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**SEVENTH  
ANNUAL REPORT**

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**DEPARTMENT OF  
MINERAL RESOURCES**

STATE OF ARIZONA

JULY 1, 1945 TO JUNE 30, 1946

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**CHAS. H. DUNNING**  
Director

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**OFFICIAL FILE**



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**DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA**

**Board of Governors:**

- Weldon C. Humphrey, Tombstone, Arizona, Chairman  
(Term expires January 31, 1947)
- H. F. Mills, Humboldt, Arizona, Vice Chairman  
(Term expires January 31, 1949)
- J. E. Layton, Chloride, Arizona  
(Term expires January 31, 1948)
- Dr. N. H. Morrison, Phoenix, Arizona  
(Term expires January 31, 1951)
- George A. Ballam, Tucson, Arizona  
(Appointed July 1, 1945; resigned September 1, 1945)
- T. E. Steele, Ajo, Arizona  
(Appointed January 25, 1946; term expires January 31, 1950)

**Personnel of Department:**

- Chas. H. Dunning, Director  
W. C. Broadgate, Assistant Director  
Lorraine Porter, Office Secretary

**Field Engineers:**

- A. C. Nebeker, Northern District, Prescott, Arizona  
Roger I. C. Manning, Southern District, Phoenix, Arizona  
George A. Ballam, Southern District, Tucson, Arizona  
(Resigned as of April 1, 1946)

**Offices:**

- Headquarters Office  
304 Arizona Title Building, 128 North First Avenue,  
Phoenix, Arizona  
Telephone—Phoenix 4-7034

**Field Offices**

- Prescott, Arizona, Basement Court House

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Director

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In compliance with Chapter 27, Laws of 1939, creating the Department of Mineral Resources, the following report of the activities of the Department from July 1, 1945 to June 30, 1946 is herewith respectfully submitted:

To Honorable Sidney P. Osborn, Governor  
State of Arizona  
Phoenix, Arizona

Dear Governor Osborn:

Many persons who may read this report do not have a clear conception of the Department of Mineral Resources, its organization, history, functions and duties.

For the benefit of these people I am again starting the report this year with an outline, or a review of the Department.

## **THE DEPARTMENT**

### **Law and History**

The Arizona Department of Mineral Resources was created by the fourteenth legislature in House Bill No. 103, Chapter 27, which became a law on March 1, 1939, and functioning started immediately thereafter.

Except for a period in 1941 and 1942, when there was no appropriation provided for the Department, it has functioned steadily since organization, and has received the following appropriations from the legislature:

July 1, 1939 to June 30, 1940.....	\$30,000.00
July 1, 1940 to June 30, 1941.....	30,000.00
July 1, 1941 to April 17, 1942.....	None

During this period the Department was supported on a limited scale by private donations.

April 17, 1942 to June 30, 1942.....	\$10,170.00
July 1, 1942 to June 30, 1943.....	40,680.00
July 1, 1943 to June 30, 1944.....	33,000.00
July 1, 1944 to June 30, 1945.....	33,000.00
July 1, 1945 to June 30, 1946.....	28,252.50
July 1, 1946 to June 30, 1947.....	28,252.50

## Purpose and Objectives

The Department was created for the purpose of furnishing aid in the promotion and development of the mineral resources of the State, with particular view to assisting small mine owners and operators along semi-technical and general economic lines. The Department co-operates with, but does not encroach upon the field of the private engineer, or the more technical bureaus.

Many persons confuse the Department and the Arizona Small Mine Operators Association. There is no direct connection between the two. The Department is state financed while the A.S.M.O.A. has nominal dues, and chapters or councils in all mining communities. The two organizations work very closely together and it has been the policy of the Department to have its field engineers attend meetings of the Arizona Small Mine Operators Association throughout the State, where the latest news or information can be disseminated, and where any operator having problems within the scope of the Department's activities can interview the engineer, and if advisable, arrange a visit to his property. Every small mine operator thus knows just where and when he can personally contact a field engineer.

During the war period this service was of particular value, as the frequently changing rules and regulations from Washington, affecting the mining industry, would have caused great confusion among mine operators without someone to interpret them and keep the operators fully informed and up to date.

## Organization and Personnel

The Department is controlled by a Board of Governors consisting of five members from various parts of the state. These members are appointed by the Governor for various extending terms as shown on the inside front cover. The Board of Governors serve without compensation other than their actual expenses in attending meetings, which are required by law to be held each quarter.

## FINANCIAL STATEMENT

A financial statement for the fiscal year July 1, 1945 to June 30, 1946 is attached herewith.

### DEPARTMENT OF MINERAL RESOURCES

STATEMENT OF EXPENSES  
July 1, 1945 to June 30, 1946

	Appropriation for Year	Expenditures for Year	Balance R'trd to State
<b>PERSONAL SERVICES</b>			
Director .....	\$ 4,200.00	\$ 4,200.00	
Assistant Director .....	4,200.00	4,200.00	
Field Engineers .....	7,200.00	7,197.74	\$ 2.26
Office Force .....	3,780.00	3,628.00	152.00
Projects Engineer .....	500.00	435.00	65.00
<b>CURRENT EXPENDITURES-TRAVEL</b>			
Headquarters .....		405.49	
Field and Special Projects.....		3,609.95	
Board of Governors.....		180.25	
	\$ 5,400.00	\$ 4,195.69	\$ 1,204.31
<b>CURRENT EXPENDITURES-OTHER</b>			
Office Supplies .....		\$ 182.88	
Printing .....		663.90	
Tel. & Tel.....		141.00	
Postage .....		211.00	
Office Rent .....		1,285.20	
Equipment Maintenance .....		115.65	
Assays .....		84.75	
Insurance .....		75.17	
Miscellaneous .....		61.10	
	\$ 2,847.50	\$ 2,820.65	\$ 26.85
<b>CURRENT EXPENDITURES—</b>			
SUBSCRIPTIONS AND DUES	25.00	5.00	20.00
CAPITAL OUTLAY .....	100.00	89.33	10.67
<b>TOTAL.....</b>	<b>\$28,252.50</b>	<b>\$26,771.41</b>	<b>\$1,481.09</b>

Research to permit higher wages to be paid because the production per man will be higher—for:

Despite the lure of bureaucratic tricks,

**Production** brings the only wealth that sticks.

Respectfully submitted,

CHAS. H. DUNNING,  
Director.

Phoenix, Arizona  
August 8, 1946

The Board of Governors outlines the policies of the Department and employs the Director. The Director in turn employs such field and office force as is consistent with the appropriation and with the policies of the Board.

### **Coordination**

While the Department has functions and objectives that are peculiar to itself, much of its service must be in coordination and cooperation with other state and government agencies. The Department also works very closely with the Chambers of Commerce both within Arizona and in other states. Each year recently the mining department of the Los Angeles Chamber of Commerce, in conjunction with this department, has made an extensive survey of the mining industry in Arizona and published a brochure listing the active Arizona mines with pertinent facts regarding each. While this publication is designed primarily as a guide for California manufacturers and salesmen, it is also of corresponding value to the mine owners and operators themselves, and to local supply houses.

## METAL PRODUCTION AND MARKETS

### General

The past year has been a difficult time for all metal production in Arizona because of the scarcity of labor and of many essential items. Costs have risen precipitously without a corresponding rise in metal prices, although during the last few weeks a boost of 10%-20% was permitted in copper, lead, and zinc.

The economics of metal production has been thrown out of kilter, as will be viewed from various angles in other parts of this report.

The tabulation on the opposite page shows Arizona's production of gold, silver, copper, lead and zinc, for each of the last ten years.

### Gold and Silver

Although the gold closing order L-208 was rescinded July 1, 1945, there has been no resumption of gold mining because economic conditions precluded profitable operations. Practically all the gold produced was a by-product in the production of base metals.

While the price of gold has been higher in foreign countries than it has here, the U. S. gold producer can only sell his gold to the U. S. Mint. Attempts to obtain legislation to permit the U. S. miner to sell gold abroad have not been successful, and neither have attempts to raise the price to some parity with costs.

Whereas Arizona had over 900 small gold producers before the war, there are practically none today. The outlook ahead is uncertain.

The production situation of silver has paralleled that of gold, but its basic situation is somewhat different. As explained elsewhere in this report, the increase in industrial use and demand for silver is accelerating and seems permanent, so in its case the law of supply and demand should eventually determine the price at an amount that would permit production.

The result is that supplies of metal from foreign countries also are very short. And the fabricator who fought against a fair price for the producer is now unable to get any supplies at all. It seems that chickens come home to roost.

Seemingly, efforts and opinions are not based on pure economics, or on common sense, but on whose ox is being gored, (or changing the old saying around):

This selfish tug-of-war results in much confusion.

Each wants his own pet ox to get a big transfusion.

How much better it would be if all factions could get together and honestly iron out their problems, with a modicum of the Golden Rule injected into their points of view.

The mining labor situation is serious and may cause basic economic changes. The miner must needs have a skill comparable to the carpenter or the brick layer. His work is much less pleasant and healthful, and often more dangerous. But he has not received, or is not now enjoying, comparable wages. The older vintage of miners is dying out, the younger ones who went off to war are not returning to the mines, and the youngsters who were brought up in the mining camps are maturing with other ambitions. The inevitable results must be an equalizing of their wages and living conditions with similar skills, and this can only be done by higher metal prices or improved or cheaper methods brought about by research.

It is a knotty problem and so inter-related with other knotty problems that it will take time and clear heads to bring the mining industry back into its proper balance. It cannot be done by the same class of "monkeying" that is largely responsible for its present precarious position.

May we again this year advocate more research. Research to find new and better ore bodies. Research to find new and cheaper ways of extracting metals.

## THE STATE OF THE INDUSTRY

The general mining industry in Arizona has been for some time, and still is, in a state of hectic flux. It is in a veritable "no-man's-land"—caught between "free enterprise" on one side, and an economy planned by those who too often know little about it, on the other side—too little about its problems, its requirements, or its importance to our whole national economy.

No long range planning, so essential to steady progress and production, has been possible under such conditions. Far too little constructive work, such as new exploration and development and research, has seemed justified, under such uncertainties, to those who have the ability and means to do those things.

We have suffered from the "Have-Not" school of monkey wrenches, who are seemingly anxious to sabotage our domestic production under the theory that we should keep our own resources well hidden underground, and rely on foreign sources for our supplies. But often, when one runs down this propaganda, he finds the proponents have heavy financial interests in foreign sources.

And then there are those who are vehemently for or against: tariffs, premiums, ceilings, stockpiles, subsidies, labor, management, etc. And each is wont to tug in his direction only.

Manufacturing interests appear with profuse propaganda demanding that metal prices be held down to levels they desire, even though mines have to close, and their own pressure results in lowered production, and consequently later, in much increased prices.

The We-Have-Nots made one oversight which now confronts them. They failed to foresee that producing costs in foreign countries would go up even more than they have here. Where peon labor in some countries was plentiful around 50 cents per day, the laborer must now have a dollar to be well enough fed to work.

	GOLD oz.	SILVER oz.	COPPER lbs.	LEAD lbs.	ZINC lbs.
1935	241,754	6,601,280	278,029,289	15,566,100	6,673,932
1936	322,408	8,386,043	422,550,000	21,376,000	7,178,000
1937	332,694	9,422,552	576,956,000	24,708,000	10,052,000
1938	305,043	7,479,153	421,594,000	21,142,000	11,628,000
1939	316,453	7,824,004	524,224,000	21,542,000	13,422,000
1940	294,807	7,075,215	562,338,000	26,532,000	30,912,000
1941	315,392	7,498,260	652,634,000	31,276,000	32,986,000
1942	253,651	7,064,467	786,774,000	29,544,000	37,044,000
1943	171,810	5,713,889	806,362,000	27,454,000	39,354,000
1944	112,162	4,394,039	716,606,000	33,414,000	58,154,000
1945	75,000	3,357,000	571,000,000	41,500,000	76,500,000

Some persons proclaim that because gold and silver are largely by-products in the production of base metals they don't cost anything. This reasoning (or propaganda) is, of course, not sound, and especially in the case of silver there would be a shortage indeed if it were not for those mines where silver is the main product. The recent raise in price from 71.11 cents to 90.5 cents will help.

### **Copper**

In spite of many difficulties, Arizona continued to lead all States in the production of copper, although production dropped about 20% below 1944.

The Morenci Mine of the Phelps Dodge Company was the largest producer. Other large producers were New Cornelia, Inspiration, Castle Dome, Miami, United Verde, Ray, Copper Queen, Magma, Bagdad, and Denn. The above large mines accounted for 98% of the State's production.

During the first part of 1946, production was further curtailed by a miners' strike, but a wage increase of 18.5 cents had again stimulated production by mid-year, 1946.

### **Lead and Zinc**

The output of lead and zinc in Arizona continued to increase in 1945. The reason for the increase in these metals, in the face of a decrease in copper, was due to more new lead-zinc mines coming into production, and furthermore to the fact that many of the large copper mines have lead-zinc phases in their ore deposits, and found it more profitable to divert their available labor to mining such ores.

Heavy producers of lead and zinc in 1945 were: the Copper Queen at Bisbee, the Mammoth-St. Anthony at Tiger, the Iron King at Humboldt, the Eagle Pitcher south of Tucson, the Athletic at Aravaipa. The Republic Mine at Dragoon was a new producer of copper and zinc.

The upward trend in the production of lead and zinc should continue.

### **Gross Production**

Metal mining in the State produced approximately \$120,000,000 for the year 1945. When the non-metallics and miscellaneous materials that are mined are added, the total production by the industry would be between 130 and 135 million.

Agricultural production for 1945 totaled \$134,000,000, so the two industries are practically equal in the production of new wealth.

The same ratio applies to their pay rolls, each paying about \$45,000,000.

A large difference appears, however, when it comes to taxes, the mining industry paying nearly three times as much as agriculture.

Perhaps a warning note should be sounded not to "kill the goose that lays the golden egg." Mines do not have unlimited life and new mines must be found or developed to take the place of those which become worked out. The initial stages in the development of a mine are speculative and there must be incentive to overcome the initial risks. Even if the older well-established mines can stand the load, over-taxation can easily kill the incentive to develop new ones, and the old ones cannot last forever.

Industries other than mining should bear in mind that the total taxes required will not decrease, and every time a mine closes down and there is no new one to take its place, the tax load becomes that much greater on the other industries.

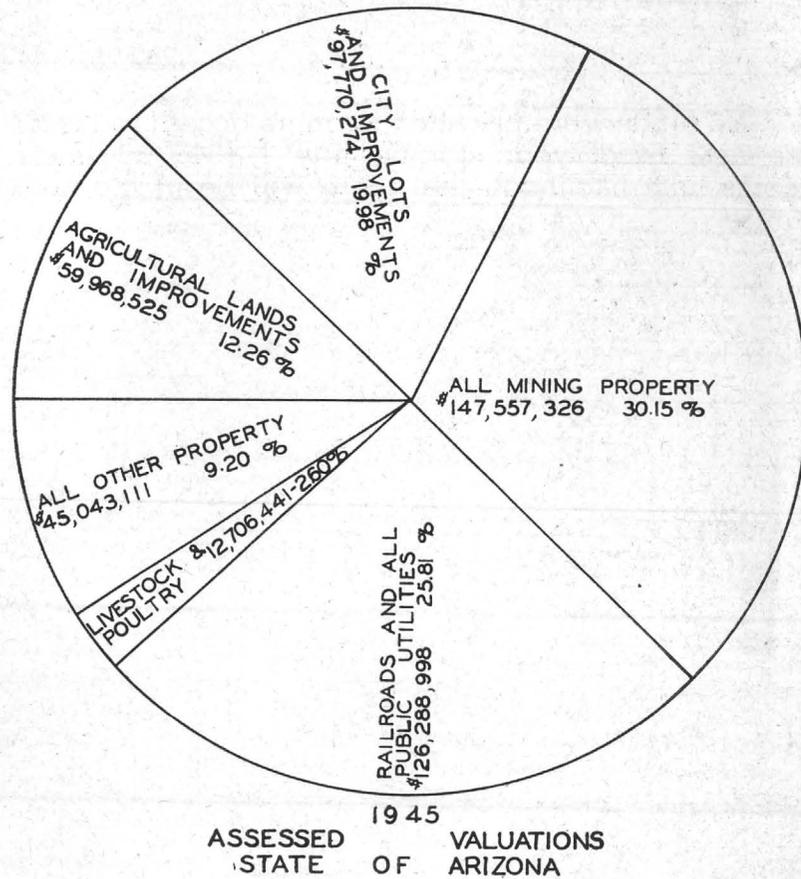
### **The Dollar Earned by Mining**

One often hears that the wealth produced by the larger mines goes mostly to "Wall Street," or points East. A survey by the Department shows an entirely different situation. Dividends are a very small percentage of gross expenditures. Stockholders are widespread and many reside in Arizona. Overhead items outside of the State are only a minute proportion. Labor constitutes about 40% of total expenditures. And approximately one-half of all purchases are made within the State. This is as great or a greater proportion than with other industries.

## MINING AS AN ARIZONA INDUSTRY

### Assessed Valuation

The chart below shows the relative position of the mining industry in Arizona to other industries from the point of view of assessed valuation, which determines taxes.



### Minor Metals

Production of quicksilver, manganese, tungsten, molybdenum, etc., practically ceased when the war stimulus was removed, and importations were possible from foreign lands.

During the war period, however, there was a great deal of prospecting for, and semi-development of, these metals, and Arizona has large potential, but low-grade, resources. It is possible that future changes in the economic picture may again make it feasible to produce these metals here.

## NON-METALLICS

### General

Production of non-metallic minerals in Arizona is increasing and, apparently, a healthy growth can be anticipated. Drawbacks in the past have been the long hauls to consuming centers and unfavorable freight rates.

The railroads are co-operating in adjusting rates when important movement is assured, and near-by demand is increasing with the population increase of Arizona and the whole Southwest.

The production and marketing of non-metallics in Arizona has lacked coordination. Buyers have had difficulty in finding sources of supply at the same time that tentative producers could not find a market.

The Department has been of considerable service in bringing these two together, and as production increases, consumers become more confident in such source of supply, which again increases demand, production, and dependability.

Non-metallic production in Arizona can be expected to increase at an accelerated rate.

### Asbestos

The asbestos mill at Globe has been taken over from Government surplus by private interests and is again in operation.

The asbestos price situation is not satisfactory and production is not extensive, but small and sundry producers in the Globe area do at least have an outlet for their product. See photo, page 9.

### Barite

The mine of the Arizona Barite Company near Stewart Mountain Dam, and their mill near Mesa, are in full production of 100 or more tons per day.

This deposit has developed satisfactorily and a large tonnage of both high-grade and low-grade barite is assured. At present only high-grade is being mined, but the mill will soon be provided with flotation equipment to concentrate the low-grade ores. See photo, page 9.

The demand for barite for oil-well drilling mud is

The following mine access roads were constructed during the year:

Name	Mileage	Cost
Bagdad .....	5.7	106,322
Bagdad .....	3.4	121,970
Walnut Bluebird .....	2.0	1,500
Summit .....	3.5	8,555
Indiana .....	2.8	3,905
Total .....	17.4	242,252

No funds were provided for mine access roads for the new fiscal year starting July 1, 1946, and there seems little likelihood that there will be in the near future.

ators can be brought to them, and they can keep the operators posted on matters of importance. They thus often become interpreters to translate the language of Washington into plain miners' English.

Since our field force has been cut to two men, their schedules are too hurried for best economy. We would like to be able to do more detailed examination work on small mines so that we would have more accurate and detailed data for any potential capital. The Department believes that assistance rendered in getting good prospects into good hands, so that the development will be properly designed and financed, is a function of prime value to the State. It cannot be done without first-hand accurate information, often to the extent of detailed examinations, including sampling.

The Department should at least have one field engineer at large to carry on such detailed work, in addition to the two regular engineers. And also, the growing importance of non-metallics in Arizona justifies the employment of a special engineer trained in the field work and economics of non-metallic mining.

### **Mine Loans and Roads**

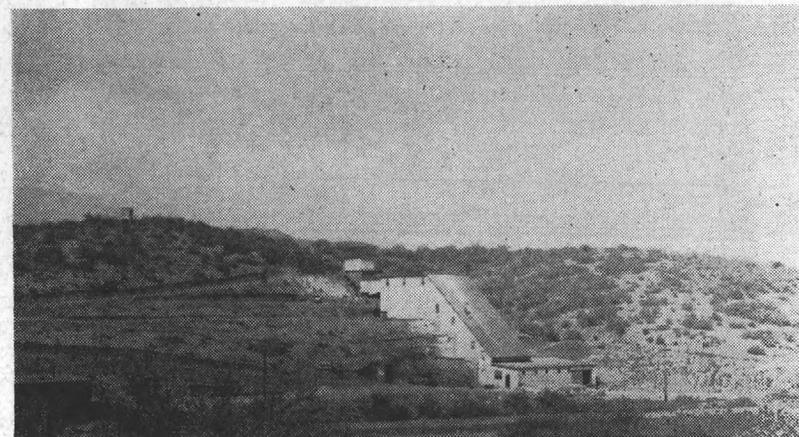
No mine loan applications were reviewed by the Department during the fiscal year, but field assistance was given to some applications.

Only a half dozen or so loans were granted by the RFC and they were mostly small.

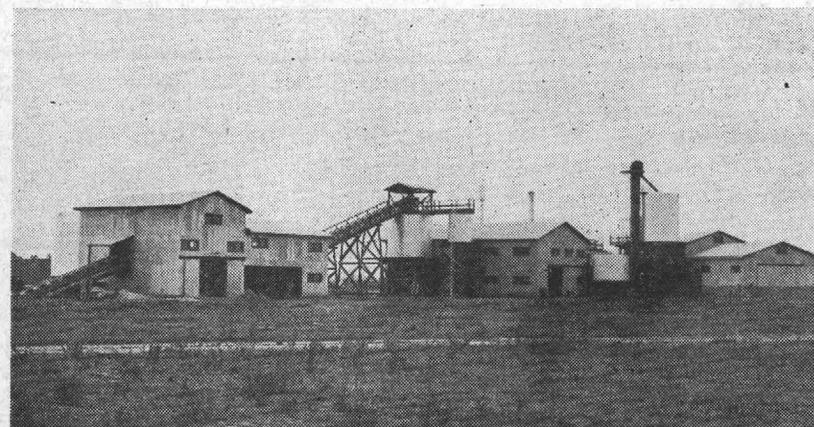
Except for the fact that Class C, or access loans, were stopped at the end of the war, the regulations and policy of the RFC has remained unchanged.

The falling off in loan applications has been due mostly to the general or economic situation. Gold and silver miners have been caught in an economic trap, and base metal miners have been faced with so many uncertainties, such as premium continuance, that there are few instances where the repayment of a loan for new development could be reasonably assured.

increasing, and other deposits in the State are being investigated. Better freight rates would help.



**Asbestos Mill at Globe, Arizona**



**Mill of Arizona Barite Company near Mesa, Arizona**

### **Building Stone and Aggregates**

There has been an increasing demand for, and production of, building stone, flagstone, and light aggregates such as pumice and cinders for concrete blocks. Flagstone, in particular, is receiving increasing interest and approval among architects and builders in the Southwest for its beauty and decorative effects in walks and patio walls. There are several quarries being operated in northern Yavapai County, and most of the production goes to Southern California.

Arizona tufa is also in demand and production as a building stone. One quarry north of Globe is equipped with an up-to-date wire saw capable of making a 20 foot cut. See photo, page 11.

### **Clays**

Commercial production of clay is confined to a deposit of bentonite near Chambers, Arizona, which is used for filtering purposes in the California oil industry.

There is a demand for a swelling type of bentonite have certain qualities useful in oil-well drilling mud, and suitable deposits may be found in Arizona.

### **Feldspar**

The mine and plant of the Consolidated Feldspar Company near Kingman have remained in steady production. Demand for feldspar is good, and the price situation fairly satisfactory. Production in Arizona may increase. See photo, page 11.

### **Fluorspar**

Fluorspar mining declined in Arizona in 1945 when it no longer was of strategic importance to the war effort. There was a small production both at Duncan and at Wickenburg.

### **Gypsum**

Gypsum production increased, the bulk of the tonnage being used locally for agricultural purposes, where it is of value in offsetting alkaline soil conditions. Most of the mining is near Winkelman and the deposits are large, and mining is done with power shovels. See pictures of mine and plant page 12.

published, and distributed in answer to the increasing requests for information of that sort.

The Phoenix Chamber does not confine its activities and help to Phoenix and vicinity alone, but takes a Statewide attitude, and believes that what helps the whole State, helps Phoenix.

Our field engineers also work very closely with the Chambers of Commerce in their districts.

### **Co-operation from the Press**

Many persons have criticized and complained of the dearth of mining news in our Arizona press. In spite of the fact that one-third of the population of Arizona is vitally interested, directly or indirectly, in the mining industry, the local press seems reluctant to publish anything of a mining nature.

Part of this reluctance is, no doubt, due to the fact that the industry has little occasion for direct advertising, although it is a prime factor in the prosperity of all business, and thus indirectly in all advertising.

Another restraining factor may be that the press was "used" so much in the past to put over "stories" for wildcat promoters, that they have become gunshy of mining news.

During the recent last weeks of Congress, when the industry was awaiting such news as the passage of the Stockpile Bill, the metal premiums angle of the new O.P.A. bill, and the stony path of silver legislation, one could search our local press in vain, and must needs refer to Los Angeles papers for such news.

When the paper shortage is also no longer an excuse, the Department will try to work out some better co-ordination with the press, so that authentic mining news can be promptly published.

### **Field Activities**

Since July 1, 1945, the Department has maintained two engineers in the field instead of four as previously. It is their custom and duty to appear at the 30 or more chapter meetings of the Arizona Small Mine Operators Association where problems of oper-

August, 1945—Article in "Arizona Grocers," "The Outlook for Postwar Metal Production."

September, 1945—Article in Nation's Business Magazine on conservation of mineral resources entitled, "Have Cake and Eat It."

November 1-4, 1945—El Paso's "Mining Day" convention. Talk on "Where Will Our Future Mineral Supplies Come From?"

November 17, 1945—American Institute of Electrical Engineers—Phoenix. Short talk on how electrical technology can help mining technology in maintaining our mineral resources.

November 23, 1945—Meeting of the American Mining Congress at Salt Lake City. No talks by our Department—much listening.

December 1945—Talk before the Southwest Mining Association in Los Angeles on where our future mineral supplies may come from.

January, 1946—Article in Pay Dirt, "Future Bright for Non-metallics."

March 18, 1945—Talk before a class in Natural Resources at the Arizona State College at Tempe, on conservation of our natural resources.

June 12, 1946—Short talk over KPHO on Arizona Craft Center program on Arizona non-metallics.

July, 1946—Pay Dirt. Article on the silver situation.

Copies of any of these items are available at the office of the Department.

#### **Chamber of Commerce Co-operation**

Starting July 1, 1946, the President of the Phoenix Chamber of Commerce has asked the Department's Director to head the Chamber's Mining Committee and suggest the other committee members.

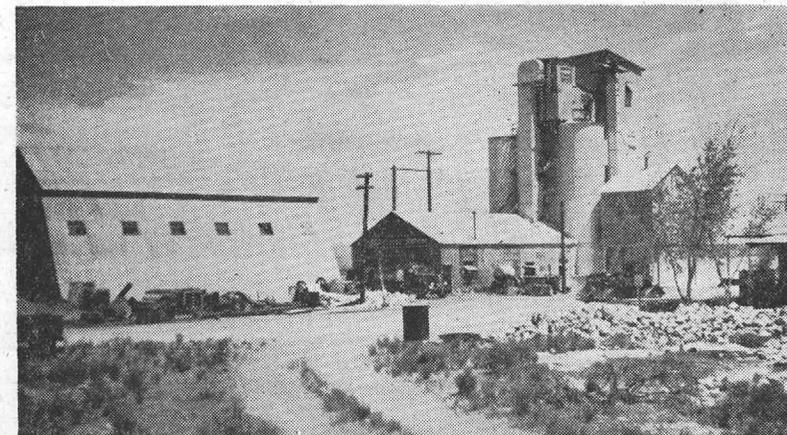
A strong committee has been named and an initial meeting will be held soon where constructive ideas can be proposed and co-ordinated.

It is planned to work very closely with the Chamber and obtain their co-operation in matters of benefit to the mining industry. It is hoped that during the coming year, in conjunction with the Chamber, an attractive and informative booklet on mining can be

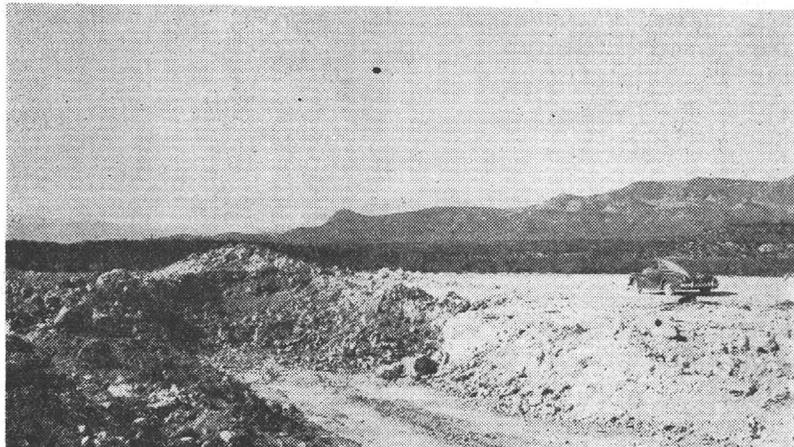
There are other excellent deposits in the State.



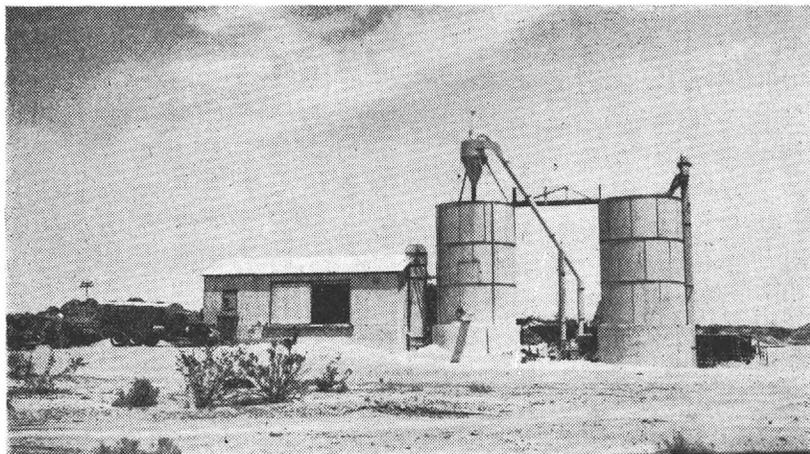
Tufa quarry and saw, Globe, Arizona



Feldspar Mill near Kingman, Arizona



Gypsum Mine near Winkelman, Arizona



Gypsum Mill, Phoenix, Arizona

This booklet was not designed as a text book or law book, but contains instructions in simple language, usually with legal references, as to how to locate and maintain mineral locations under various possible circumstances. It brings forth in some detail the various land classifications in Arizona such as public domain, State lands, Indian Reservations, forest reserves, railroad lands, special withdrawn areas, etc., and shows how mining locations may or may not pertain in each case.

The booklet fills a long standing demand, and is being distributed free upon request. The Arizona Bureau of Mines at Tucson was furnished 1000 copies for which they paid the extra printing cost.

This booklet was compiled by Mr. J. E. Busch who has had a lifetime experience in land-mining matters. His services were practically donated to the Department, and we extend our great appreciation to Mr. Busch for his excellent work.

#### **Active Mines List**

Each month the Department publishes and distributes free on request a mimeographed list of the active mines in Arizona.

This list is revised each month by our field force, and the status of each mine, whether developing, producing, etc., is stated.

The list has contained between 250 and 300 names during the past year. It is of special value to Arizona merchants, and to the entire mining fraternity.

#### **Publicity and Meetings**

The Department continues to believe that the mining industry would benefit if the general public had a broader knowledge of its problems and its importance.

While it is not your Director's choice of a vocation, he has never refused a request to make a talk or write a paper on some phase of mining economics, if for the general furtherance of the industry.

In this regard the following items may be enumerated:

## OFFICE AND FIELD ACTIVITIES

### Visitors and Mail

Even though production from small mines may have been curtailed during this uncertain period and some miners have gone to other fields, there has been little lessening in the number of visitors, or inquiries at this office.

There are many who have mining "born in their blood," and such persons are more inclined to make frequent inquiry under present confused conditions than they would in normal times. They want to know all the facts that may guide them in switching from one metal to another, or from a metal to a non-metallic.

Many inquiries are referred to us by other departments or organizations, such as the Secretary of State's office, the Governor's office, the Mine Inspector's office, the Bureau of Mines, and the Chamber of Commerce. The Department thus fills an important niche that it would be difficult for any or all of these other departments to fill.

### New File of Mines

The Department has some description or report on over 2000 Arizona mines in its files. While it is fine to have such a record, the list is too unwieldy to use in answer to any broad inquiry for a mine or mines.

The old list is being circularized with a new report form, and the answers segregated into those mines which are for sale or lease. About 15% of these inquiries have been returned unclaimed or deceased, and of course there are many who have abandoned their prospects or disproven them, and do not answer at all. The result, however, will be a boiled-down list that will not be too bulky to be useful in promoting the development of prospects or small mines.

### Mineral Locations, Regulations Booklet

During the year the Department compiled and published a 45-page indexed booklet entitled "Regulations Governing Mineral Locations in Arizona."

### Mica

There is a heavy demand for ground flake mica of various meshes at prices that would appear attractive. Demand comes from both the East and the West Coast.

There is no appreciable production from Arizona, but it does seem that opportunities exist for the proper persons with technical knowledge and capital to start a successful business.

### Perlite

Perlite production probably promises a greater degree of expansion than any other Arizona non-metallic.

Perlite is a light colored volcanic glass containing included water so that it pops like popcorn when ground and heated to about 2000 degrees F.

The resulting expanded perlite has a weight of 5-15 pounds per cubic foot, and this light weight makes it an excellent heat insulating material, and useful for a great variety of purposes. As a heat insulator it compares favorably with ground cork and exceeds other cheap mineral insulators. It is also fire-proof, verminproof and rotproof. A few uses can be enumerated:

Light aggregate for concrete or building blocks.

Plaster, insulating and accustical.

Bulk insulator, poured or blown, or with a binder for rigidity.

Filtering media for evaporative air conditioning, or industrial sludges.

Chicken litter.

Foundry or moulding sand.

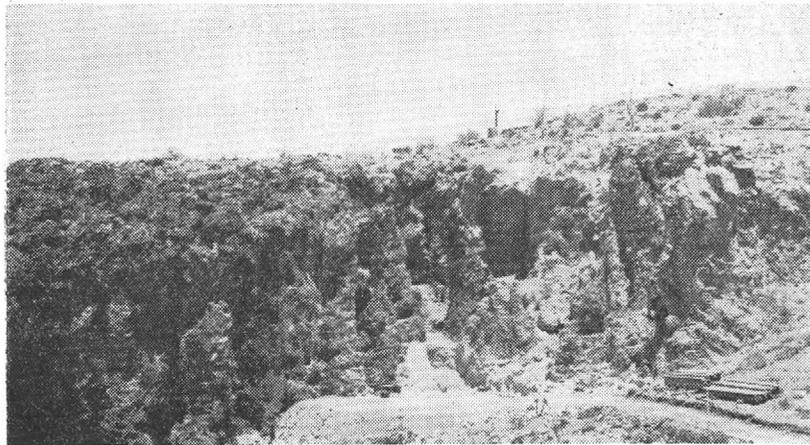
Refractory brick.

Soap filler.

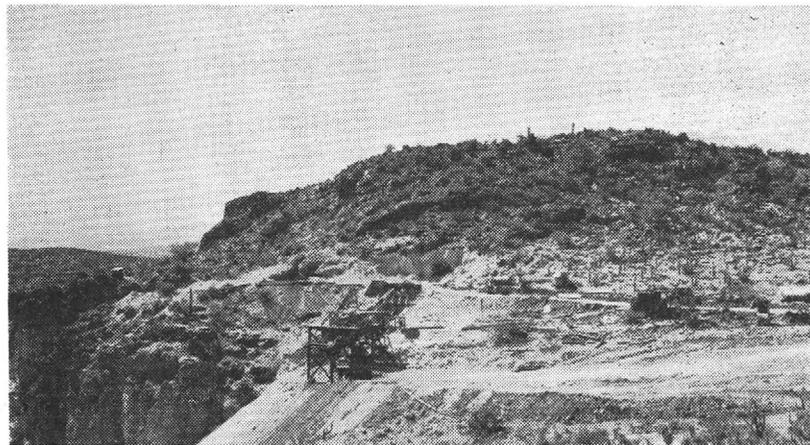
Rubber industry.

There seems no limit to the usefulness of the product and no material of competitive nature has such versatile applications. Both current and potential demand is high.

There are several deposits of perlite throughout Arizona, one of the largest being near Superior. It



Perlite Deposit near Superior, Arizona



Mining Perlite near Superior, Arizona

Technically, one who undertakes such exploration would have no exclusive right to his claim until he had proven "mineral in place." While he is carrying on this expenditure and exploration, someone else might come in and make a valid discovery and take the claim away from him.

To obviate such a situation the Department has advocated a new type of location called, temporarily for convenience, the "Geophysical Mining Claim." Under a proposed act providing for such a claim, a locator would have exclusive right to a designated claim or area while he is diligently performing such exploratory operations.

A bill has been designed covering this point and is being submitted to the industry for criticism and suggestions. It is hoped that the bill will prevent "hogging" of favorable areas by either big companies, or small prospectors, or speculators, but give a fair deal to all.

#### *Miscellaneous Gold Bills*

Various bills for the rehabilitation of gold mines which were closed by Government order, or for opening foreign markets to U. S. gold producers, or for raising the price of gold, have probably died with the adjournment of Congress. The entire gold situation is very confused.

This Department recently wrote the United States Bureau of Mines in Washington seeking some clarification of the uranium situation. They have replied that "legislation is pending in Congress designed to establish controls on the mining, manufacture, and use of fissionable materials, and any answer today may not be correct next month."

We trust that the situation will eventually be cleared up so that a prospector will know where he stands. There are possibilities of producing uranium in Arizona, and we will work toward obtaining a sensible and constructive arrangement.

#### *Federal Lands*

There is a movement on foot to return western federal lands to the States. It will become a matter of great controversy, and the mining industry is very much involved. Under Arizona's Enabling Act a miner cannot acquire final title to State land. He may only lease—and leases are on a rental or royalty basis. Required royalties are obsolete in present day, low-grade, big volume mining. Furthermore, leases must be renewed, with no certainty that they will be, or who will say "yes" or "no."

Such provisions create impossible conditions for a large or long range investment, and the mining industry will be dead set against the return of such lands to the States unless they have the same rights to locate, operate, and proceed to eventual patent, as they have at present on the public domain.

This legislation is probably rather far in the future, but the subject has already become a matter of discussion and controversy.

#### *Geophysical Claim Bill*

The present method of locating a mining claim requires a discovery of mineral in place.

It has now become a fact that important deposits of mineral may be reasonably suspected by geological inference or geophysical instruments, and later proven by drilling or development.

occurs in massive beds which permits cheap mining, and it crushes easily. See pictures, page 14.

There are three plants producing expanded perlite in Phoenix and some on the West Coast. Several more plants are planned for the Phoenix area in the near future.

The popping industry is not yet on a basis of standardized technique and difficulty has been experienced by some operators in obtaining an acceptable and uniform product. These "bugs" will eventually be worked out and when the trade can rely on a supply of proper and uniform material, production possibilities are unlimited.

One important point of technique is that time and temperature largely control the expanded weight. The lighter the weight the better the insulating qualities, but the less the structural strength. Therefore, two distinct classes of material should be produced. One for a bulk insulator, and another where strength is required such as in concrete or building blocks.

The Department expects, in the near future, to compile a booklet on perlite, containing available technical and economic data, and the experience of operating plants. There is a large demand for such information.

## IMPORTANT RECENT DEVELOPMENTS

### **Abril**

The Abril Mine is located 20 miles north of Tombstone in the Dragoon Mountains. It is reached by a mine access road from Tombstone, built under that authority a short time ago. During the year this mine was taken over by the Shattuck Denn Company, and an intensive development program was inaugurated.

Developments have been satisfactory and ore coming from development work is shipped to the Shattuck Denn mill at Bisbee. Values are in lead and zinc.

### **Athletic**

The Athletic Company, who are developing the old Arivaipa Mine near Klondyke, Arizona, have been steady shippers of lead-zinc ore throughout the year. Their ore has been going to the Eagle Picher mill at Sahuarita. They are not well situated for freight, power, or bright lights for their employees, but we understand, they have large potential possibilities along lead-zinc lines.

### **Bagdad**

The Bagdad Company at Bagdad, Arizona, has changed during the year from underground to open pit mining, and thereby increased their economy. They have also increased their production to 2500 tons per day.

The Bagdad has long been a marginal copper mine, but continual well-advised efforts are bringing it into the class of a permanent producer.

### **Eagle Picher**

The new mill of the Eagle Picher Company at Sahuarita came into production during the past year or so, and is handling 450 tons per day, about half of which comes from their own San Xavier Mine, and the other half from custom sources.

This mill makes an up-to-date technological, three-way separation of copper, lead, and zinc, and is a great help to all producers of such ores within a reasonable distance.

## Legislation Pending

### *Contract Termination*

The original contract termination law was found unworkable for alleviating injustices in metal production, at least according to the interpretation of Washington, and no mine loss claims have ever been paid or approved.

There are many hardship cases wherein producers made heavy investments in order to produce metal for the war effort, under some sort of contract or metal purchase plan promised or implied by the Government, only to have such plan suddenly withdrawn, leaving them out on a limb.

Efforts to obtain relief for these cases have been 100 per cent unsuccessful under the present law. A new law has been prepared and is being considered. A report from Washington states "the situation will be studied to see what can be accomplished under the present Act, and if mining cases can be handled more equitably, new legislation may not be necessary." No action is expected this session of Congress.

When one reads in the press of the billions that have been **overpaid** to many war contractors, it seems strange that the Government should assume such a hard-boiled attitude toward the metal producer, and refuse any alleviation in the worst hardship cases, because of some technicality or interpretation of the law.

It took over 20 years to settle some of the metal producers' claims of World War I, and we had hoped and still believe that the present law would be adequate to take care of the deserving cases of World War II, if a reasonable interpretation were used.

### *Uranium*

Since much data about the atomic bomb has been made public, there has naturally been an increased interest in the possibilities of producing uranium in Arizona. In the meantime various restrictive directives have been issued, some of which are not clear and further confuse the matter.

basic trouble with the silver situation is merely the old story of demand exceeding supply, as the chart on page 23 will show.

Silver occupies a unique position among metals, in that the producer actually subsidizes the Government and the consumer, instead of receiving a subsidy, as does the producer of many other metals. The Government has for years bought silver from the producer at the set price of 71.11 cents. In turn they coin it and sell it back to the public at \$1.29. This profit accrues to all of the people. Is it fair for the silver fabricator to demand that this differential be taken away from the people and given to him alone?

This chart also shows that the industrial consumption alone of silver (coinage use not included) in the United States and Canada alone, now exceeds **world production**. Unless the attitude of the consumer toward the producer becomes more fair, and encourages production instead of inhibiting it, the law of supply and demand may force the price of silver to unreasonable heights. We wonder what the manufacturer would say if he has to pay around \$3.00 per ounce.

Producers do not want such extreme conditions.

#### *Mineral Records Bill*

This bill provides for the permanent preservation in National Archives under the auspices of the U. S. Bureau of Mines, of any records or data concerning mines or prospects which were the property of temporary agencies such as the War Production Board. Any matter concerning the national security or the evaluation of private property will be respected as confidential, but the data will be there even if the shaft caves in.

#### **Iron King**

The Iron King Mine at Humboldt, a producer of gold, silver, lead, and zinc, doubled its capacity from 200 to 400 tons per day some time ago, but, expects to double it again to around 800 tons per day in the near future. We understand their underground developments have been good. Here again is a live example of an old abandoned mine having fallen into the hands of people who have the technical and financial ability, and who know how to take advantage of general economic conditions. They have brought about as a result, an important metal producer for our Nation and our State.

#### **Mammoth-St. Anthony**

During the early days of the war the Mammoth-St. Anthony Mine at Tiger, Arizona, was noted mostly as a producer of molybdenum. When molybdenum became no longer strategic, they switched to the lead-zinc phases of their mineralization and are now producing about 7000 tons per month.

#### **Phelps Dodge Zinc**

The Phelps Dodge zinc concentrator at Lowell, Arizona, was started just before the turn of the year. It has a capacity of about 900 tons of zinc ore per day, and is running at capacity.

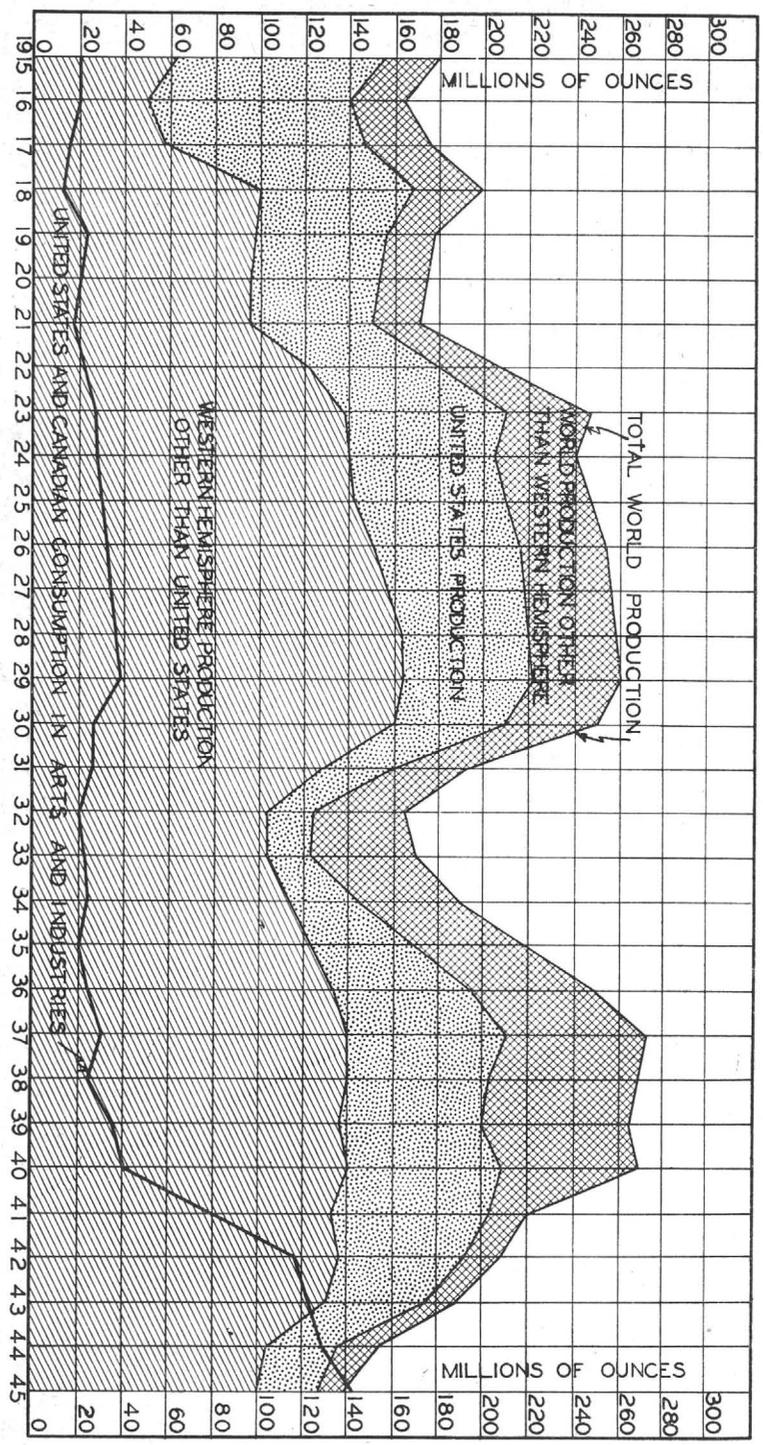
The zinc ore in these Phelps Dodge properties exists as a phase or margin of their main copper deposit but for economic reasons they have found it advisable to concentrate lately on this zinc-lead phase.

They are the largest producers of zinc in Arizona.

#### **Republic**

The Republic Mine of the Coronado Copper and Zinc Company at Dagoon, north of Douglas and west of Willcox, came into heavy production during the year.

Here again is a property that has long been known, but has been made commercial by a management which has taken advantage of technological developments and improved methods. The products



are copper and zinc, and the company is mining about 5000 tons of ore monthly, with probability of substantial increase.

An interesting feature of the Republic Mine is that when it became necessary for them to acquire a mill water supply, they constructed an 8½ mile pipe line of welded bazooka tubing, through which the water is pumped with a vertical lift of over 800 feet.

We understand that recent drilling or other developments have added a great deal to the future prospects of this mine.

**San Manuel**

The San Manuel Mine, located at Tiger, Arizona, 43 miles north from Tucson, has been under extensive development by drilling during the year. Work is being carried on by the Magma Copper Company, and also on a separate section of the deposit by the Inspiration Copper Company.

It has long been known that a favorable copper mineralization existed there, but no systematic development was undertaken until recently.

Twenty drill rigs are being operated at the present time. Seventy-three drill holes have been completed, ranging in depth from 500 to 2600 feet each.

Approximately 100,000,000 tons of low-grade copper ore have been developed. Many problems may have to be overcome before this deposit can be considered as commercial, but it has enormous possibilities, and is in good hands.

**General**

We in the mining industry feel that we have recently had, and are having, an unjust share of troubles, but when we look at the record and see the new mines that have, or may, come in, in spite of these difficulties, we realize that opportunities in mining not only still exist but are greater than ever.

The initial stages of a mining venture are highly speculative. The secondary stages are still speculative, but probably not more so than in any other new

The so-called "silver bloc" of western senators attached a rider to the Treasury-Post Office appropriation bill creating a new purchase price of 90.3 cents per ounce for treasury purchases of newly mined domestic silver. This was a raise in price from the price of 71.11 cents which has existed for some years past.

This bill also permitted the Treasury to sell silver for industrial uses at this same buying price, and further provided for an automatic advance in price to \$1.29 after two years.

Industrial users strenuously objected to the price rise and demanded that the Treasury be permitted to sell them silver at 71.11. They formed a powerful and well financed bloc of their own, and the battle started. Various articles were published in the press and magazines, and full page ads were placed in some big dailies, appealing to the public sympathy.

In the meantime world and domestic production of silver had declined because of increased mining costs. Prices in foreign countries had risen, generally to \$1.00 or more per ounce, and many countries had set up export embargos. The situation became so tight that manufacturers were unable to obtain any supplies at all, and some turned to melting down silver dollars and thus obtaining silver at its monetary value of \$1.29 per ounce—plus melting costs.

Still our Congress could not get together, and when the Government's fiscal year expired on June 30 there was no appropriation available to pay the expenses of the Treasury and Post Office Departments, and employees of those departments had to undergo payless pay days.

Finally, during the latter part of July, the conferees got together and agreed upon a new bill carrying a price of 90.5 cents for an unlimited time ahead. The Treasury may either buy or sell at that price. The raise to \$1.29 in two years was eliminated. The President signed the bill.

The industrial uses and consumption of silver have expanded rapidly in the past few years, and the

business enterprise. In these stages none should venture who cannot afford to lose what they risk.

In the third stage—the developed mine—the speculation is only that pertaining to our national economy itself, and as to whether the majority of our people, and their administration realize the basic importance of mining. The wealth that it produces is always new wealth and not merely trading dollars. There are still many opportunities for those who have the technical and financial ability.

## WASHINGTON ACTIVITIES

### General

The Department's connections and activities in Washington have remained of the same prime importance during the reconversion period as they were during the war. We must be continuously on the alert to see that the mining industry gets a fair deal in all legislation, as well as to "shoot trouble" for the individual operators.

The connections and organization of Arizona in this regard probably surpass those of any other State, but we maintain a broad viewpoint, and work for the benefit of the whole industry, rather than for any Arizona individuals alone.

It is planned, generally, to have this report cover the fiscal year ending June 30 as a deadline, but during the first part of July so much legislation of importance to the mining industry was still undecided that this portion of this report includes Washington matters up to the adjournment of Congress on August 2, 1946.

### Legislation Accomplished

#### *Stockpile Bill*

The Critical Materials Stockpiling Act (S-752) became a law during the last weeks of the Congress. The bill is generally acceptable to the mining industry, and requires that purchases be made so far as practicable from supplies in excess of industrial demand.

It is interesting to note that a section of the bill which permitted purchases from foreign sources without payment of tariff duties, was deleted in final conference, and that a **mid-western representative** in the House stated in this conference:

"The tariff on these materials is highly important to our national defense as it will help our nation develop our domestic sources of strategic and critical materials during the years immediately ahead."

It seems that this theory of "conservation" originally conceived and frequently promulgated by this Department is at last receiving broader recognition

and understanding among those who may have misunderstood the importance of maintaining a healthy mining industry.

#### *Premium Price Plan*

The premium price plan for copper, lead and zinc was a part of the O.P.A. bill and went overboard with that bill on June 30. During most of July that portion of the mining industry who were dependent on premiums to meet costs was thrown into chaos, and a great many marginal mines were forced to close down immediately, thus adding to the short supply of metals.

There was no controversy in Congress regarding the metal premium phase of this bill, and various steps were immediately undertaken to continue the premiums via other legislation or directives.

Finally, during the latter part of July, a new O.P.A. bill, carrying the metal premiums provisions, became a law, and premiums similar to those heretofore in vogue were restored, and made retroactive to June 30.

Marginal mines are different from other marginal businesses in that the operator has no control over what nature put in the ground. If high operating efficiency is maintained, there is little an operator can do, when costs exceed proceeds, other than close down. In times of emergency or of extreme metal shortage (as at present) the country needs this extra metal, but too often other forces exert themselves to prevent its production. It is also true that many large and low cost mines were once small or marginal mines, and if our mineral resources are to be maintained, encouragement and incentive must be lent to many of these small mines. The premium price is a sensible answer in many of these special cases.

#### *Silver*

There has probably been more controversy, name calling, and threatened spilling of blood, in Washington this past year over silver, than any other issue.