

OFFICIAL FILE

**THIRTEENTH
ANNUAL REPORT**

★

**DEPARTMENT OF
MINERAL RESOURCES**

STATE OF ARIZONA

JULY 1, 1951 TO JUNE 30, 1952

★

R. I. C. MANNING
Director

"Mining, probably more than other industries, is made the object of discriminatory legislation and confiscatory taxation. The development of natural resources, often difficult under the most favorable circumstances, is discouraged by unfavorable security laws and severance taxes. And in this way the State loses because natural resources which are not developed are not wealth, and some of your sons have to move to foreign countries to find employment."

Otto Herres

"Many of the great mines in this continent, perhaps most of the older ones, were developed by the public through the medium of stock companies shares which were bought by people in all financial categories. In those years the man of small means had an opportunity to gamble on the success of a mining venture. Many of them won. Some made fortunes. But today, because of the restrictions imposed by the Securities and Exchange Act, and similar state laws, these men are discouraged from taking such chances with their own money. There are, however, no restraints on playing the horses and bucking the slot machines and roulette tables. I have yet to hear of a fortune founded in a crap game or at the races . . ."

John G. Baragwanath, V-Pres.
Freeport Sulphur Co.



**DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA**

Board of Governors:

Charles F. Willis, Phoenix, Arizona, Chairman
(Term expires January 31, 1956)

Edwin W. Mills, Salome, Arizona, Vice-chairman
(Term expires January 31, 1953)

H. F. Mills, Humboldt, Arizona
(Term expires January 31, 1954)

T. J. Long, Globe, Arizona
(Term expires January 31, 1957)

Stanley M. Secrist, Tucson, Arizona
(Term expires January 31, 1955)

Personnel:

R. I. C. Manning, Phoenix, Arizona, Director

W. C. Broadgate, Prescott, Arizona, Special Assistant

J. E. Busch, Tempe, Arizona, Mining Regulations and Land Specialist

A. L. Flagg, Phoenix, Arizona, Field and Office Engineer, Central District

Axel L. Johnson, Tucson, Arizona, Field Engineer, Southern District

Mark Gemmill, Prescott, Arizona, Field Engineer, Northern District

Frank J. Tuck, Phoenix, Arizona, Statistician

Mrs. Glenn W. Pare, Phoenix, Arizona, Office Secretary

Mrs. George L. Dunagan, Phoenix, Arizona, Stenographer

**FINANCIAL STATEMENT
DEPARTMENT OF MINERAL RESOURCES**

STATEMENT OF EXPENSES
July 1, 1951 - June 30, 1952

	Expendi- tures for fiscal year	Lump Sum Appropriation for fiscal year	Balance Returned to State
		\$50,000.00	
PERSONAL SERVICES	\$36,374.25		
CURRENT EXPENDITURES—OTHER:			
Utilities	\$ 343.09		
Tel. & Tel.	435.14		
Postage	420.31		
Equipment Maint. & Repair	508.89		
Office Supplies	856.72		
Janitor Supplies	45.36		
Engineering Equipment	340.30		
PRINTING OF:			
Annual Report	\$199.56		
Regulations Book	499.90		
Mining's Part in Arizona's Economy	223.82	923.28	
Miscellaneous	85.95		
	\$3,959.04		
		3,959.04	
TRAVEL:			
State	\$5,381.86		
Out-of-State	239.54	5,621.40	
SUBSCRIPTIONS & DUES		13.00	
CAPITAL OUTLAY		3,178.14	
TOTALS:	\$49,145.83	\$50,000.00	\$854.17
Recovered for Insurance Loss		52.55	
Partial replacement of stolen property	36.16	52.55	16.39

Much time and effort was devoted to investigations in the Tungsten field toward securing a fair price for the metal and operation of custom mills to treat ores from small operations.

There was an increase of about 25% in the number of operating mines over the previous year and a few of these individuals and companies are new to mining. This plus the fact that there is a ready market and good price for most minerals produced in this state has attracted many and the requests for service by this Department has increased considerably.

We have cooperated to the best of our ability with other state and federal departments in the securing and dissemination of data for the betterment of the mining industry in general. Requests for aid in preparing reports and filling out forms for participation in the federal programs have been numerous.

WASHINGTON ACTIVITIES

The Department has continued its efforts during the year in formulating a workable program for the mining industry in an effort to increase the production of strategic minerals badly needed in the rearmament program.

Continuous work has been done on the policy programs of DMPA and DMEA especially to get some sort of development loan set up which will bridge the present gap between exploration and development, thereby enabling the small operator with limited means to carry his undertaking through to a successful conclusion.

Some measure of success was achieved for the gold mining industry when those hurt by L 208 were granted the right to sue for damages regardless of the statute of limitations.

We were able to render valuable assistance on the manganese program hearings and the establishment of the Wenden depot.

Data was gathered for the tungsten producers in an attempt to formulate an equitable purchase program for local ores and concentrates.

Miners were assisted in getting their applications for Federal assistance to and through the proper agencies.

Aid was rendered several applicants in obtaining consideration of requests for over the market prices in order to keep their properties in production where scarce metals were being mined.

Some Governmental departments in Washington still are trying to change over basic mining laws. The trend seems to be toward a leasing system particularly on forest lands and they are using non-metallics as an entering wedge. The idea of public ownership apparently grows with long tenure of office in Federal Bureaus.

To the Honorable J. Howard Pyle
Governor of Arizona
Capitol Building, Phoenix, Arizona

Dear Governor Pyle:

Pursuant to Chapter 27, Laws of 1939, creating the Department of Mineral Resources, I am submitting herewith the 13th Annual Report of the Department covering the fiscal year July 1, 1951 to June 30, 1952.

Respectfully,

(signed) R. I. C. MANNING,
Director.

Offices:

The headquarters office of the Department is located in the Minerals Building at the State Fairgrounds, McDowell and Nineteenth Avenue, Phoenix.

The field offices are located as follows:

Northern District:

Chamber of Commerce Building, 150 South McCormick, Prescott, Arizona

Southern District:

Chamber of Commerce Building, 80 South Stone Avenue, Tucson, Arizona.

Central District:

Mineral Building, Fairgrounds, McDowell and 19th Avenue, Phoenix, Arizona.

Both the Prescott and Tucson Chambers of Commerce have graciously furnished space to the Department at no cost to the State and the many favors extended are gratefully acknowledged.



Department of Mineral Resources, Phoenix, Arizona

tunity to make the necessary contacts with the miners and prospectors having need of their services. It also serves as a medium whereby engineers can disseminate information regarding the various governmental programs for the procurement of metals badly needed in the rearmament program and explain the various forms of federal participation in exploration and development programs. They are able to render considerable assistance in the preparation of applications for federal loans of various sorts.

The field activities entailed travelling 47,591 miles.

GENERAL

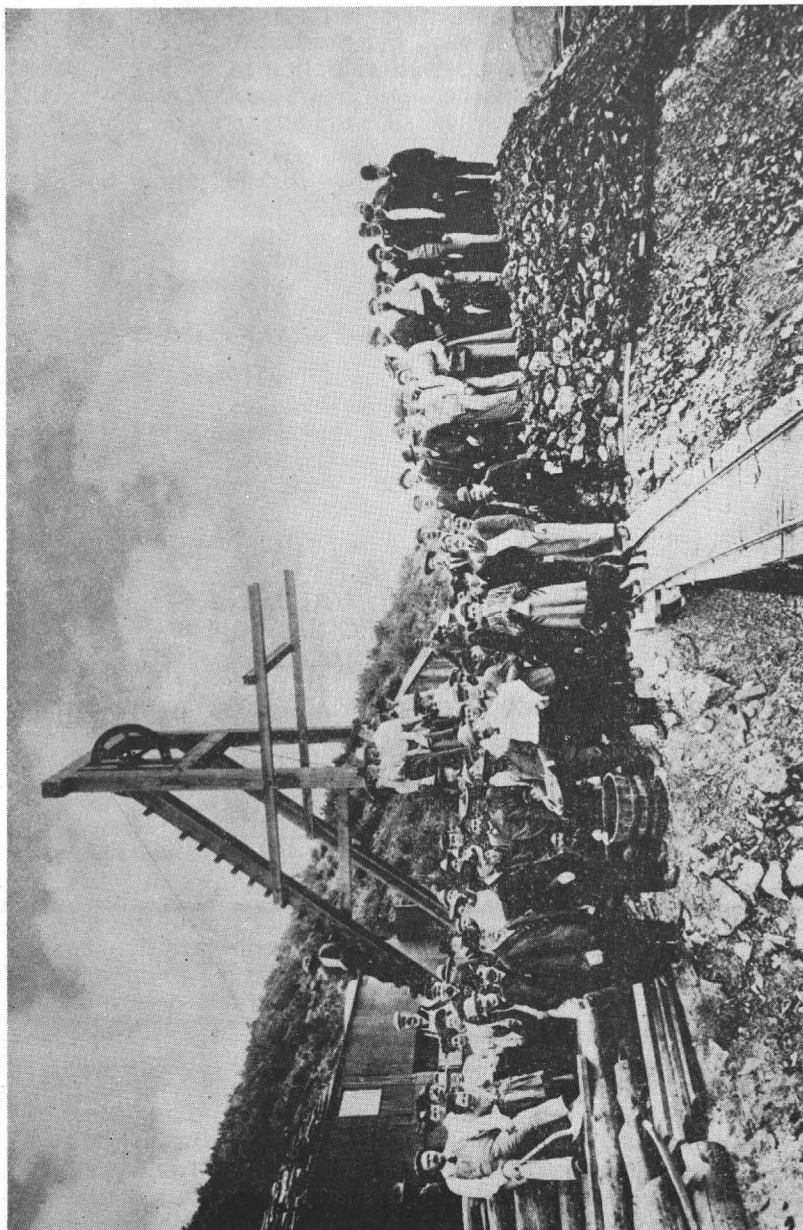
Some thirty odd reports have been issued by the statistical section of this Department, covering metal production, taxation, mining employment and wages; and stories of the low-grade porphyry copper mines and some of the large bonanza mines. Copies of these reports have been mailed to the Governor and the committee-chairman of the Arizona legislature, the state tax commission, the corporation commission and the state mine inspector; also to the college business bureaus and Arizona and United States Bureau of Mines, tax research association, and any newspapers which have asked for them.

The pamphlet entitled "Regulations Governing Mineral Locations in Arizona" was revised and printed—this being the third edition. We also published a pamphlet entitled "Mining's Part in Arizona's Economy".

In addition to the above, the Department has available for free distribution to the general public mimeographed lists of buyers of the principal metals and non-metallics. We also have available mimeographed instructions as to the procedure to follow in applying for a mineral patent.

Lectures have been given to some 700 students in grade schools in the importance of the mineral industry and we have mailed 106 boxes of mineral specimen to school children throughout the United States. A charge of 30c per box has been made to cover the cost of handling and postage. Some 500 people have visited the main exhibit in the past six months, in spite of the fact that this exhibit has had no heating or cooling facilities and no funds are available for janitor or custodian care. It is our fond hope that in the near future it will be possible to put this exhibit in a condition where it will be a credit to the State.

The Department personnel participated in conference and hearings on the Manganese program, which has lead to the establishment of a manganese purchasing depot, soon to be in operation at Wenden.



EARLY DAY MINING

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 minerals.

Do such other things as may assist the more extensive exploration and development of the mineral resources of the state."

ARIZONA'S METAL PRODUCTION

Source: U. S. Bureau of Mines

	GOLD oz.	SILVER oz.	COPPER lbs.	LEAD lbs.	ZINC lbs.	TOTAL VALUE \$
1941	315,392	7,498,260	652,634,000	31,276,000	32,986,000	\$ 97,638,310
1942	253,651	7,064,467	786,774,000	29,544,000	37,044,000	114,525,600
1943	171,810	5,713,889	806,362,000	27,454,000	39,354,000	121,212,902
1944	112,162	4,394,039	716,606,000	33,414,000	58,154,000	113,094,806
1945	77,223	3,558,216	574,406,000	45,734,000	80,452,000	95,963,006
1946	79,024	3,268,765	578,446,000	47,860,000	87,330,000	114,986,254
1947	95,860	4,569,084	732,436,000	57,132,000	109,288,000	182,752,537
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	806,602,000	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

*Final Figures

RELATIVE 1951 PRODUCTION

Preliminary Figures

	United States	Arizona	Arizona %	Arizona's Place	Leading State	Production
Gold (oz.)	1,957,543	118,000	6.03	5	South Dakota	466,918
Silver (oz.)	39,463,661	5,165,000	13.09	4	Idaho	14,642,231
Copper (tons)	928,576	417,000	44.91	1	Arizona	417,000
Lead (tons)	390,428	17,300	4.43	6	Missouri	125,928
Zinc (Tons)	679,111	53,000	7.80	4	Montana	84,205

Furthermore, the Arizona mines already have a large and unjustified assessed valuation. The assessed valuation of the mining industry in Arizona for the past 10-year period is 10 per cent greater than the value of the production, whereas in the agricultural industry the assessed valuation in the same period is approximately one-half the value of its production. For the cattle industry, the assessed valuation is approximately one-fifth the value of its production.

Thus the Arizona mines are already "soaked" under both the Arizona sales tax law and the property tax valuations. This factor is causing new capital to look to other fields and other states for investments.

SOME FIGURES ON ARIZONA'S PRIMARY INDUSTRIES

Industry	1950 Production Dollar Value	State Property and Sales Taxes on Each \$10,000 Produced	Percentage
Mining	\$201,034,000	\$257.30	128.0
Agriculture	186,037,000	71.08	38.0
Cattle	89,858,000	20.08	22.0

AVERAGE ASSESSED VALUATION AND VALUE OF PRODUCTION

(10-Year Period—1941-1950 Inclusive)

	Assessed Valuation	Value of Production	Percentage
Mining	\$154,993,208	\$141,531,000	110.0
Agriculture	64,807,184	107,141,200	60.0
Cattle	12,128,450	59,079,300	21.0

FIELD ACTIVITIES

As a result of an increase in our yearly appropriation, we reopened our Tucson and Prescott field offices which gave us three field engineers to serve the mining industry—the other engineer being stationed at the headquarters office in Phoenix.

The engineers visited 345 mining properties at the request of the owners. The Department has always considered these field trips as one of its most important functions as the engineers can render valuable assistance to small mine operators in advising as to proper procedure. This is particularly true where the operators are new to the mining industry.

The engineers attended 202 Arizona Small Mine Operators Association meetings. These meetings afford them an oppor-

recommend that the Board of Governors of the Department of Mineral Resources might be authorized by law to recommend full or partial exemption of a new mining project for a period not exceeding five years.

The present effort to saddle a new severance tax on the mining industry is certainly not the way to encourage new mining investments. There would be justification for such a tax if it were a substitute for the ad valorem tax, but since it is another tax added on to so many others now burdening the mining industry, it might turn out to be the last straw that breaks the camel's back. The low-grade mines of the State, which account for most of the metal production, are working on a very narrow margin, and any additional tax might very well be the difference between life and death.

The idea that the mining companies are depleting the State's natural resources is flagrantly absurd, when it is realized that the mining companies have created the resource out of worthless rock, by the expenditure of money and brains. They have taken Federal lands on which no taxes were being paid and have put them on the tax rolls, thus contributing to the State tax revenue. Instead of depleting the State's resources, the mining companies are adding to the State's wealth.

Those who are advocating increased mine taxes are promoting the thought that the Arizona mining industry is not paying its just share of state property taxes and that the mines pay only a 1 percent sales tax whereas the public pays 2 per cent. Both of these statements are fallacies.

The mining industry pays a 2 per cent sales tax on everything it buys, just the same as everyone else. In addition, the mines pay a 1 per cent production tax—according to the provision of the sales tax law—and mining is the only primary industry in the state which is taxed on production. Thus the mines already pay a production or severance tax, but cannot pass this tax on to their customers as is done by those who collect the sales tax on retail sales.

The mining industry is, and has been for many years, "soaked" by taxes in Arizona. In 1950 the mines in Arizona paid \$557.34 in taxes per \$10,000 production, as against \$412.94 in Utah, \$379.82 in New Mexico, \$273.05 in Montana and \$179.81 in Nevada. Thus the mines in Arizona pay higher taxes than if they were located in any other western state.

This alone, however, does not answer the question as to whether mining is paying its share of Arizona taxes. It is significant that, based upon the dollar value of the production, the mining industry in Arizona pays $3\frac{1}{2}$ times as much taxes as is paid by the agricultural industry and 12 times as much as is paid by the cattle industry.

ARIZONA METAL PRODUCTION

GENERAL:

The table on the opposite page shows Arizona's metal production of gold, silver, copper, lead and zinc. Arizona is first in copper, fourth in silver and zinc, fifth in gold and sixth in lead. Considering the present large output of open pit properties plus the expected production from new properties now being brought into production, Arizona bids fair to maintain its No. 1 position in the production of copper for many years to come.

The value of Arizona's metal production for 1951 is estimated by the U. S. Bureau of Mines to be \$235,289,045 and leads the second ranking state (Utah) by over fifty millions of dollars. This estimated value was arrived at by assigning the respective average market prices of the metals to the reported production, as follows: (Production figures are final figures issued by U. S. B. M.)

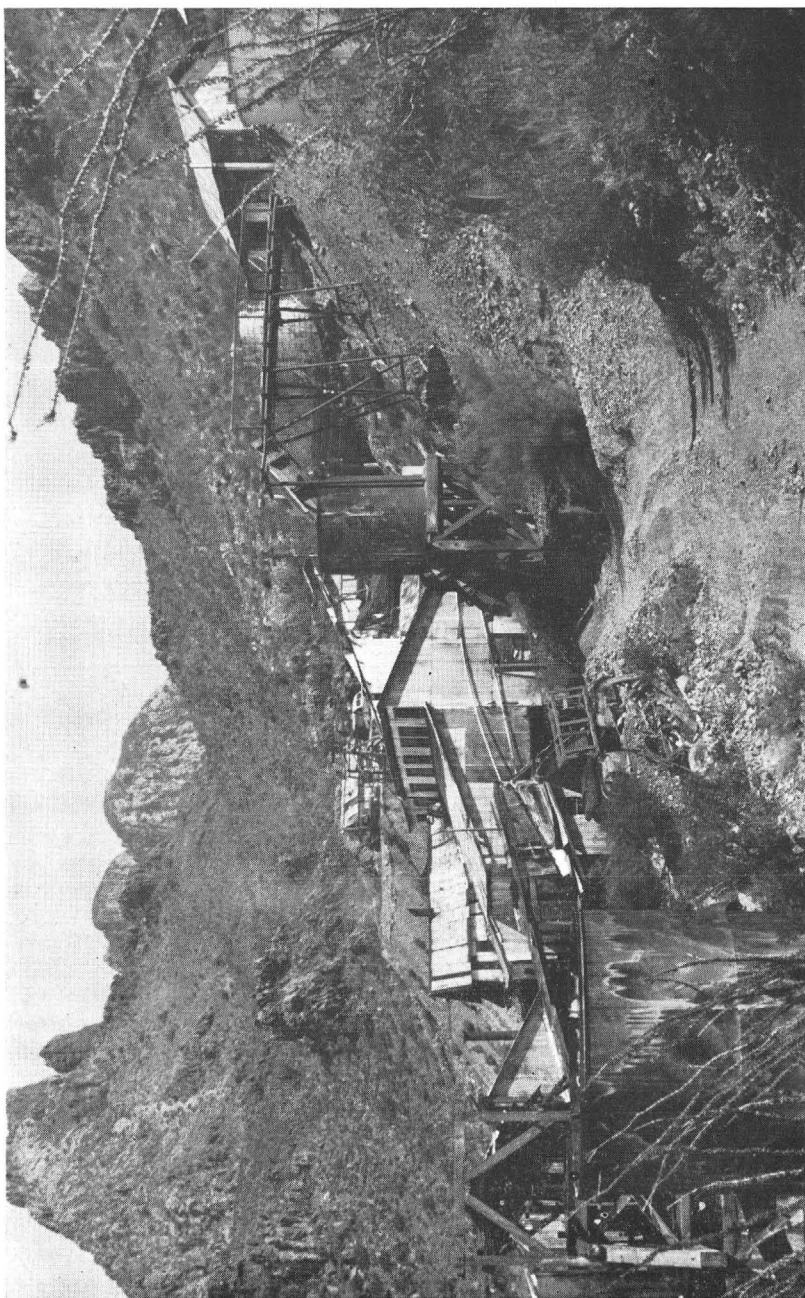
415,870 tons copper	@ 24.3c lb.	\$201,281,080
17,394 tons lead	@ 17.1c lb.	6,018,324
52,999 tons zinc	@ 17.9c lb.	19,291,636
116,093 oz. gold	@ \$35.00 oz.	4,063,255
5,120,985 oz. silver	@ 90.5c oz.	4,634,750
TOTAL VALUE		\$235,289,045

Actually, with the exception of the gold and silver values, the values of these metals as they left the State to be transported in interstate commerce, and to be further processed, and marketed, were lower by the cost of freight, refining and marketing in the case of lead and zinc. The full government price of the gold and silver was returned to the state's producers.

This lower value of copper, lead and zinc may be obtained by reference to the sales or production tax reports of the State Tax Commission, which uses the statutory gross sales value of ore, concentrate, or metal "at the time it enters interstate commerce". For the year 1951 the gross mining income, on which the sales, or production tax of 1% was paid, amount to \$214,203,279. If we add the value of gold and silver as shown above, we get \$222,901,284, as "The gross sales value of ores, concentrate or metal at the time it entered interstate commerce".

GOLD AND SILVER:

Production of gold and silver for 1951 was practically the same as that for 1950 both of which showed about a 10% increase over 1949. Since nearly all of the gold and silver is a by-product of copper, lead and zinc mining the quantity recovered varies in proportion to the production of those three metals.



Idle Gold Mine

Originally, processed perlite was used almost exclusively in the building industry. At present it is still used to a greater extent and most successfully in building, also by poultry raisers and fertilizer manufacturers, horticulturists, oil and natural gas producers, oil cementers, acidifiers and service companies.

The most recent and a very promising application of perlite in manufacturing is its use in foundry practice. It has been found adaptable as an insulator, in moulding sands, core sands and ladle covering. A detailed report of results obtained in actual practice at the Puget Sound Naval Shipyard is set forth in a paper presented to the American Foundrymen's Association at its Annual Meeting in 1952.

There are two concerns producing and marketing perlite in Arizona at the present time. One produces from three to five cars per month of raw material which is processed within the State for consumption in the immediate vicinity. The other concern, producing from seven to ten cars monthly for export, is strictly a supplier of sized raw material. This is crushed and graded to meet the sizes required by the processors whose specifications vary according to the ultimate use of the product. Projected improvements and expansion of plant facilities will more than double the present rate of output. Processing is not contemplated as a part of this operation.

MINING TAXES

The matter of taxation is one of prime importance to the Mining Industry. If new ore bodies are to be discovered and developed, serious consideration must be given to changes in the tax structure which will encourage rather than discourage the development of new mines and the inflow of capital into the State for mining investment.

Studies by this Department have shown that there must be something wrong with the methods of mine valuation used here in Arizona, when Arizona's mining taxes are compared with those of its sister mining states of Utah, Montana, Nevada and New Mexico.

The Griffenhagen Report states that the State property tax is particularly in urgent need of improvement. The report recommends that ore deposits as such be exempted from taxation, and that a new method of valuing producing mines be developed, in consultation with the mining companies, basing the taxable value on a five-year average of net proceeds base. It recommends that if it is decided to continue the conventional method of property assessing for mines, an advisory committee on mine appraisal be formed to advise the Tax Commission. In the event of the proposed exemption of new mines, the tax consultants

GYPSUM:

From the deposit south of Winkelman, twenty to twenty-five cars of gypsum per month are shipped to the Arizona Portland Cement plant at Rillito. The Western Gypsum Company of Wickenburg produces a small amount intermittently. There is no current production of plaster fabricated products in the State. Agricultural gypsum is all imported.

MICA:

The mica processing plant at Buckeye continues to operate on material from nearby sources and the steady output of the San Antonio mine south of Ajo. Lacking a continuous supply of raw material the plant at Aguila has not operated since the first of the year 1952. Several potential new sources, in widely separated areas, are being explored for additional scrap mica.

PERLITE:

The perlite industry, initiated in Arizona about 1944, experienced a temporary boom which subsided within a year or two because of lack of proper understanding of not only the properties of raw and expanded perlite, but also of the application of the processed material to industry. Carefully directed research has pointed the way to successful application in the original uses and, during the same period, developed new uses for perlite in various forms. As a result, the perlite industry is in a much better position than it has been with prospects of a considerable expansion during the next few years.



PUMICE DEPOSIT — Coconino County

In the case of gold there were no mines operating during the year having it as the principal mineral and none are likely to commence operations as long as the price remains at \$35.00 per ounce and the cost of labor and materials maintain their present levels.

The Congress passed and the President signed Senate Bill 3195 giving gold miners who were damaged as a result of WPB L-208 Limitation Order issued October 8, 1952, the right to bring suit for damages even though the statute of limitations has run out. This must be done within one year from the date of the enactment or presumably by July 14, 1953.

If the price of gold were now increased in proportion to the increased cost of labor and materials since 1934 when the present price of \$34.95 per troy ounce was set, Arizona would undoubtedly experience considerable gold mine activity.

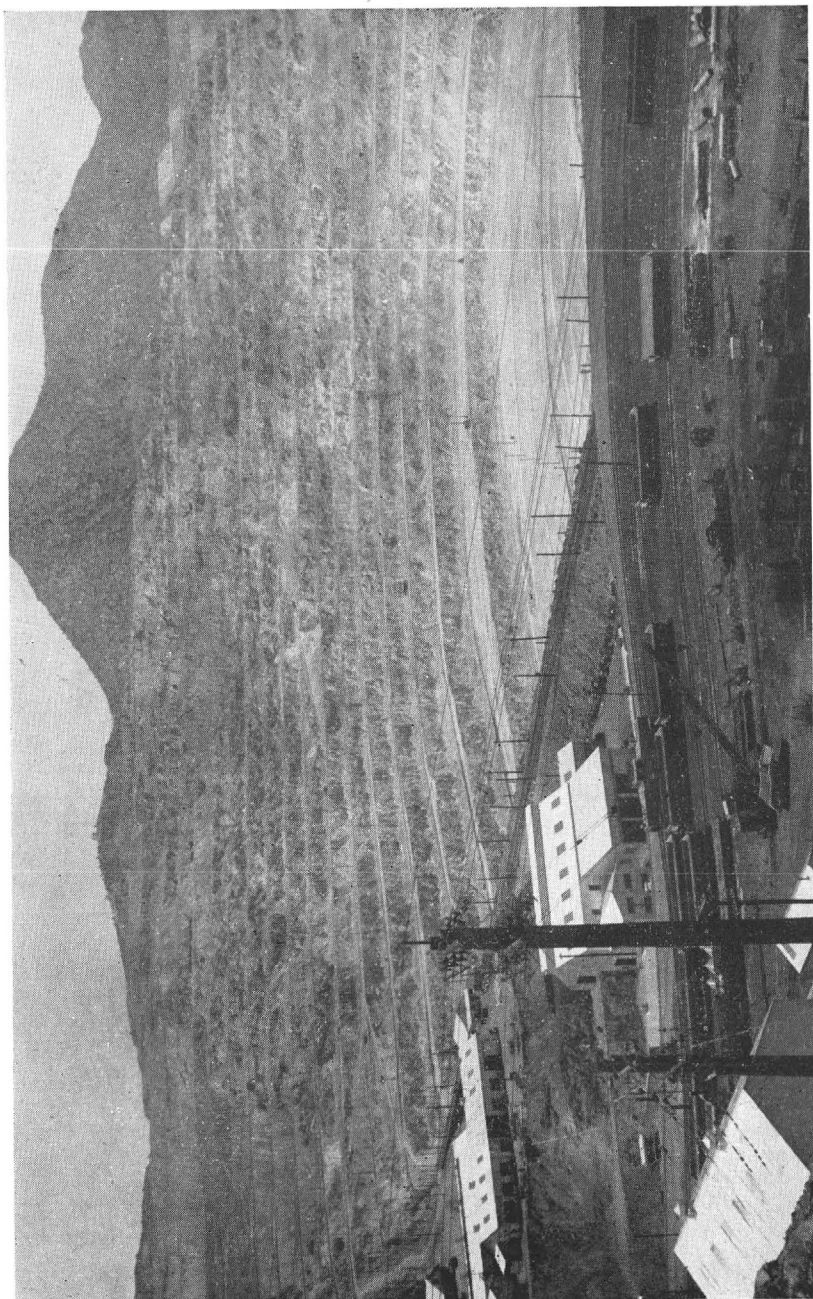
COPPER, LEAD AND ZINC:

The beginning of the year saw copper, lead and zinc in critically short supply because of the rearmament program and increased civilian needs. Within the year however, lead and zinc have become more plentiful and the current price of 15.8 cents and 15 cents represents a decline of 3 cents for lead and 4.5 cents for zinc.

Copper is still in short supply and has maintained a constant price of 24½ cents throughout the year. Over the market price contracts up to 35 cents have been made in some instances in order to keep producing mines in operation.

MANGANESE:

As a result of the government stockpile depot at Deming, New Mexico and the General Services Administration's purchasing program there was considerable interest in manganese mining. It soon became evident however that penalties for impurities plus high freight rates made mining the deposits in the vicinity of Aguila, Wenden and Artillery Peak unprofitable. Since by far the largest tonnage of ore appeared to be in this area, negotiations were started toward the establishment of a purchase depot in this vicinity. After many examinations, conferences with Federal officials in Phoenix and trips to Washington by representatives of local mining people, the General Services Administration agreed to put into operation a purchase depot at Wenden. It is hoped that this will be in operation by September 15, 1952 and it will undoubtedly provide the incentive for the activation of many manganese mines.



Open Pit Copper Mine, 1952



BENTONITE

tile has the lowest iron content, an especially important factor in some fields of use.

FLAGSTONE:

Flagstone principally from the Drake, Ashfork, Williams areas, produced in the neighborhood of 50,000 tons. The industry employed about 250 men. A large portion of the product is shipped to California.

CEMENT:

The one cement plant operating in the State doubled its capacity during the past year and is now producing approximately 1,500,000 barrels of cement per year, all of which is used within the State.

FLUORSPAR:

Currently there are three active fluorspar properties in the State. Development and preparations for milling plants are in progress at two of these properties. One is located in the Whetstone district, Cochise County, and the other in Ask Peak or Steeple Rock district, Greenlee County. These two properties are under the same management. When the proposed processing plants are completed, there will be a considerable increase in the production of fluorspar from Arizona. At the present the only property on a steady production basis is in Maricopa County, southwest of Wickenburg. The entire output is shipped to the Geneva Steel Company, at Provo, Utah.

average recoverable titanium content. Its economic future depends on the outcome of efforts to reduce the titanium metal at a lower cost and the freight rates to fabricating plants. Bismuth has been produced in small quantities and one small shipment of tantalum minerals has been made. No doubt many of the minerals for which the demand is increasing steadily will be produced sooner or later in Arizona.

URANIUM:

Mining of uranium in the State continues at an ever increasing rate with most of the production coming from the Navajo Reservation, the lone exception being at Hack's Canyon in Mohave County. Several discoveries have been made in other sections and a fair tonnage has been proven in the vicinity of Roosevelt Lake in Gila County.

There is still considerable activity in prospecting for radioactive ores among both professionals and amateurs and requests for assistance regarding it lead all other minerals.

NON-METALLICS

ASBESTOS:

During the past year Arizona chrysotile asbestos production, all of which comes from the Sierra Ancha Mountains north of Globe, increased materially. The market has been steady and producers have been able to dispose of their product without delay. Exact figures as to yearly production since 1944 have not been released by the Statistical Division of the U. S. Bureau of Mines but the current output is from five hundred to seven hundred tons per month. There are seven mills treating the product from the twelve major mines. In addition to the properties producing regularly a number of new properties are being developed.

Unlike the deposits in Canada there is no massive fiber-bearing rock in Arizona. In Arizona the asbestos is associated with serpentine, more or less parallel to the enclosing Mescal limestone which has been intruded by sills and dikes of diabase. The deposits are nearly horizontal, with outcrops on the steep faces of cliffs, affording an easy point of access for development by tunnels and drifts.

Early in 1952 the majority of the producers in this district formed the Arizona Asbestos Producers Association to study marketing problems, the betterment of transportation facilities within the active area and similar factors affecting production and marketing. The superiority of Arizona asbestos, most of which is of the cross-fiber variety is well known. Of all the asbestos produced in the Western hemisphere, Arizona chryso-

TUNGSTEN:

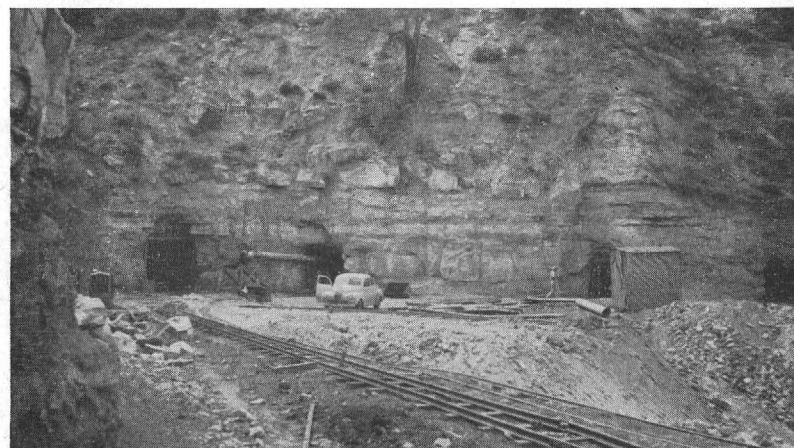
There has been considerable activity in tungsten mining throughout the year and there are several properties now in operation, the largest of which has a capacity of 300 tons per day.

Apparently each deposit of tungsten within the state provides an individual problem as to milling and it seems to be the consensus of opinion that under the present purchase program with high penalty costs, anyone attempting to produce tungsten at a profit will almost have to have at his disposal a deposit sufficiently large to warrant a milling plant of his own.

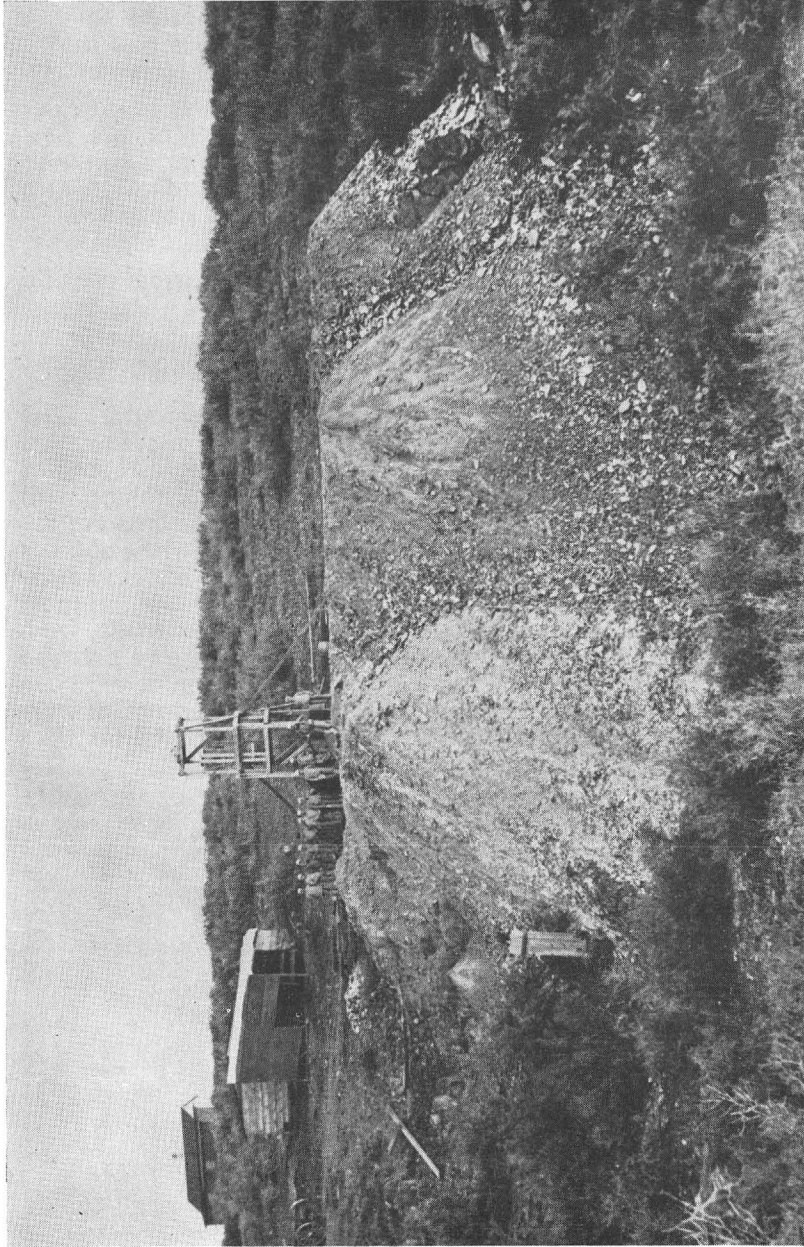
There are a few mills in the State that handle custom ore and purchase concentrates.

LITHIUM MINERALS:

Research and recent technologic advance have brought to the fore many of the uncommon elements, including the so-called rare earths which previously have been in the same category as museum pieces. Because the prospector is not familiar with the relatively scarce minerals from which these elements are recovered or the mode of occurrence, the discovery of new sources of workable deposits is a slow process. The application to industry is far ahead of new sources of supply. Beryl is the most easily identified and several shipments have been made from Arizona. New deposits are being explored which give promise of profitable production. Two carloads of lithia minerals have been shipped to eastern chemical works for experimental purposes. Sampling of one titanium prospect shows a better than

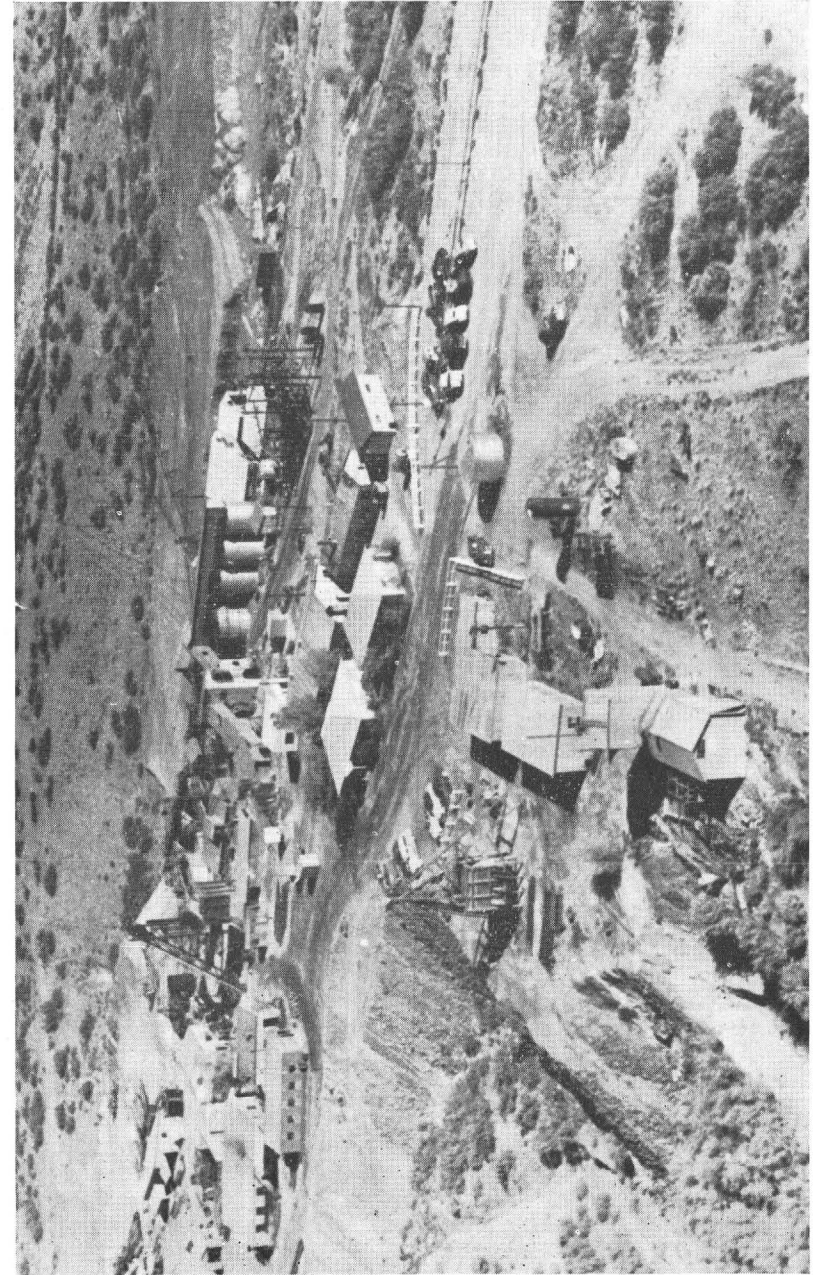


URANIUM — Apache County



ABOUT 1899

12



THE SAME PROPERTY, 1952

13