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Department of Mineral Resources

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OFFICES:

Mineral Building, State Fairgrounds, Phoenix 7. (Main Office)

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Honorable Paul Fannin Governor of Arizona Capitol Building Phoenix, Arizona

Dear Governor Fannin:

The Annual Report of the Department of Mineral Resources, covering the fiscal year July 1, 1961 to June 30, 1962 is submitted herewith.

Respectfully yours,

Frank P. Knight
FRANK P. KNIGHT,

Director.

POWERS AND DUTTES

OF THE

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 for the purpose of 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 other investigations which 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 information and data 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 deliver to the bureau problems which the field work of the division shows to be within the scope of the activities of the bureau.

Cooperate with federal and other agencies designed to develope mines and minerals.

Oppose congressional acts favoring reciprocal or duty free imports of foreign minerals.

Use its authority in other ways to assist in more extensive exploration and development of the mineral resources of the state".

ARIZONA MINING

PRODUCTION

Based on U. S. Bureau of Mines reports for 1961 output, Arizona ranked first in copper production in the United States (including Alaska), as it has done since 1910. It ranked 2nd in silver, 6th in zinc, 3rd in gold and 6th in lead.

Arizona production and value of the five principal metals in 1961, as reported by the U. S. B. M., were as follows:

587,053 tons copper 5,937 tons lead 29,585 tons zinc 145,959 ozs. gold 5,120,007 ozs. silver	@ @	\$ 30.0 ¢/1b 10.34¢/1b 11.54¢/1b 35.00 /oz 92.444 ¢/oz	\$ 352,232,000 1,223,000 6,804,000 5,109,000 4,733,000
			\$ 370,101,000

This compares with the following final figures for 1960:

538,605 8,495 35,811 143,064 4,774,992	tons tons ozs.	lead zinc gold	6 6666	32.1 ¢/lb 11.7 ¢/lb 12.9 ¢/lb 35.00 /oz 90.5 + ¢/oz	\$ 345,784,000 1,988,000 9,239,000 5,007,000 4,322,000
4,774,992	ozs.	silver	æ	90.5 + ¢/oz	4,322,000 \$ 366,340,000

Following are tables showing:

- 1. Mineral Production of Large and Small Producers in Arizona in 1961.
- 2. Arizona Metal Production with ten year figures for the five principal metals.
- 3. Relative 1961 Production in the United States for the five principal metals.
- 4. Copper, Gold, Silver, and Molybdenum Recovered from Mines in Arizona in 1959, 1960, and 1961.

MINERAL PRODUCTION OF LARGE AND SMALL PRODUCERS IN ARIZONA IN 1961 $\frac{1}{2}$

Source: U.S.B.M. Area Report III-40

LARGE COPPER PRODUCERS:* Copper (lbs.)	PRODUCTION 1,154,222,501 129,184 4,380,455 4,878,000	\$ 346,266,750 4,521,440 4,049,293 6,232,000
Total Value of Large Mine Production in 1961		\$ 361,069,483
SMALL MINERAL PRODUCERS: Beryllium concentrates . short tons, gross weight	8	\$ 4,000
Clays 3/ thousand short tons Copper (recoverable content of ores etc.) lbs Gem stones	165 19,883,499 <u>4</u> / 16,775	240,000 5,965,250 119,000 587,560
Iron ore (usable) Long tons, gross weight Lead (recoverable content of ores etc.)short tons Lime	246 5,937 167,000 <u>2</u> /	$\frac{2}{1,223,000}$ $\frac{2}{686,000}$
Mercury	148 <u>5</u> / 67 745	$2\overline{9},000$ $2/$ 1,89 $\overline{3},000$
Sand and gravel thousand short tons Silver (recoverable content of ores etc.) thousand troy ounces	21,953	24,706,000 683,707
Stone thousand short tons Uranium ore short tons Zinc (recoverable content of ores etc.)short tons Value of items that cannot be disclosed: Asbestos,	3,582 228,225 29,585	4,626,000 4,965,000 6,804,000
cement, clays (bentonite & fire clay), diatomite, feldspar, gypsum, helium, mica(scrap), perlite, pyrites, vanadium, and values indicated by footnote 2/		18,910,000
Total Value of Small Mine Production $\underline{6}/$		\$ 71,544,517
GRAND TOTAL VALUE OF MINERAL PRODUCTION		\$ 432,614,000
PERCENTAGE DUE TO SMALL MINES		16.54%

^{*} Phelps Dodge, Kennecott, Inspiration, Miami, Magma (incl. San Manuel) Asarco's Silver Bell, Pima, Bagdad, Duval's Esperanza and Asarco's Mission Unit.

2/ Figure withheld to avoid disclosing individual company confidential data.

<u>5</u>/ Preliminary figure.

 $[\]underline{1}/$ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

^{3/} Excludes bentonite and fire clay (1961); included with "Value of items that cannot be disclosed."

^{4/} Weight not recorded.

^{6/} Total adjusted to eliminate duplicating value of raw materials used in manufacturing cement and lime.

ARIZONA'S METAL PRODUCTION

Source: United States Bureau of Mines

	GOLD ozs.	SILVER ozs.	COPPER Lbs.	LEAD Lbs.	ZINC Lbs.	TOTAL VALUE
1952 1953	112,355 112,824	4,701,330 4,351,429	791,438,000 787,050,000	33,040,000	94,286,000	220,686,278
1954	114,809	4,298,811	755,854,000	18,856,000 16,770,000	55,060,000 42,922,000	242,572,489 237,818,952
1955 1956	127,616 146,110	4,634,179 5,179,185	908,210,000	19,634,000 23,998,000	45,368,000 51,160,000	355,928,786 450,599,680
1957	152,449	5,279,323	1,031,708,000	24,882,000	67,810,000	332,081,963
1958 1 959	142,979 124,627	4,684,580 3,898,336	971,678,000 860,594,000	23,780,000 19,998,000	57,064,000 74,650,000	273,398,148 282,977,000
1960 1961	143,064 145,959	4,774,992 5,120,007	1,077,210,000 1,174,106,000	16,990,000 11,874,000	71,622,000 59,170,000	366,340,000 370,101,000
	,	- , , ,	-,,100,000	11,077,000	37,170,000	370,101,000

RELATIVE 1961 PRODUCTION

	UNITED STATES	Production	ARIZONA % of U.S.	Rank in U.S.	LEADING STATE	IN THE U.S.A. Production
Gold -ozs. Silver-ozs. Copper-tons Lead -tons Zinc -tons	1,548,270 34,794,456 1,165,155 261,921 464,390	145,959 5,120,007 587,053 5,937 29,585	9.43 14.72 50.38 2.27 6.37	3rd 2nd 1st 6th 6th	S.Dakota Idaho Arizona Missouri Tennessee	557,855 17,576,322 587,053 98,785 81,734

COPPER, GOLD, SILVER AND MOLYBDENUM RECOVERED FROM MINES IN ARIZONA IN 1959, 1960 and 1961.

Source: U.S.B.M. Area Reports

	1959	1960	1961
Tons copper concentrating and leaching ore mined	52,741,920	65,528,603	71,332,364
% Copper in ore (estimated assay)	0.,92	0.84	0.86
Tons direct smelting copper ore	379,625	503,836	586,627
% Copper in ore (estimated assay)	4.56	4.07	3.92
TOTAL TONS COPPER ORE MINED	53,121,545	66,032,439	71,918,991
Ozs. gold recovered from all copper ores mined	96,153	115,602	129,184
Ozs. silver recovered from all copper ores mined	2,724,701	3,689,622	4,380,455
Lbs. molybdenum recovered from all copper ores mined	2,659,000	4,359,000	4,878,000
Lbs. copper recovered from all copper ores mined (including all clean-up)	803,087,000	993,370,700	1,092,858,200
Lbs. copper recovered from mine waters	48,610,000	66,691,000	68,698,300
TOTAL LBS. COPPER RECOVERED FROM ALL COPPER MINES	851,697,000	1,060,061,700	1,161,556,500
TOTAL LBS. COPPER RECOVERED FROM MINES OTHER THAN COPPER	8,897,000	17,148,300	12,549,500
GRAND TOTAL LBS. COPPER RECOVERED FROM ALL ARIZONA MINES	860,594,000	1,077,210,000	1,174,106,000

ACTIVE MINES

The United States Bureau of Mines reported production during the calendar year, 1961, from 43 copper mines, 4 copper-zinc, 6 lead mines, 10 lead-zinc, and 2 zinc mines: total 64. It also reported 16 dry gold lode mines, 5 dry gold-silver lode mines and 11 dry silver lode mines: total 32, all of which shipped their production as smelter silica flux ores, and 4 gravel placer operations. Eleven of the above copper mines produced copper precipitates from water solutions.

Uranium ore was produced at 42 operations in Apache, Coconino and Navajo Counties, compared with 64 operations in 5 counties in 1960.

The department's lists of active mines show the following as of February, 1962 compared to February, 1961, the 1961 figures being in parentheses: 39 (36) copper, 6(7) copper with lead or zinc, 11 (13)lead and/or zinc, 11 (14) uranium, 14 (13) gold and/or silver, 3(3) quicksilver, none (2) manganese, 19 (17) sand, rock and stone, 6(7) silica, 4 (7) asbestos, 4(4) gypsum, 7(8) lime, limestone and cement, 5(2) marble, 3(3) perlite, 2 (1) bentonite, 1 (1) mica, 1(1) diatomaceous earth, 1(1) feldspar and 2(2) iron.

EMPLOYMENT

The Arizona Employment Security Commission reported for 1961 that there were employed in mining and quarrying a total of 16,178 covered employees with total wages of \$107,813,787, and an average wage of \$6,664. Smelting employment brought the grand total payroll to \$113,737,536 with an average of 17,143 covered employees, earning an average of \$6,635 per year. Fringe benefits are not included in these figures, but are estimated to amount to over 25 percent of the regular payroll.

COPPER

The Arizona copper mines in 1961-62 again accounted for over half of the United States copper production. Production and employment were relatively steady and the producers' price for copper held at 31 cents per pound throughout the fiscal year.

Loss of production due to a 22-day strike at the Inspiration Consolidated Copper Company's operating property and a two-month shutdown of the Magma mine of Magma Copper Co. because of a mine fire, was more than offset by added production elsewhere, chiefly from the Mission Mine.

Copper mines elsewhere in the world were relatively free from strikes in the fiscal year. The excess of production over consumption towards the close of the fiscal year was creating market weakness and curtailment of production soon followed.

Copper mining and exploration activities in the fiscal year were high. The largest development, the \$33 million Mission Mine project of the American Smelting and Refining Co., began production August 1, 1961. It soon attained its objective of 15,000 tons of ore per day, a rate estimated to yield 45,000 tons of copper annually.

The Christmas mine project of Inspiration Consolidated Copper Company was completed to the point of initial production at a total cost in excess of \$20 million. The company's report for the first half of 1962 stated that production would gradually increase during the balance of the year. The mine development and plant were planned for an ore capacity of 4000 tons per day. Concentrates are trucked from the mill at Christmas to a terminal at Lower Miami where they are transferred to ore cars for rail transportation up to the Inspiration smelter.

Banner Mining Co. completed its 1028 ft. Palo Verde shaft and mine development program and made mill alterations and additions for increased capacity. About 1000 tons per day were being mined and milled at its properties south of Tucson at the end of the fiscal year.

Pima Mining Co. proceeded with stripping and planning for expansion of the capacity of the Pima mine and mill south of Tucson from 3800 to 7000 tons of ore per day.

The exodus from Ray to the new town of Kearny continued. The copper open pit mine of the Ray Division of Kennecott Copper Corp. is expected to swallow the town of Ray eventually.

Transarizona Resources, Inc. financed, partly through the Small Business Administration, expansion of its open pit mine and segregation process plant at the Lake Shore mine south of Casa Grande. Operations were resumed in April at the rate of 500 tons per day. Planned changes in the pilot plant equipment were expected to raise the capacity to the 750 tons per day sought by the expansion project.

Bagdad Copper Corp. installed at its Bagdad mine additional mine and mill equipment to increase plant capacity about 20 percent. Their \$2 million acid-leach-precipitation plant, started in May, 1961, encountered difficulties for several months but by 1962 and major problems had been solved.

Al Stovall drilled an area of oxidized copper ore at the Carrow Bluebird mine southwest of Inspiration's Live Oak pit, near Miami. He then stripped most of the drilled area preparatory to open pit development and began preparation for treatment of that ore by heap leaching and precipitation of the copper. Production was scheduled to start before the end of 1962 with about 50 men employed. Employment was expected to increase as operations got well under way.

The D.M.B.D. Mining Co. finished construction of a 60-ton selective flotation mill at Mammoth and treated copper molybdenum ores from the Childs-Aldwinkle mine at Copper Creek.

Inspiration Consolidated proceeded with preparations for leaching copper from a large dump at Inspiration.

Duval Sulphur and Potash Co. started leaching of dump material at its Esperanza mine south of Tucson. Fisher Contracting Co. completed plant construction for precipitation of cement copper in May, 1962.

Duval also drilled an important new discovery of ore similar to that of the Esperanza pit and immediately to the west of it. The exploration program and metallurgical testing at its Mineral Park property on and near Ithaca Peak north of Kingman were nearly completed at the close of the fiscal year. The decision on further development of this copper molybdenum, porphyry type deposit, is awaited hopefully by the residents of Mohave County and many others.

Kennecott Copper Co. completed planned workings from the 3900 level of the new development shaft at its Safford project claims northeast of Safford. It also completed leach testing with its new pilot plant near the shaft. Further leach testing was carried on in the company's Utah laboratory. Diamond drilling continued throughout the year.

Breaking and leaching operations at the De Soto mine northwest of Cleator were resumed early in the fiscal year by R. E. Chilson, et al.

Banner Mining Co. started plans for a pilot plant to test the application of its patented methods of leaching to its "sizeable reserves of oxidized copper ores in a limestone derivative gangue which are too low in grade for direct shipment to smelters". Much ore of this type probably is present in the extensive area of low grade copper mineralization which the company has found by drilling in the Helvetia Mining District.

Inspiration drilling showed additions to the large tonnage of low grade ore found to the north of its Live Oak pit and plans for a third pit were under consideration.

Magma Copper Company acquired the Belmont Copper Mining Company's property south of and adjacent to the Magma mine at Superior.

Hunting Geophysical Services, Inc. negotiated for others an exclusive exploration contract on all but a small part of the Papago Indian Reservation. The company is to carry out the proposed exploration program. 25 leases of not over 2,560 acres each may be taken.

Copper exploration work, including drilling, was done during the fiscal year in the following areas: Courtland-Gleason mining district, Cochise County; White Mesa district, Coconino County; Miami and Summit districts, Gila County; Safford and Mt. Turnbull districts, Graham County; San Francisco River District, Greenlee County; Big Horn district and area north of Agua Caliente, Maricopa County; Mineral Park, Maynard and Owens districts, Mohave County; Mineral Hill, Twin Buttes, Helvetia, Ajo, Gunsight and Quijotoa districts, Pima County; Owl Head, Ray, Riverside and Casa Grande districts, Pinal County; Palmetto and Harshaw districts, Santa Cruz County; Bagdad, Copper Basin and Squaw Peak districts, Yavapai County; and Mineral Hill, Ellsworth and Planet districts, Yuma County.

Silica Flux for the 7 copper smelters in Arizona was produced from a number of mines, particularly in the following mining districts: Johnson and Gleason, Cochise County; Banner and Globe, Gila County; Pikes Peak, Maricopa County; Ajo and Montezuma, Pima County; Old Hat, Owl Head, Silver Reef and Tiger, Pinal County.

LEAD - ZINC

The price of pig lead, f.o.b. New York, fell from 11 cents per pound November 1, 1961 to $9\frac{1}{2}$ cents on February 9, 1962, and stayed there. The Prime Western Zinc price, East St. Louis basis rose from $11\frac{1}{2}$ to 12 cents on December 1, 1961, fell back to $11\frac{1}{2}$ on April 3, 1962, and stayed there.

The president signed a lead-zinc stabilization bill in October, 1961 and appropriation therefor was made in August, 1962. The Act is so restrictive and limited in its relief that it is expected to have little effect upon Arizona's depressed lead-zinc mining industry.

The Iron King mine of Shattuck Denn Mining Corporation continued as the largest Arizona producer of both lead and zinc by far. It and the Flux mine of Nash & McFarland produced well over 90 percent of the lead. Together with the Old Dick mine of Cyprus Mines Corp., the Johnson mine of McFarland & Hullinger, the Atlas mine of B.S. & K. Mining Co., and the Flux mine, it produced nearly all of Arizona's zinc output for the fiscal year.

The Iron King mine, shut down during a two month strike, was largely responsible for the drop-offs of 30 percent in lead and 17 percent in zinc tonnages produced in Arizona in 1961. Shattuck Denn continued exploration for extensions of Iron King mineralization. Part of its program was exploration at lower mine levels of ground to the north under which it obtained a deep lease. The company also developed a soil additive from iron and sulphur in mill tailings.

B.S. & K. Mining Co. sank a new shaft at its Atlas mine south of Red Rock to 554 ft. depth and developed 4 new mine levels.

Cerbat Mining and Milling Company ran the Golden Gem mill in the Cerbat district, Mohave County at low tonnage with ore from development work at the Golden Gem, Flores, Summit and Banner mines in the area. It was announced in June, 1962 that the Office of Minerals Exploration had made its first Arizona contract with the Cerbat company for an exploration project estimated to cost \$49,920, of which O.M.E. would pay half.

The Silver Crown (Walker district) and Savoy (Tiger district) mines in Yavapai County operated intermittently during the fiscal year.

Interest in Arizona lead-zinc properties was very low and was stimulated little by either the stabilization act or the silver boom.

GOLD - SILVER - MOLYBDENUM

Gold

The increased interest in gold, locations of large areas of placer claims in Maricopa, Mohave, Yavapai and Yuma Counties, and considerable test work thereon, particularly with dry methods, resulted in a neglible amount of gold production. Arizona's gold continued to come almost entirely as byproduct from copper ores or silica fluxing ores.

Glendel Mining Co., Inc. continued work in and from its new adit tunnel at the old Congress mine near Congress Junction.

Silver

Termination of Treasury sales of silver in November, 1961 resulted in renewal of interest in silver mines. Exploratory work was carried on in the old White Hills silver district in Mohave County. F. Frankovich did more work at the Vizina shaft at Tombstone. Walter Bopp sank the Silver Ray mine shaft further then started a new 670 ft. level. The mine is near Arivaca. Money Metals Mining Co. obtained a lease on the Allison mine in the Fresnal district, Pima County and started development work. Arizona's 1961-62 silver production was practically all by-product from the copper, lead and zinc mines. Some small production came from silica fluxing ores.

Molybdenum .

Interest in molybdenum ran with higher prices for the metal but Arizona's production was entirely by-product from some of the copper mines, the major amounts coming from the San Manuel, Esperanza and Morenci properties.

Uranium

The value of Arizona's uranium production in 1961 was 20 percent lower than in 1960. Mines in the Cameron area were idle in fiscal year 1961-62. The Orphan mine at Grand Canyon operated by Western Equities, Inc., was the principal shipper to the Tuba City mill of Rare Metals Corp., until the ore bin and headframe collapsed into the main shaft in December, 1961. The mine was unable to ship for the balance of the year and consequently the Tuba City mill operations were greatly curtailed. In May, 1962, the President signed a bill which paved part of the way towards operation of the Orphan mine and Tuba City mill through 1966.

Most of the uranium mines producing in the fiscal year were in northern Apache and Navajo Counties. Shipments from these mines went almost entirely to out-of-state mills.

Vanadium

Uranium mills with vanadium recovery units were operated at Grand Junction and Durango, Colorado, and Shiprock, New Mexico. The recovery from Arizona ores in 1961 was reported by the Federal Bureau of Mines to be slightly lower than in 1960.

Iron

The considerable interest in Arizona's iron resources held through 1961-62.

The 70 ton sponge and pig iron plant of Arkota Steel Co. at Coolidge was dedicated in December, 1961. The company did pilot and research work during the balance of the year. Arkota Mining Co. concentrated magnetite from

sands at the Omega deposit southeast of Florence and shipped the requirements of the Coolidge plant. Further test drilling and sampling was done at the Omega deposit.

Phelps Dodge Corp. completed a sponge iron plant of 25 tons per day capacity at Douglas and started production in the latter part of 1961. The iron replaced tin cans for the purpose of precipitating copper from solutions from copper ores.

Colorado Fuel and Iron continued exploratory drilling in the Apache-Chediski districts, which it started about two years ago.

Pacific Mines, Inc. acquired rights in iron properties in the Planet district and proceeded with plans for exploiting them.

Large areas of magnetite sands in Arizona have been located as association placer claims. Exploratory drilling and sampling have been done in some of them and some have been found worthless. Others may have future possibilities. The Federal Bureau of Mines reported Arizona production of 246 tons of usable iron ore in 1961.

Manganese

No manganese was produced in Arizona in the fiscal year, 1961-62.

Mercury

The Rattlesnake mill ran intermittently on Pine Mountain mine ore until the second quarter of 1962 when lower quicksilver prices and higher mining costs caused a shutdown. Some exploration was done at a few other properties in the Sunflower district.

Beryllium

Very little, if any, beryl ore was shipped from Arizona in the fiscal year.

Non-Metallic Minerals

Sand and gravel output, second in value among Arizona's mineral commodities, probably increased above that for the previous fiscal year.

The output of building stone probably increased little, if any.

The large amount of lime used by the copper concentrators continued to account for most of the lime produced.

Search for structural clays for manufacture of vitrified sewer pipe and tile continued. Some are claimed to have been found.

Asbestos production in Gila County was at a record level early in the fiscal year then fell off.

Klaner and Doolin mined and crushed tuff at Franconia for rock granules. They also started a plant for making concrete blocks.

Tombstone Mica Co. closed the Charleston mine and mill in September, 1961.

U. S. Marble Corp. stripped a sizeable area of marble about 6 miles southeast of Wenden.

Mick-Donald developed a marble quarry in the Harquahala district.

Snotop Minerals, Inc. explored and partly stripped its Marble Top deposit southeast of Three Points, Pima County. It also started work on a crushed marble screening and sacking plant.

The Crystal White Rock Company's Tucson marble plant and the San Francisco Marble Quarries north of Tucson closed in late 1961.

David C. Hartley reported a large increase in production from his Helvetia marble quarry and crushing plant.

Union Carbide Nuclear Co. continued drilling and stripping at their deposit of zeolitized volcanic ash north of Bowie.

With expanded use of scoria and cinders in concrete blocks, pozzolanic pumice going to Glen Canyon dam, and continued use by the Santa Fe of cinders for railroad ballast, large tonnages of pumice-pumicite material were quarried in Coconino, Yavapai, Graham and Cochise counties. According to the U.S. Bureau of Mines, Arizona was the nation's largest producer of these materials in 1961.

Production of gypsum at Feldman and Camp Verde, perlite at Superior and silica sand at Houck, continued throughout the year.

Peabody Coal Co. continued its exploration and drilling for Black Mesa coal in and north of the northern part of the Hopi-Navajo reservation. Fisher Contracting Co. drilled a few holes on its coal lease in the southwest part of the Black Mesa, west of Oraibi.

Department Activities

Proposed legislation and administrative procedures affecting mineral rights in Arizona were subjects of more than usual attention from the Departments of the Interior and Agriculture, the Congress, and others, including this Department. The department studied various bills introduced or drafted, compiled and distributed information relating to them, discussed them with mining people at special meetings and at regular meetings of the Arizona Small Mine Operators Association, and attended Congressional hearings on several of them.

The director gave written and oral testimony at a hearing at Tucson by the House Interior Subcommittee on Mines and Mining, and at hearings by the House Interior Subcommittee on Public Lands at Phoenix and Sacramento, California, on public Land matters of importance to Arizona mining.

The special assistant attended Washington hearings by House and Senate committees on various bills relating to public lands, lead-zinc, gold,

uranium, stockpiles, Trade Expansion Act, and impact of imports on domestic labor conditions, and discussed such matters with legislators and administrative personnel. He also attended Tariff Commission hearings on lead-zinc, mercury, beryllium, manganese, fluorspar and cobalt. He worked for a government long range mining policy, bills favorable to mining, and import protection, and against reduction of depletion allowances, disrupting stockpile sales and legislation adverse to mining.

The director attended an industry meeting at Denver called by the Department of the Interior to discuss the lead-zinc stabilization act and other mining matters. He also attended a January meeting at Portland, Oregon, of the Western Governors' Mining Advisory Council to which he was a delegate, and the annual meeting in September, 1961, of the American Mining Congress at Seattle, Washington.

Publications

The following statistical reports were issued to a mailing list of over 200 companies, legislators, agencies, banks, newspapers, libraries, and individuals, and many copies were distributed by request following their announcement in various publications:

The Gold and Silver Industries in the World, United States and Arizona - Salient Statistics Ten-Year Period, 1951-1960.

Copper Industry - Statistics for 1960 Compared with Other Years - Arizona, United States and World.

Lead and Zinc Industry - Statistics for 1960 Compared with Other Years - Arizona, United States and Free World.

Mine Taxation in Arizona - Four Years 1958-1961 Incl.

Use of Water in the U. S. Copper Industry.

Stories of - Duval's Esperanza Mine and Asarco's Mission Unit.

Preliminary Estimate of Copper, Lead, Zinc, Gold and Silver Production in Arizona and the United States, in 1961. U.S.B.M. Area Report III-137 (Preliminary).

Fifty Years of Mining in the State of Arizona 1912-1962 and Mining in Arizona, Its Past - Its Present - Its Future.

Copper in 1961.

Comments on Copper Stockpile.

Wage Statistics and Copper Output - Arizona and United States Copper Mines.

The booklet, Laws and Regulations Governing Mineral Rights in Arizona, was revised to incorporate law changes to date and reprinted. Over ten thousand copies of this booklet have been distributed in the past five years.

Lists of active mines were compiled as of October, 1961, and February, 1962, mimeographed and distributed on request.

Other papers prepared and distributed in the fiscal year were:

Lists of asbestos, beryllium, clay, iron and limestone deposits.

Directory of State and Federal Agencies of Interest to Mining.

Summary of proposed gold legislation, 87th Congress.

Summary of proposed public land legislation, 87th Congress.

A paper entitled "Mining Law Revision Act of 1962" by the U. S. Bureau of Land Management, and remarks about it by the Bureau Director, Karl S. Landstrom, and Charles F. Willis, Secretary, Arizona Small Mine Operators Association, were mimeographed and distributed because of their importance to Arizona mining.

Library

The department's files, maps and library on Arizona mining and mining properties are in constant use and of recognized high value. A field engineer is present at the Phoenix office and much of the time at the Tucson office, as well as at announced places and dates, for consultation. The administrative assistant is especially helpful in land matters because of training and experience in the federal land office and in this department.

During the fiscal year, the field engineers traveled 33,192 miles, attended 151 Arizona Small Mine Operators Association meetings, made 293 visits to mining properties, and discussed mining problems with individuals on 2261 occasions - 466 in the field, 860 in the office and 935 over the phone. They also answered 242 mail inquiries. Their services included: Vice President, Maricopa Subsection, A.I.M.E.; Secretary-treasurer, program committee chairman, Phoenix Council, A.S.M.O.A. Special meetings attended were: Arizona Geological Society; annual State and special safety; Arizona Planning and Zoning Association; Prescott Subsection, A.I.M.E.; Arizona Section, A.I.M.E.

There were 1928 visitors and 3810 telephone calls to the department during the fiscal year.

There were approximately 7900 visitors to the Mineral Museum exclusive of an estimated 59,400 museum visitors during the State Fair. Special visits for 420 school children and special meetings with 1920 total attendance were held in the Mineral Building. The museum curator answered 1462 inquiries, sent out 579 specimen kits to school children and acquired for the museum 72 new mineral specimen.

A scale model of the Mammoth Mine at Tiger, Arizona was presented to the museum in memory of former curator, Arthur L. Flagg by the Mineralogical Society of Southern California.

The following financial statement shows a return to the General Fund of \$2,944.86 due largely to unused travel allowance.

FINANCIAL STATEMENT

Fiscal Year 1961-62

DEPARTMENT APPROPRIATION		\$ 78,110.00
EXPENDITURES:		
Personal Services Professional Services Travel - State Travel - Out of State Current Expenditures: Utilities Telephone Postage Bldg. & Equip. Mtnce Supplies: Office, etc. Fixed charges Subscription & Organization Dues Capital Outlay	\$ 53,100.00 7,300.00 5,876.23 597.60 1,301.71 1,209.92 821.00 1,265.80 2,730.54 162.94 91.00 708.40	
TOTAL EXPENDITURES	733.45	\$ 75,165.14 -
Returned to General Fund		\$ 2,944.86
Deposits: Insurance Refund Sale of Regulations and		35.00
Copper Stories booklets	(out-of-state)	23.60
MUSEUM ACC	OUNT	
BALANCE BROUGHT FORWARD		\$ 157.22
DEPOSITS		2,700.00 2,857.22
EXPENDITURES:		
Personal Services Employer's share OASI & State Retirement Janitor & Maintenance supplies	\$ 2,400.00 157.56 24.89	
TOTAL EXPENDITURES		\$ 2,582.45 -
Carried Forward		\$ 274.77