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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, 1962 to June 30, 1963 is submitted herewith.

Respectfully yours,

Frank P. Knight

FRANK P. KNIGHT,

Director.

POWERS AND DUTIES

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 1962 output, Arizona ranked first in copper production in the United States (including Alaska), as it has done since 1910. It ranked 2nd in silver, 7th in zinc, 4th in gold and 5th in lead.

Arizona production and value of the five principal metals in 1962, as reported by the U. S. B. M., were as follows:

644,242 ton	s copper	@	30.8 ¢/1b	\$ 396,853,000
6,966 ton	s lead	@	9.20¢/1b	1,282,000
32,888 ton	s zinc	@	11.50¢/1b	7,564,000
137,207 ozs	. gold	a	\$ 35.00 /oz	4,802,000
5,454,000 ozs	. silver	@	108.49¢/oz	5,917,000
				\$ 416,418,000

This compares with the following final figures for 1961:

587,053 5,937 29,585 145,959 5,120,007	tons tons ozs.	lead zinc gold	ବ ବ ବ ବ ବ	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

Following are tables showing:

- 1. Mineral Production of Large and Small Producers in Arizona in 1962.
- 2. Arizona Metal Production with ten year figures for the five principal metals.
- 3. Relative 1962 Production in the United States for the five principal metals.
- 4. Copper, Gold, Silver and Molybdenum Recovered from Mines in Arizona in 1960, 1961 and 1962.

MINERAL PRODUCTION OF LARGE AND SMALL PRODUCERS IN ARIZONA IN 1962 1/2

Source: U.S.B.M. Area Report for Arizona, 1962

LARGE COPPER PRODUCERS: * Copper (1bs)	\$ 389,094,000 4,107,670 4,959,936 5,864,000 \$ 404,025,606
Beryllium concentrates - short tons, gross weight Clays 3/ thousand short tons 138 Copper (recoverable content of ores, etc.) lbs. 25,192,821 Gem stones	2/ 184,000 7,759,000 120,000 694,330 5/ 1,282,000 2,914,000 5/ 5/ 1,640,000 17,404,000 957,064 6,616,000 14,000 3,047,000 5/ 7,564,000
pyrites, and values indicated by footnote $5/$ Total Value of Small Mine Production $6/$	19,894,000 \$ 70,089,394
GRAND TOTAL VALUE OF MINERAL PRODUCTION	\$ 474,115,000
PERCENTAGE DUE TO SMALL MINES	14.78%

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

2/ Less than \$500.

4/ Weight not recorded.

^{1/} Production as measured by mine shipments, sales, or marketable production (including consumption by producers)

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

 $[\]frac{5}{6}$ / Figure withheld to avoid disclosing individual company confidential data.

^{7/} Preliminary figure.

ARIZONA'S METAL PRODUCTION

Source: United States Bureau of Mines

	GOLD Ozs.	SILVER Ozs.	COPPER Lbs.	LEAD Lbs.	ZINC Lbs.	TOTAL
1953 1954 1955 1956 1957 1958 1959 1960 1961	112,824 114,809 127,616 146,110 152,449 142,979 124,627 143,064 145,959	4,351,429 4,298,811 4,634,179 5,179,185 5,279,323 4,684,580 3,898,336 4,774,992 5,120,007	787,050,000 755,854,000 908,210,000 1,011,816,000 1,031,708,000 971,678,000 860,594,000 1,077,210,000 1,174,106,000	18,856,000 16,770,000 19,634,000 23,998,000 24,882,000 23,780,000 19,998,000 16,990,000 11,874,000	55,060,000 42,922,000 45,368,000 51,160,000 67,810,000 57,064,000 74,650,000 71,622,000 59,170,000	\$ 242,572,489 237,818,952 355,928,786 450,599,680 332,081,963 273,398,148 282,977,000 366,340,000 370,101,000
1962	137,207	5,453,585	1,288,484,000	13,932,000	65,776,000	416,418,000

RELATIVE 1962 PRODUCTION

	UNITED STATES	Production	ARIZONA % of U.S.	Rank in U.S.	LEADING STATE State	IN THE U.S.A. Production
Gold -ozs Silver -ozs. Copper - tons Lead - tons Zinc - tons	236,956	137,207 5,453,585 644,242 6,966 32,888	8.90 14.82 52.44 2.94 5.06	4th 2nd 1st 5th 7th	S. Dakota Idaho Arizona Idaho Tennessee	577,232 17,772,435 644,242 84,058 71,548

COPPER, GOLD, SILVER AND MOLYBDENUM RECOVERED FROM MINES IN ARIZONA IN 1960, 1961, and 1962.

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

	1960	1961	1962
Tons copper concentrating and leaching ore mined	65,528,603	71,332,364	78,436,804
% Copper in ore (estimated assay)	0.84	0.86	0.89
Tons direct smelting copper ore	503,836	586,627	431,263
% Copper in ore (estimated assay)	4.07	3.92	4.20
TOTAL TONS COPPER ORE MINED	66,032,439	71,918,991	78,868,147
Ozs. gold recovered from all copper ores mined	115,602	129,184	117,362
Ozs. silver recovered from all copper ores mined	3,689,622	4,380,455	4,571,370
Lbs. molybdenum recovered from all copper ores mined	4,359,000	4,878,000	4,412,000
Lbs. copper recovered from all copper ores mined (including all clean-up)		1,092,858,200	1,201,172,000
Lbs. copper recovered from mine waters	66,691,000	68,698,300	73,215,900
TOTAL LBS. COPPER RECOVERED FROM ALL COPPER MINES 1	,060,061,700	1,161,556,500	1,274,387,900
TOTAL LBS. COPPER RECOVERED FROM MINES OTHER THAN COPPER	17,148,300	12,549,500	14,096,100
GRAND TOTAL LBS. COPPER REGOVERED FROM ALL ARIZONA MINES 1	,077,210,000	1,174,106,000	1,288,484,000

ACTIVE MINES

The United States Bureau of Mines reported metal production during the calendar year 1962, from 41 copper mines, 3 copper-zinc, 1 copper-lead-zinc, 7 lead mines, 4 lead-zinc and 1 zinc mine: total 56. It also reported 5 dry gold lode mines, 6 dry gold-silver lode mines and 13 dry silver lode mines: total 24, all of which shipped their production as smelter silica flux ores; and 5 gold placer operations. 12 of the above copper mines produced part or all of their copper by precipitation from leach solutions.

The department's lists of active mines show the following as of April, 1963, as compared to February 1962, the 1962 figures being in parentheses: 30 (39) copper, 5 (6) copper with lead or zinc, 10 (11) lead and/or zinc, 7 (11) uranium, 8 (14) gold and/or silver, 3 (3) quicksilver, 18 (19) sand, rock and stone, 7 (6) silica, 2 (4) asbestos, 3 (4) gypsum, 7 (7) lime, limestone and cement, 5 (5) marble, 2 (3) perlite, 1 (2) bentonite, I (1) mica, 1 (1) diatomaceous earth, 1(1) feldspar 2 (2) iron, and 1 (1) pozzolan.

EMPLOYMENT

The Arizona Employment Security Commission reported for 1962 that there were employed in Arizona mining and quarrying a total of 15,988 covered employees with total wages of \$110,647,421, and an average wage of \$6,921. Smelting employment brought the grand total payroll to \$117,286,445 with an average of 16,976 covered employees, earning an average of \$6,900. 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 copper mines of Arizona continued to produce over half of the Nation's total copper mined in 1962-63. The copper price held at 31 cents per pound, although some discounting was reported in the latter part of 1962. In late 1962, strikes in Chile and Rhodesia and reduced output in Katanga, lessened somewhat the need for the domestic production curtailment which started in July 1962. Supply and demand were in approximate balance in the first half of 1963, partly due to continued curtailment by some producers.

Inspiration Consolidated Copper Co. finished initial development and construction work and started processing of Christmas mine ores in August. The mine entered the production stage October 1, 1962. In the second quarter of 1963, ore production averaged about 2,500 tons per day or about 62 percent of mill capacity.

Inspiration completed alteration of its molybdenum plant in October, 1962. The subsequent recovery of by-product molybdenum was excellent.

Stripping at the hill at the west side of the Thornton pit of the Inspiration mine was started in order to remove a slide hazard and to develop an additional reserve of low grade ore. Also at the Inspiration mine, the leaching of a large dump of segregated stripped overburden was started in late 1962.

Duval Sulphur and Potash Co., now Duval Corp., in late 1962, started a \$28 million development project at its Ithaca Peak property in the Mineral Park district, Mohave County. Start of production of copper and molybdenum concentrates is scheduled for late 1964. Isbell Construction Co. is doing the stripping of the orebody and Parson-Jurden Co. is building a mill.

At its Esperanza pit in the Sierrita Mountains, Duval began stripping a smaller orebody at the west side of the pit. It also installed new facilities for dump leaching at the Esperanza. Expected output of cement copper is 125 tons per month.

Pima Mining Co. pursued its program for increasing the capacity of its Pima mine facilities to 7,000 ore tons per day. The increase is to permit the company to mine an additional 18 million tons of ore proven to contain 0.66 percent copper and to take care of the contracted mining and milling of 256,670 tons annually of Banner Mining Company's ore bordering the Pima pit. The program includes stripping of Pima pit ore extensions, mill and other additions, and is expected to be completed by December, 1963.

Banner Mining Co. reduced its Palo Verde mine production by about one-half at the end of 1962, for a period of mill repair and alteration. The mine was closed by strike on May 27, 1963, and remained closed into the following fiscal year.

The Banner Co. commissioned Stearns-Roger Manufacturing Co. to build a 5 ton-per-day pilot plant in or near the Pima district, to test the economy of continuous operation using the company's new patented alkaline leach process. The process has promise of successful handling of oxidized copper and other ores associated with limestone.

Early in 1963, Banner Mining Co. entered into an agreement with the Anaconda Co., under which the latter could explore properties of the former located in the Mineral Hill and other areas south of Tucson, with option to lease. By the end of the fiscal year, Anaconda was actively drilling certain of these properties.

American Smelting and Refining Co. started stripping to the eastward from its El Tiro pit of the Silver Bell mine. Oxidized capping is being segregated for future leaching. Cement copper from leaching of dumps of the Oxide and El Tiro pits continued to be produced during the year. Asarco started up a new ball mill-cyclone unit at its Silver Bell mill the first of March, 1963. Its new \$400,000 unit for recovery of by-product molybdenum at Silver Bell, was started in the summer of 1962.

Phelps Dodge Corp. obtained a license for a 15,000 acre feet reservoir, 2,800 KW power plant, power lines, etc., the estimated cost of which is \$6,700,000, and started construction of a dam on East Clear Creek, northeast of Pine and north of the Mogollon Rim, in the spring of 1963. The reservoir, named Blue Ridge, will feed into the East Verde river to the south, and its run-off will entitle Phelps Dodge to draw a corresponding amount of water from Black River for use at its Morenci operations.

Phelps Dodge applied for patent to 118 lode claims about 12 miles north of Safford in the Lone Star mining district. The company drilled in the area during the year for assessment and patent work.

At Kennecott Copper Corporation's Safford project, drilling and other exploration work was completed in December, 1962.

The old town of Ray went out of existence to make way for extension of Kennecott's open pit Ray mine. The company continued exploratory drilling at Ray during the fiscal year.

Miami Copper Co., Division of Tennessee Corp., now the Miami Copper Co., Division of Cities Service Co., continued leaching operations at its Miami and Castle Dome mines. Merging of Tennessee Corp. with Cities Service Co. was approved by stockholders of the companies in March 1963.

In late 1962, the Miami division started a program to deepen its Copper Cities pit by some 360 feet in order to mine an estimated 25 million tons of low grade primary ore disclosed by deeper drilling. Material stripped from the pit contains some copper. A precipitation plant for leach recovery of this copper was completed at the mine and placed in operation in December.

Newmont Mining Corp. during the year increased its holdings of Magma Copper Co. shares to 80.6% through stock exchanges.

Magma Copper changed the method of mining its east replacement orebody of the Magma mine from a long-wall retreat to a horizontal cut and sand fill. Most of the Magma mine ore mined in the fiscal year came from the east orebodies. At the San Manuel mine, Magma Copper Co. added 154 flotation cells to the concentrator to improve metal recovery. The company leased Anaconda property containing a small part of the San Manuel orebody, with option to purchase.

Bagdad Copper Co. greatly improved its leaching operations with better sprinkling of leach solutions. A pilot plant to test a process of chemically refining its leached copper was completed in the fiscal year. The molybdenum section of the Bagdad mill was revamped, and improved recovery resulted.

Stovall Copper Co. began open pit mining and heap leaching of copper ores at the Carrow Bluebird mine near Miami in late 1962. Heavy rains in January caused the dump to slump. Leaching was continued after the height of the dump was reduced.

Zontelli Western Mining Co. of Ironton, Minnesota, began open pit-heap leaching operations at its White Mesa property near Copper Mine Trading Post in Coconino County, with the aid of a \$66,500 loan from the Small Business Administration. Water was obtained from a well 8 miles away.

Transarizona Resources, Inc. operated its expanded plant at the Lakeshore mine south of Casa Grande, for a short time at the start of the fiscal year. The property remained idle for the balance of the year.

Direct Minerals, Inc. leased the Mame mine in the Courtland area late in 1962, constructed new precipitation tanks, and on May 6th began leaching in place of old stope fill and broken ground.

DMBD Mining Co. closed its operations at the Childs Aldwinkle mine at Copper Creek and Burney mill near Mammoth at the end of 1962.

Virgil Denning of Yuma shipped some copper-silica ore from a leased part of the Apex group near Jacobs Lake, Coconino County, late in the fiscal year.

Copper State Leasing Co. started piling surface material preparatory to heap leaching at the Mineral Hill mine, Planet district, northern Yuma County. Future plans include an open pit mine and a concentrator.

Copper exploration in Arizona continued to be very active with some favorable reports, especially of extensions of known ore areas.

Hunting Geophysical Services, Inc. stopped exploration work in the San Carlos Indian Reservation early in the fiscal year, and obtained a prospecting permit covering most of the Papago Indian Reservation. Geo-Ventures, Inc. succeeded the Hunting company and continued exploration of the Papago Reservation in the remainder of the year.

Milca Mining Corp. optioned the Carlotta mine about 8 miles west of Miami and did some exploration work.

Bear Creek Mining Co. began exploratory drilling in the Sacaton Mountains under a permit from the Gila River Indians covering 19,200 acres. The company discontinued drilling projects in the Copper Creek district, Pinal County, Twin Buttes district, Pima County and the Maynard district, Mohave County. It continued exploration work in the Sierrita Mountains, Pima County until April, 1963.

Other copper exploration work was done in Cochise County, Johnson district; Gila County, Miami district; Graham County, Lone Star district; Greenlee County, Copper Mt. and Copper King Mt. districts; Pima County, Amole, Gunsight, Helvetia, Pima and Twin Buttes districts; Pinal County, Casa Grande area; Santa Cruz County, Greaterville, Harshaw, Patagonia and Tyndall districts; Yavapai County, Cherry, Copper Basin, Groom Creek, and Humbug districts; Yuma County, Midway and Oro Fino districts.

Silica flux for the 8 copper smelters in Arizona was produced from a number of mines, including some of the above.

LEAD-ZINC

The price of pig lead, f.o.b. New York, rose from $9\frac{1}{2}$ to 9.75 cents per pound on November 1st and to 10 cents the following day. In Mid-January it went to $10\frac{1}{2}$ and in early June to 10.75 cents. Prime Western Zinc, St. Louis basis, held at $11\frac{1}{2}$ cents per pound throughout the year.

Arizona's lead and zinc production in 1962 increased 16 percent and 11 percent respectively above 1961, due largely to the low 1961 production caused by a strike at the Iron King mine. This mine, owned by Shattuck Denn Mining Corp., and the Flux mine of Nash & McFarland, again produced well over 90 percent of Arizona's lead output. The Iron King, Old Dick mine of Cyprus Mines Corp., Johnson mine operated by McFarland & Hullinger, Atlas mine of B. S. & K. Mining Co., and the Flux mine, again produced nearly all of Arizona's zinc.

No appreciable increase in lead-zinc output in Arizona resulted either from subsidy under the stabilization act, for which Congress appropriated funds in the first quarter of the fiscal year, or from the increases in the price of silver before and after repeal of the silver purchase act early in June, 1963. Similar bills with provisions for flexible lead and zinc quotas were introduced by 19 members of the House of Representatives, 88th Congress and a similar Senate bill was endorsed by 25 Senators. Although the lead-zinc industry was closer to agreement on this bill than ever before on lead-zinc legislation, it faced strong opposition by the administration.

One Arizona mine, the Silver Crown, operated by the Arizona Michigan Mining Co., was the only reported receiver of lead-zinc subsidy. It got \$2,095 on 28 tons of lead shipped in 1962.

Cerbat Mining and Milling Co. obtained an O.M.E. loan shortly before start of the fiscal year. The government's 50 percent participation amounted to \$24,960. The company proposed to process ore from the Golden Gem and other properties in its 50-ton mill near Chloride. The mill operated a few months. At the close of the year, following company reorganization, it was expected that work would be renewed soon.

McFarland & Hullinger ceased operations at Johnson Camp. They had been Arizona producers of lead-zinc for a decade.

- B. &. & K. increased production at its Atlas mine near Silver Bell by about 30 percent.
- B. O. W. Mining Co. started operations near the end of 1962 at the Silver Bell-Martinez mine and 100 ton mill in Martinez Creek district, Pinal County. Work was suspended early in 1963 because of washout and breakdown.

Arizona Silver, Inc. at mid-1963 had nearly completed a gravity-flotation mill at the Ajax mine, Mineral Hill district, Pinal County. It planned to start the mill on Ajax mine dump material and ore from the Orphan Boy mine and nearby claims held under lease and option.

Mining World magazine gave Nash & McFarland, operators of the Flux mine, its award for Small Mining Company of the year.

There was small production by leasers from the Duquesne mines in the Patagonia district, Santa Cruz County.

Chem Metals processed zinc dross at its Humboldt plant and Royal Aluminum Refining Co. processed aluminum dross at its plant, also at Humboldt.

"D" Mining Co. started mill repairs at the Sunshine Banner Mines, Papago District, Pima County, early in 1963 and began processing stocked lead-silver ore about mid-1963.

Interest in lead-zinc mines with appreciable silver content increased because of the increase in the open market price of silver. However, 1962-63 was a year of low, although increasing, interest in lead-zinc exploration. Exploration and development work continued at the Copper Queen mine, Bagdad district, and at the "79" mine, Banner district, Gila County, exploration, development, and mill testing of the complex lead-zinc ores also continued. Exploration continued until November, 1962, at Tombstone, and was active in the Patagonia and Big Bug districts during the fiscal year.

GOLD-SILVER-MOLYBDENUM

Gold

Gold mining and exploration activity had dropped to a low level by the end of the year despite the continued decrease of the Nation's gold reserves, which dropped below \$16 million in late 1962 and were below \$15,733,000,000. at mid-1963. For the first time in a number of years, Congressional hearings on gold were held by the Senate Interior Subcommittee on Mining. The Treasury Department continued adamant against any change which might affect the price of gold.

The validity of extensive areas of gold placer claims in Northern Maricopa county, both unpatented and patented, was contested or questioned following the arrest in

April 1963 of a man identified as an official of two of several companies which had applied for mineral patents to extensive lands in the area, on charges related to suspected gold "salting" of samples of one of the claims involved in one of the patent applications. Applications to patent 14,951 acres of these lands were subsequently withdrawn. In May, 1963 the U. S. Bureau of Land Management challenged the validity of a group of 50 claims, embracing 6,689 acres in the area northwest of Phoenix, held by one of the patent applicants. Patents applying to about 8,000 acres in the general area were issued early in 1962.

Gold prospecting and dry concentration testing were active in the San Domingo and Weaver districts, Maricopa and Yavapai Counties, in the first quarter of the fiscal year, but dwindled to almost nothing by the end of the year.

Some gold placering was done in the Kofa and Plomosa districts, Yuma county, in the first part of the year.

Americana Investment Co. built a 1,000 ton mill at Oatman and started processing tailings from the Tom Reed mill in May, 1963. It also did some shaft work at the White Chief mine nearby. All work was stopped near the end of June.

C. O. Carlson and A. A. Frederickson mined some pyritic gold ore and intermittently treated it in the gravity section of the mill at the Little Daisy mine in the Sunflower district, Maricopa County.

Work at the Congress tunnel near Congress, Yavapai County, was stopped in mid-1962-63.

Silver

Early in the fiscal year, the New York price of silver moved from 103¢ to a 42-year high of 122¢ per ounce in October. By the end of the year it was only a few tenths of a cent below the monetary price of \$1.29. The president on June 4, 1963 signed a bill to repeal the silver purchase act and transaction tax and authorizing withdrawal of \$1 and \$2 silver certificates.

Interest grew in Arizona mines which might have become mineable because of higher silver price. Some diamond drilling was done in the White Hills silver district north of Kingman, in Maricopa County and elsewhere.

Pedico, Inc., Denver, Colorado, started shaft repair work at the Commonwealth mine at Pearce, Cochise County. The company planned to move a mill from Denver to the mine and water from the mine shaft would be needed. The mill will reprocess tailings from the large tailings dump at the mine. The Commonwealth probably is the largest of Arizona's silver mines.

U. S. Magnetite, Inc., Tucson, started shaft repairs at the Cerro Colorado mine west of Kingsley in the Cerro Colorado district, Pima County. The mine is an old silver producer of the last century. Also at the Cerro Colorado property Walter Bopp of Tucson deepened the shaft at his Silver Queen lease. He also did repair work in the Silver Shield shaft.

Canez Bros. did some drifting at the Arizona mine, Cerro Colorado district.

Philip S. Hoyt and son did some exploration work at the old Lane silver mine in the southern part of the Bradshaw Mts.

F. Frankovich stopped repair work at the Vizina shaft at Tombstone, in November, 1962.

Practically all of Arizona's 1962-63 production of gold and silver was by-product of the copper, lead and zinc mines.

Molybdenum (Molybdenum)

Molybdenum continued to be recovered as by-product at the following mines in 1962: San Manuel, Esperanza, Morenci, Silver Bell, Inspiration, Bagdad and Childs-Aldwinkle. As mentioned under Copper, Silver Bell, Inspiration and Bagdad facilities for molybdenum treatment were improved.

In 1962, Arizona produced 4,412,000 lbs. of molybdenum valued at \$5,864,000. These figures are lower than in 1961 by 10 and 6 percent respectively. Arizona produced 9 percent of the national total and ranked third in the U.S.

Molybdenum is reported to be an important constituent, along with copper, in the ores at Duval's Ithaca Peak mine.

Uranium

Arizona's uranium production for the past three years was reported by the U. S. Bureau of Mines to have been as follows:

	Ore, short tons	Value
1960	283,084	\$ 6,219,428
1961	228,225	4,964,505
1962	143,196	3,047,000

The decline in ore production of 37% from 1961 was much greater than the national drop of 12 percent. This is probably due to the closing of most of the smaller, scattered mines of which Arizona had a large share, and to delay in approval of a new contract between A. E. C. and Rare Metals Corp. of America which allowed continuation of the operation of the Orphan mine, an important Arizona producer, and of the Tuba City mill, the only uranium processing plant in Arizona. The original contract expired March 31, 1962 and the new contract was approved on November 19. Full resumption at the mine was reached early in 1963.

Vanadium was recovered only from the Arizona ores shipped to out-of-state mills. No vanadium recovery was made at Tuba City.

Iron

The U. S. Bureau of Mines reported that the value of iron ore produced in Arizona in 1962 was 5 times that of 1961.

Sponge iron was produced in plants at Hayden (Kennecott) and Douglas (Phelps Dodge) in the fiscal year. The sponge iron-steel plant of Arkota Steel Co. at Coolidge was idle much of the year. Increase in the amount of copper produced by leaching followed by precipitation, and an increased cost of tin cans for the precipitation, stimulated interest in sponge iron. Phelps Dodge planned to double its 25 tonsper-day plant at Douglas.

Fifteen more holes were reported drilled in the magnetite sands at the Omega property southeast of Florence. Little other activity was reported.

Iron Valley Mining Co. dropped its lease of the Red Rock Placer claims near the Omega property.

Direct Minerals, Inc. dropped its state mining lease but kept some Federal claims covering magnetite.

New locations of magnetite placer claims increased early in the fiscal year but were few in the latter part.

The Tribal Council of the White Mountain Apaches gave Colorado Fuel and Iron Corp. a two year extension for further iron exploration and feasibility studies of 36,000 acres of their reservation near Young. Studies were started early in 1963. Numerous claims have been located west of this area beyond the reservation and nearer Young.

Canyon State Leasing Co. was reported to be building roads and excavating at a millsite at the Golden Ray Group of iron (hematite) claims 10 miles northeast of Parker.

Canyon State Development Co. started building a road to magnetite placer claims also near Alamo, Yuma County.

E. M. Seitz shipped some iron ore from the Margaret Howard mine in Gila County to a Phoenix foundry.

George B. Smith Chemical Works shipped hematite ore from the Sally mine in Mohave County and Ferro-Oxide Research, Inc. shipped like ore from stockpiled ore from the Iron Chancellor mine, in the Seligman area. The Ferro-Oxide Co. built a pulverizing plant for grinding paint pigment but did not operate it.

Manganese

Ampco Process Corp. started construction of a pilot plant for recovery of manganese dioxide plus iron and copper from low grade ores, for Sterling Oil Co. of Oklahoma. No manganese ores were produced in Arizona in the fiscal year 1962-63.

Mercury

Hugh Nichols and Oliver Brunson, who have been exploring and developing the Mercuria claims, installed a $1.5\,$ to $2\,$ ton retort to treat the Mercuria ores.

Exploration work was done by J. A. Bacon, H. A. Lee and William Brunson at the Pine Mountain mine, and by Amity Mining Co. at the Ord and Bluebird mines, in the Sunflower district, Gila County.

Tom Bolich et al installed a new retort and processed some ore in the 150 ton plant at the National mine. The ore was taken from an open cut.

Beryllium |

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

Non-Metallic Minerals

Sand and Gravel continued to be second in value among Arizona's mineral commodities produced in 1962. Glen Canyon Dam and highway construction took the bulk of the material used. Production in the fiscal year probably was lower than in 1961-62.

Building stone production probably increased in 1962-63. Western States, Dunbar, Armstrong, Maesta stone companies produced flagstone and cut stone at their plants at Ashfork and Williams. Other smaller operators in these areas produced flagstone or stone for cutting.

Melluzzo Stone and Apache Building Stone companies of Phoenix produced ornamental stone in areas around Phoenix and unique stone was taken from small quarries in several parts of the state.

Terrazzo and roof chips were sized and shipped by Dragoon Marble Quarries, Inc., Dragoon; Sierrita Marble Products Co., Tucson; David C. Hartley, Tucson; Snotop Minerals, Inc., Santa Ana, California; Klaner & Doolin, Scottsdale; Ed Town, Globe; and U. S. Marble Corp., Aguila; from quarries in Cochise, Pima, Mohave, Gila and Yuma Counties. Arizona White Eagle Stucco Co. of Phoenix crushed and sized limestone from near Cave Creek for stucco and various uses.

Paul Lime Plant, Inc., Paul Spur; Hoopes & Co., Miami; U. S. Lime Products, Nelson; and three of the copper companies operated limestone quarries and lime plants in Arizona. Most of the lime produced was used in the concentration of copper ores.

Alba Mining Corp. continued production of bleaching clay from the Cheto mine near Sanders.

With completion of concrete work at Glen Canyon Dam near, the cement plant at Clarkdale and pozzolan plant north of Flagstaff faced loss of substantial business. The gypsum operators in the Camp Verde area and other mineral suppliers were in like position.

Arizona Perlite Roofs, Inc., and Harborlite Corp. increased production at their perlite quarries and plants near Superior to meet increased demand for filtering media.

The fluorspar mill at Duncan was started on a test basis using ore from New Mexico, but operated only a short time in 1963.

Buckeye Mica Co. ran its Buckeye grinding plant at capacity in 1962-63.

American Diatomes, Inc. found an outlet for its diatomite in insecticides and operated its plant in Pinal County in the latter part of the fiscal year.

Jaquays Mining Co. completed its contracted shipments of Crude No. 2 asbestos to the Government. The company had good demand for filter grade, No. 3 asbestos from its plant at Globe, but not for the higher, expensive grades. Metate Asbestos Co., Globe, produced filter grade, No. 3 fibre and shorter grades, some of the latter going to Mexico. Ed Town remilled some fibre for the Phillips estate then converted his plant at Globe for production of terrazzo chips.

The use of pumice in lightweight concrete aggregate for concrete blocks and other uses, increased in the year.

Mrs. Mary Jo Bracken made history by finding an outlet for the mineral diopside, hitherto unused commercially. It is being produced by her for use in the manufacture of ceramic tile. The department is pleased to have been of help to Mrs. Bracken in search for this outlet.

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Department Activities

Laws, regulations and administrative procedures pertaining to mineral rights in the public domain continued to be subject to abnormal attention from the Departments of the Interior and Agriculture, the Congress, and others, including this department. The department studied various bills introduced or drafted, distributed information about them, and discussed them with mining people at special meetings and regular meetings of the Arizona Small Mine Operators Association.

Congressional hearings also were held on other subjects in which the department took active interest. These included numerous metals in stockpile surplus, tax laws-depletion, gold, mineral subsidy, silver purchase act, and lead-zinc import control.

The special assistant attended a number of these hearings and the department protested House and Senate bills to suspend the excise tax upon copper imports, and the Wilderness bill as passed by the Senate of the 87th Congress. The department worked for a government long range mineral policy, protection against low cost mineral imports, and equitable return for gold mines which are idle because of the 1933 fixed price of gold and the inflated mining costs of 1963, and against reduction of depletion allowances, disrupting stockpile sales, and the growing tendency of the Departments of Interior and Agriculture to disregard long-standing precedents, based upon numerous court decisions, in the administration of our mining laws.

The director was a delegate to the Western Governors Mining Advisory Council and served on its Discovery, Uniform State Law, Specific Metals & Minerals, and Health and Safety committees in the fiscal year. He attended the annual meeting of the Council at San Francisco in September, 19-22, and a special meeting for consideration of recommendations at the same city in January. He also assisted at the presentation of recommendations at the Western Governors Conference at Phoenix in April. The director attended a meeting of the Public Lands Committee of the American Mining Congress at Reno, Nevada, in August, 1962, and the annual meeting of the Western Division of the Congress at San Francisco in September.

The director gave a lecture at Arizona State University and another at Arizona State College and talked to various organizations on the subject of mining in Arizona.

Publications

The following statistical reports were issued to a regular 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:

Copper Excise Taxes and Peril Point for Copper.

Inventory of Arizona Lands - As of June 30, 1961.

The Gold and Silver Industries in the World, United States and Arizona.

Copper Industry - Statistics for 1961 Compared with Other Years - Arizona, United States and World.

Lead and Zinc Industry - Statistics for 1961 Compared with Other Years - Arizona, United States and Free World.

Copper in 1962.

Review based on Preliminary Statistics Published by the U.S. Bureau of Mines.

Preliminary Estimate of Copper, Lead, Zinc, Gold and Silver Production in Arizona and the United States, in 1962.

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

The booklet, History of Mining in Arizona was revised and republished, the first printing having been exhausted.

Lists of active mines in Arizona were compiled in October, 1962 and April, 1963, mimeographed and distributed upon request.

Gold Today, a paper by Travis P. Lane, of which about 1,000 copies were distributed, was revised to bring it up to date and mimeographed.

Articles on mining in Gila, Yuma and Yavapai Counties and a county by county outline of mining prospects for 1963, were written at the request of the Development Board.

Lists of Arizona gypsum, molybdenum, iron and marble deposits were compiled and distributed.

The larger mining companies were canvassed and a list of their visitor privileges was prepared and distributed.

Information and Other Services

The department's files, maps and library on Arizona mining properties and mining are in constant use and of recognized high value. This fiscal year, employees of the U.S. Bureau of Land Management spent considerable time examining department records and maps during the year.

A department field engineer is present at the Phoenix office, and much of the time one is at the Tucson office, for consultation. The engineers also are present at announced places and dates during the year. The administrative assistant is especially helpful in land matters because of experience with the federal land office and with this department.

During the fiscal year, the field engineers traveled 30,453 miles, attended 138 meetings of the Arizona Small Mine Operators Association, made 297 mine visits, and discussed mining problems with individuals on 1761 occasions - 447 in the field, 776 in the office and 538 by phone. They also answered 217 mail inquiries. Miscellaneous services included: Vice-President, program committee chairman, Maricopa Subsection, A.I.M.E.; program committee chairman of Phoenix Council, A.S.M.O.A., lecture at Arizona State University and talks at several meetings, on the subjects of geology and mining.

There were 1812 visitors and 4172 telephone calls to the department during the fiscal year.

There were approximately 10,600 visitors to the Mineral Museum, exclusive of an estimated 64,000 visitors during the State Fair. Special visits for 575 school children and special meetings with 1760 total attendance were held in the Mineral Building. The museum curator answered 972 inquiries, sent out 493 specimen kits to school children and acquired 20 new specimens. Twenty-three new museum exhibits were prepared; and 13 old exhibits were re-worked. The Woolery collection of beautiful mineral specimens was given temporary housing in the Mineral Building and attracted much attention.

The following financial statement shows a return to the General Fund at the end of the year of \$5,372.09, due largely to unused travel allowance.

FINANCIAL STATEMENT

Department appropriation		\$ 82,109.00
Expenditures:	A 5/ (01 7/	
Personal Services	\$ 54,691.74	
Professional Services	7,150.00	
Travel - State	5,422.52	
Travel - Out of state	455 . 55	
Current Expenditures:		
Utilities	1,137.08	
Telephone	1,234.08	
Postage	984.50	
Bldg & Equip Mtnce	1,558.77	
Supplies: Office, etc.	2,397.99	
Fixed charges	215.39	
Subscription & Organization Dues	100.00	
Capital Outlay	1,389.29	
Total Expenditures		\$ 76,736.91-
zouwa amponwa du zoo		7 /03/30:72
Returned to General Fund		\$ 5.372.09
Deposits: Sale of Regulations book	lets	\$ 5,372.09
Deposited. Data of Regulacions Book.	2020	7 3.70
MUS EUM ACCO	UNT	
Balance Brought Forward		\$ 274.77
Deposits		2,600.00
Deposits		\$ 2,874.77
Franco di turca :		7 2,074.77
Expenditures:	0 2 / 00 00	
Personal Services	\$ 2,400.00	
Employer share OASI &		
State Retirement	165.12	
Janitor & Maintenance supplies	24.49	
Total Expenditures		\$ 2,589.61-
Carried Forward		\$ 285.16