of February 15, 1958, according to the Department's field engineers, there were 174 active mines - mills and - smelters in the State. 133 of the mines were classed as metal and 41 as non-metallic mineral producers. Of the non-metallic producers, 11 were asbestos. Of the metal producers, 39 were copper, 20 were lead-zinc, 29 were manganese, and 26 were uranium. Many of these metal mines produced more than one metal.

During the year 1957, the State Mine Inspector reported inspection of 41 copper mines, 17 copper combined with lead or zinc, 12 lead and/or zinc mines, 28 uranium or uranium-vanadium mines, 20 manganese mines, 9 asbestos mines, 5 other metallic mines and 15 other non-metallic mines - total 147.

The United States Bureau of Mines reports production during the calendar year 1957 from 67 copper mines, 6 copper-lead-zinc, 4 copper-zinc, 21 lead, 8 lead-zinc and 2 zinc mines.

The Arizona Employment Security Commission reported for 1957 that there were employed in mining and quarrying a total of 17,072 covered employees with a total payroll of \$96,566,625 and an average annual wage of \$5,656. Smelting employment brought the grand total payroll to \$107,318,681, with an average of 18,973 covered employees, earning an average of \$5,656 per year. Fringe benefits are not included in these figures, but are estimated to amount to 18-20 percent of the regular payroll.

### Copper

The fiscal period of this report began July 1, 1957 and saw the producers' price for copper drop from 29½ cents to 28.5 cents on August 7th; to 27 cents on September 3rd; and to 25 cents on January 13, 1958. The producers maintained their 25 cent price for the remainder of this fiscal period, though custom smelters offered copper as low as 23½ cents, and foreign copper sold from two to five cents lower than the prices at which domestic producers were offering their copper.

Domestic mine production of copper has dropped to about 65 percent of capacity, but the curtailment so far has not had much market effect, except possibly to prevent an even more drastic decline in the price.

This Department early in the fiscal year, at the request of the Copper Tariff Board, compiled over 130 pages of historical data and special articles relating to the copper industry, showing the need for a copper tariff.

Bills were introduced in Congress, sponsored by 14 Senators and 17 Representatives, calling for a 4-cent tariff and a 30 cent peril point, but they were side-tracked by the Administration's proposals for purchasing 150,000 tons of copper for the government stockpile, which was defeated in the House of Representatives in August, 1958.

On July 1, 1958, a copper tariff of 1.7 cents per pound was reinstated automatically at the end of a seven year suspension period. The President has been asked to exercise his power to increase this tariff to further relieve the distress in the industry.

The fiscal year saw completion of the Kennecott smelter at Hayden, a part of the \$40 million expansion program of the Ray Mines Division; completion of the L-P-F circuit in the Miami mill; other metallurgical developments in oxide ore treatment at Bagdad and elsewhere; and considerable progress in the major development of the Esperanza mine in Pima County.

### Lead-Zinc

Lead had declined to 14 cents by the end of June, 1957; to 13.5 cents in the middle of October; and to 13.0 cents in December. The price held steady at 13.0 cents until April, 1958, when it declined to 12.0 cents; to 11.5 cents by the middle of May; and to 11.0 cents early in June; but it rebounded to 11.5 cents on June 19th, and remained at that figure until the end of the fiscal year.

Zinc was at 10.0 cents July 1, 1957, and remained at that price throughout the fiscal year.

On September 27, 1957, the Emergency Lead and Zinc Committee, representing a large segment of the domestic lead and zinc industry, petitioned the Tariff Commission for relief under the "escape clause" provision of the Trades Agreements Extension Act of 1951. This Department assisted in the preparations for this case, and after a long and thorough investigation, the Tariff Commission reported favorably for tariff increases on both metals. However, in spite of the fact that the President had recommended to the industry that they seek relief through this process, he failed to act on the Tariff Commission's recommendation; and, after long delay, came up with the minerals price stabilization plan. The fiscal year ended with no Government action to relieve the distress of the domestic lead-zinc industry, which is being forced to the wall by imports of low cost foreign production.

Events during the year 1957 that affected the lead-zinc industry of the state included the suspension of operations in June at the San Xavier mine by McFarland & Hullinger, closing of the Head Center mine (operated by the Athletic Mining Company) in July, and shutdown of the American Smelting & Refining Company Trench Unit operations in October. The state's principal producer, the Iron King Mine, operated by Shattuck-Denn Mining Corporation, was active throughout the year. Coronado Copper & Zinc closed its Johnson Camp Unit copper-zinc operations in August, 1957, and Cyprus Mines Corporation closed its Big Dick mine.

It is interesting to note that of the 29 active lead-zinc producers in operation in January 1, 1957 and employing 895 men, there were only 4 in operation July 28, 1958, employing 275 men. These mines are the following: Flux-Trench, 28 men; Glove, 15 men; Iron King, 205 men; and San Xavier, 27 men.

### Asbestos

Near the start of the fiscal year, Congress appropriated \$2,500,000 for continued buying of asbestos until July 1, 1958. The industry did not produce enough asbestos to use up these funds before that date and the time was extended to December 31, 1958, termination date for Public Law 733, under which asbestos purchases have been made. A bill to extend the asbestos and acid grade fluorspar purchase program to December 31, 1959 passed both houses but was vetoed. Asbestos production is expected to fall off when Government support ends.

### Manganese

Arizona production of manganese nearly doubled in 1957 with 80,000 tons of ore and concentrates reported by the U. S. Bureau of Mines compared to 42,000 tons in 1956. 1957 value was \$6.6 million and 1956 grossed \$3.5 million. There were 40 mines operated, half of them in either Maricopa or Yuma Counties. All production was marketed under the Government "carlot" program. The quota under this program is expected to be filled in the last half of 1959. Bills introduced to extend the program failed to pass Congress. The industry is not expected to be able to continue without Government support.

### Tungsten

Arizona's tungsten mines remained closed during the fiscal year. Attempts to obtain Government support failed.

### Uranium

The United States Bureau of Mines reported Arizona uranium production as 286,037 tons of ore containing 1,510,644 pounds of  $U_3O_8$ , with a value at the mines of \$6,276,969. The Gila County mines remained idle following the closing of the Cutter buying depot. There was considerable prospecting activity just south of the Santa Maria river near the west border of Yavapai County, but uranium production during the fiscal year was almost entirely from the Navajo Indian Reservation, in the Cameron and Four Corners areas.

### Mercury

Small production of mercury continued in the area north and east of Sunflower. Government buying of mercury ends with 1958 and efforts to obtain extensions beyond this have failed so far.

### Iron

Testing of the extensive magnetite sands southeast of Florence continued into 1958 and results were reported to be encouraging.

### Other Minerals

Arizona in 1957 produced gold, silver and molybdenum totalling \$13,185,000 in value. These metals were mostly by-products of the copper industry.

Sand, gravel, stone and lime totalled \$14,331,000 in value of 1957 output.

Other minerals including natural gas, totalled \$11,536,000.

The United States Bureau of Mines, Area Report D-74 (The Mineral Industry of Arizona, 1957) released July 23, 1958, gives interesting details about the production of minerals in Arizona.

Exploration activity fell off during the fiscal year, although that for copper continued to be considerable, especially in the Pima area south of Tucson and the area north of Safford.

This department during the year furnished to Arizona members of Congress, the Copper Tariff Board and Congressional Committees, pertinent mining information. Department personnel testified before such committees and cooperated with various mining organizations and parties in efforts to assist the depressed mining industry.

Unfortunately neither the serious market effect of imports of low cost foreign metals, nor the fact that the domestic mining industry is faced with increasingly large, excess foreign productive capacity of such low cost metals, could convince Congress of the need of import control or the House of Representatives of the need of the alternative, Government support. Efforts to secure favorable legislation to save important segments of Arizona mining must and will be continued when the new Congress convenes. In this connection, the experience and work of W. C. Broadgate will continue to be very valuable to Arizona mining.

This department will continue to cooperate with others in endeavors to arrive at and secure a long range minerals program adequate to preserve the domestic mining industry which is essential to national security and welfare. The Director is a member of the Western Governors Mining Advisory Council and of the Strategic Minerals Committee of the American Mining Congress. His activities, however, will be restricted by budget reduction of out-of-state travel allowance. During the past year he twice testified before the Sub-Committee on Minerals, Materials, and Fuels of the Committee on Interior and Insular Affairs of the Senate at Washington. Available funds will not allow such appearances during the 1958-59 year.

The department field engineers continued their valuable services to the small miners and prospectors. Two replacements were made during the year. The field engineers are competent and of wide experience. Their advice not only is helpful to successful enterprise, but also results in large savings to those who ill-advisedly undertake development of uneconomic or even worthless properties. The engineers keep in contact with and serve mining in the various ways prescribed by the law governing the Department's activities. During the year they travelled 40,065 miles, attended 169 meetings, made 227 mine visits and held 429 field conferences. While at their offices, they interviewed many of the Department's 2170 visitors, and answered several hundred each of mail and telephone inquiries.

The Department published revisions of booklets "Mining in Arizona" and "Uranium in Arizona". It also had printed another 1,000 copies of "Laws and Regulations Governing Mineral Rights in Arizona" because approximately 2,500 of the initial 3,000 copies were issued during the fiscal year. This book has proven to be of sufficient value to warrant revision at about two year intervals to bring it up to date.

The office staff made considerable progress in card indexing the voluminous mining information in the department's files and library. It also sent out requests for recent information about properties whose data antedated 1952.

Idle mine workings flood and cave. The cost of lost engineering, geological and assay data on such workings runs into millions in this state alone and this department's files are consulted daily for data preserved in them.

The statistical department issued the following reports. Its mailing list consists of over two hundred companies, legislators, agencies, banks, newspapers, individuals and libraries.

Review of the Copper Industry in 1956 & 1st Half of 1957 - Arizona's Production Record in the Picture

Arizona's part in Combined Lead-Zinc Production of the United States.

Review of Zinc Industry in 1956 and 1st Half of 1957

Review of Lead Industry in 1956 and 1st Half of 1957

Revision of April "Copper Tariff" Discussion

Some Comments on the Defense Minerals Production Administration Program

Revision of June Report on Repeal of "Silver Purchase Act of 1934"

Final Valuations of All Properties Assessed to Producing Mining Companies for the year 1957.

Brochure on the Copper Industry:  
Historical Data and Special Articles Relating to the Copper Industry,  
Showing Need for a Copper Tariff.

Salient Statistics of the Copper Industry

Salient Statistics of the Lead Industry.

Salient Statistics of the Zinc Industry

Preliminary Estimate of Copper, Lead, Zinc, Gold and Silver Production  
In Arizona and United States in 1957.

Mine Production of Gold, Silver, Copper, Lead and Zinc in Arizona in the  
Year 1956, by Class of Ore, in Terms of Recoverable Metals.

Table 1 - Mineral Production in Arizona - 1956 & 1957 (preliminary)

Table 2 - Average Prices of Selected Mineral Commodities in Arizona  
1956-57.

Table 3 - Showing Comparative Mineral Production of Large and Small  
Mining Companies in Arizona in 1957.

Table 4 - Mine Production of Uranium Ore in Arizona during 1956

Devalued Foreign Currencies Used as Trade Weapon to Undersell Copper  
Produced in the United States - Appendix.

Arizona Mine Production of Copper, Lead, Zinc, Gold and Silver - 1853-  
1956 Inclusive & Preliminary in 1957 - in terms of Recoverable Metals.

Estimated Employment, Weekly Hours, Hourly & Weekly Earnings in Arizona  
Copper Mining, by years from 1951 to 1956 Inclusive & by Months in 1957.

Summary of Refined Copper Statistics Reported by Members of the Copper  
Institute - by Months & 6-Month Periods.

Addendas # 1 and # 2 to the Copper Tariff Brochure

Wage Statistics and Copper Output of Arizona Copper Mines.

Salient United States Copper Statistics for 1957

Salient United States Zinc Statistics for 1957

Salient United States Lead Statistics for 1957

There were 11,400 visitors to the Mineral Museum during the fiscal year, excluding the estimated 18,000 during the State Fair. 885 school children attended museum classes and lack of transportation prevented many others from attending. 1,966 persons attended the regular and special meetings held in the Mineral Building. 61 new mineral specimens were acquired during the year and over 600 have been added in the past five years. Curator, A. L. Flagg sent out 607 mineral kits to school children throughout the country who sent in their requests and postage money. He also answered over 1,100 inquiries regarding minerals. The museum continued to be supported by the larger copper companies.

There was returned to the General Fund about the same amount as at the end of 1956-1957, and again it came principally from the travel allowance. The replacement of the director and a field engineer in 1956-57 and of two field engineers in 1957-1958 resulted in break-in periods of reduced travel. Reduced small mine activity in the last fiscal year also required less travel. Full travel allowance to take care of normal needs and to provide for sudden increases in mining activity, especially in the event of war, or boom such as occurred in uranium mining, should be continued.

FINANCIAL STATEMENT\*

DEPARTMENT APPROPRIATION

\$ 72,677.00

EXPENDITURES:

Personal Services	\$ 54,046.81
Travel - State	5,829.91
Travel - Out of State	500.00
Current Expenditures:	
Utilities	876.38
Tel & Tel	1,147.42
Postage	700.80
Bldg & Equip Mtnc	959.57
Printing	1,489.02
Supplies: Office, Janitor, Eng'r, etc	1,435.64
Fixed Charges	124.01
Subscriptions & Org. Dues	41.00
Capital Outlay	<u>492.20</u>

\$ 67,642.76

TOTAL EXPENDITURES

\$ 67,642.76-

Returned to General Fund

\$ 5,034.24

Deposits: Sale of Regulations Booklets and  
Copper Stories Booklets (out-of-state)

\$ 157.70

MUSEUM ACCOUNT

BALANCE BROUGHT FORWARD  
DEPOSITS

\$ 2,522.41  
1,500.00  
\$ 4,022.41

EXPENDITURES:

Personal Services	\$ 2,798.05
Employer's Share OASI & St. Retirement	154.68
Signs, etc.	<u>353.26</u>
	\$ 3,305.99

TOTAL EXPENDITURES

\$ 3,305.99-

Carried Forward

\$ 716.42

\* Fiscal Year 1957-1958