ELEVENTH ANNUAL REPORT

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DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

JULY 1, 1949 TO JUNE 30, 1950

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CHAS. H. DUNNING
Director

THE FIRST MELT

At first we started life by seeking slaves
And hunting game within stone's throw around.
Nor dreamt while sleeping in our lowly caves,
Of better means that lay beneath the ground.
We needed slaves to fashion tools of stone,
Bear shield in war, make artifacts of bone.

Then one who oft would meditate alone
Sat poking at the ash of our spent fire;
Found metal pebbles tougher far than stone
And visioned hammered spears and knives and wire,
Quoth he—"Should make far better slave than man,"
And that's where our abundant life began.

"The incentive of a favorable economic climate would, more than any other factor, deevlop the degree of activity in exploration essential to finding new mineral sources."

American Mining Congress Journal

Rx *Prescription for a Sick Industry—* DOMESTIC MINING

(Mix intelligently, administer properly and IMMEDIATELY)

Equitable Taxation
Protective Tariff
Adequate Stockpile
Industry Equality in Washington
Understanding Public

EXPECTED RESULTS—patient should show immediate signs of relief leading to increased exploration, development and production, increased employment, improved national economy, relatively high mineral sufficiency and greater national security.

"Original by Jack Pierce of New Mexico Miners and Prospectors Assn. Reprinted by permission."

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA

Board of Governors:

Dr. N. H. Morrison, Phoenix, Arizona, Chairman
(Term expires January 31, 1951)

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

T. E. Steele, Ajo, Arizona
(Term expires January 31, 1950)

W. C. Humphrey, Tombstone, Arizona
(Term expires January 31, 1952)

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

Personnel:

Chas. H. Dunning, Phoenix, Arizona, Director

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

R. I. C. Manning, Phoenix, Arizona, Chief Engineer

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

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

Mrs. George D. Hunt, Phoenix, Arizona, Office Secretary

Offices:

Headquarters Office:

Mineral Building, Fairgrounds, Phoenix, Arizona - Telephone 4-7034

To the Honorable Dan E. Garvey
Governor of Arizona
Capitol Building
Phoenix, Arizona

Dear Governor Garvey:

In compliance with Chapter 27, Laws of 1939, creating the Department of Mineral Resources, the eleventh annual report of the activities of the department, covering the fiscal year ending June 30, 1950, is hereby respectfully submitted.

Although the small mine industry has been in a precarious and declining state during the past year, due to causes beyond local control, we feel that the department has accomplished many worth while things and has fully justified its cost to the state.

The more difficult the conditions for new mines, the more the department is needed; for most surely we must continually strive to bring about new mines to maintain our state's economy and tax resources.

Yours sincerely,

CHAS. H. DUNNING,
Director

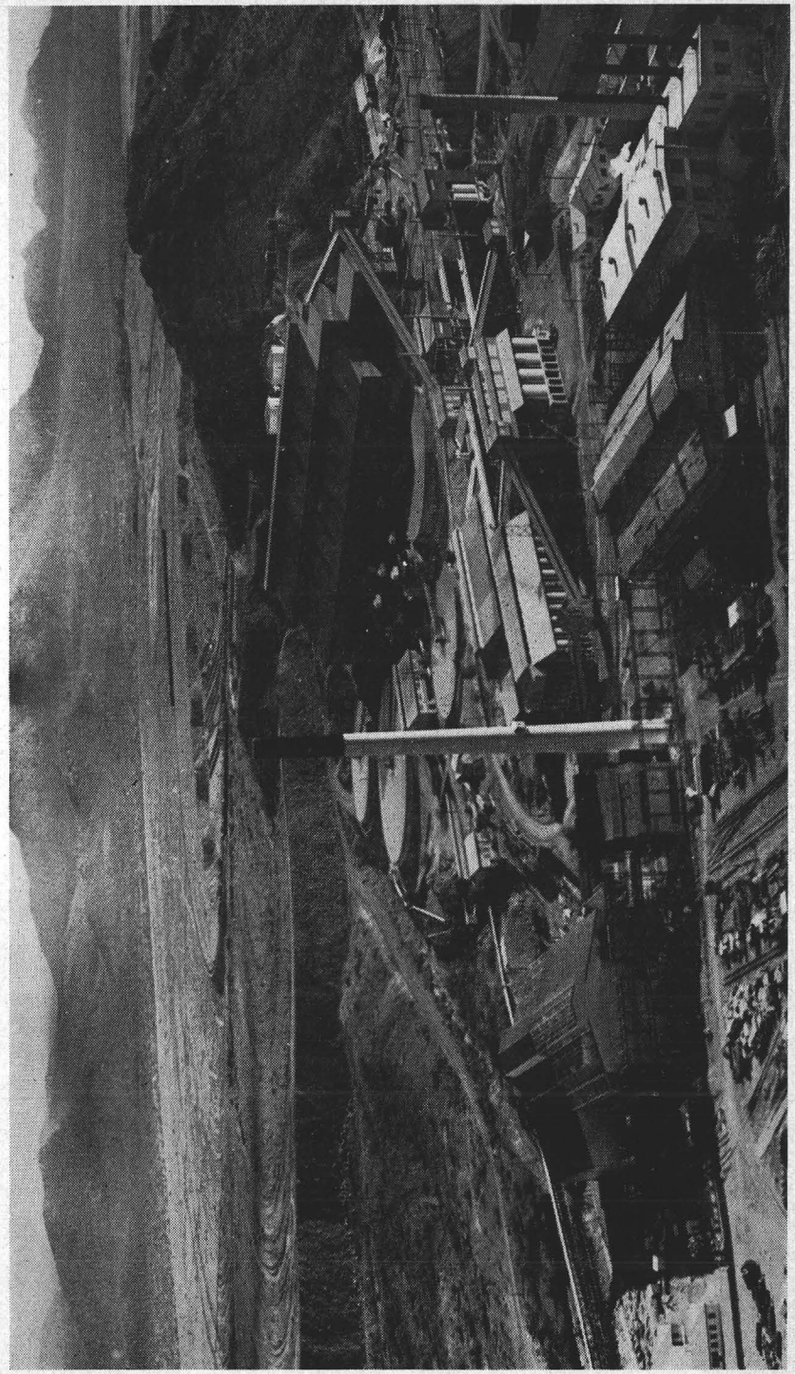
Phoenix, Arizona
June 30, 1950

FINANCIAL STATEMENT
DEPARTMENT OF MINERAL RESOURCES

STATEMENT OF EXPENSES
July 1, 1949 - June 30, 1950

	Appropriation for fiscal Year	Expenditures for fiscal year	Balance Returned to State
PERSONAL SERVICES:	$21,175.00	$20,471.84	$703.16
CURRENT EXPENDITURES—OTHER:			
Rent		150.00	
Utilities		369.93	
Postage		496.76	
Telephone & Telegraph		290.80	
Printing of Annual Report		350.00	
Equipment Repair & Maintenance		126.22	
Office Supplies		211.39	
Janitor Supplies		45.53	
Laboratory & Engineering Supplies		150.35	
Insurance		32.02	
Miscellaneous		140.50	
	2,450.00	2,363.50	86.50
TRAVEL:			
State	1,500.00	1,500.00	
Out-of-State	150.00	150.00	
SUBSCRIPTIONS & DUES	10.00	10.00	
CAPITAL OUTLAY-EQUIPMENT	100.00	100.00	
TOTALS	$25,385.00	$24,595.34	$789.66

NOTE: Certain amounts for the month of June are estimated as final bill will not be received until July 1950.



The New Phelps Dodge Copper Smelter at Ajo

THE DEPARTMENT

The purposes and objectives of the Department can probably be best set forth by quoting from our creating law:

"Section 2. **Functions of Department.** The Department of Mineral Resources shall:

1. Aid in the promotion and development of the mineral resources of the state.
2. Conduct studies of the economic problems of prospectors and operators of small mines with a view to assisting in their solution.
3. Assist in discovering sources of supply for persons desiring to buy minerals.
4. List and describe available mining properties.
5. Make mineral resource surveys and conduct such other investigations as may interest capital in the development of the state's mineral resources.
6. Serve as a bureau of mining information in conjunction with the Arizona Bureau of Mines.
7. Publish and disseminate such information and data as may be necessary or advisable to attain its objectives.
8. Cooperate with the State Land Department to encourage mining activity on state lands.
9. Cooperate with the Corporation Commission in its investigations and administration of laws relating to the sale of mining securities.
10. 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.
11. Cooperate with federal and other agencies having for their purposes the development of mines and minerals.
12. Work against all congressional acts favoring reciprocal or duty free imports of foreign minerals.
13. Do such other things as may assist the more extensive exploration and development of the mineral resources of the state."

Since the department started to function certain more definite lines of duty have become policy. We wish to avoid any overlapping of functions between our department and the Arizona Bureau of Mines, and with frequent consultations between us any such overlapping has been avoided. Generally speaking, our lines are delineated as follows:

Department of Mineral Resources - Economic - promotion of resources - individual mines - semi technical;

Arizona Bureau of Mines - Educational - research - technical - area consideration (not individual mines).

As an example, in the realm of statistics the basic statistics are compiled by the Arizona Bureau of Mines, whereas we are often called upon to whip these statistics into detailed or enlarged form for some special purpose.

It is also the policy of the department not to assume the duties of a private engineer, but rather to create work for the private engineer. We are frequently called upon to make detailed reports on mines, but when desired for promotional purposes, the owners are some times a bit perturbed that we cannot give the type of service they desire. Our policy on requested mine examinations has been to make a preliminary examination on request, including a few key samples if necessary and a Brunton survey if needed. We will then talk the matter over with the owner-operator and guide him the best we can. If he needs more detailed engineering work, and especially if he can afford it, we recommend that he obtain the services of a private engineer. In this case we refer him to a list of the registered engineers who might be available in his district.

In case it is necessary to render a written report, such a report must cover the facts only, with brief recommendations. Visionary amplifications are not permitted.

A more detailed service and report is sometimes necessary when the department is trying to find a deposit or a certain type mine in answer to a specific request from a definite buyer. In such case it is often necessary for the department to expend more travel funds and engineering time and expense in order to present a proposition in a manner that will command the attention of the buyer.

The following-out of this policy has brought several new operations to the state and may we say that in no instance has there been any criticism that the department has misled any buyer.

When we are called upon to render an opinion or advice on a mining project that is being publicly promoted and are asked "is it any good?", it is naturally difficult for us to answer

patent will unquestionably take place with the abolition of moratoria on assessment work, if the Bureau of Land Management and the Forest Service will liberalize their requirements as to what constitutes a mineral discovery as a basis for valid location and patent, and will expedite processing of applications so that the present interminable delays in departmental proceedings may be cut down.

"We approve in principle (the plan) to sell small tracts outright. The 5-acre limit proposed by the Bureau of Land Management is not unreasonable. In such cases public bidding should not be required and the right to purchase should (give preference to) adjacent owners.

"A lode location perfected and patented vests a complete title in the owner to the surface as well as to the mineral in the land (subject only to extralateral rights of adjacent claims). We oppose the suggestion that this ownership be severed and that the Bureau of Land Management be given authority to award the surface or such portion thereof as it deems advisable to claimants for other land uses. The interference with the miner by persons seeking to cut timber which is necessary for fuel and for timbering of the miner's workings; the interference by persons desiring to cultivate areas which may be necessary at some future date for mine buildings, employees' lodging houses, dumps, mill sites, and other structures, the need for which may not be apparent at or before the date when patent is granted; the perpetual conflict with grazing claimants; interference with surface needs—all these certain conflicts indicate the desirability of maintaining the present complete surface title which goes with the mine patent.

"For mineral location, we again urge opening of unused military reservations, power site withdrawal areas, and other territory in Alaska and elsewhere now closed, except national parks and monuments, and lands required for secret defense and active military training, testing and other operations. New withdrawals and reservations of public land should be held to a minimum essential to national defense unless authority for exploration for and development of minerals is contained in the withdrawal order."

It is the further thought of this department, that the mining industry, led by the large companies, should put greater stress on public relations angles. After all, the difficulties which the industry now encounters, stem largely from a lack of knowledge amongst the general public. From that comes lack of any unified pressure, and consequent "unwanted step child" treatment from the "powers-that-be".

Every citizen in the United States should be enlightened as to the importance of keeping our state and nation as self-sufficient as possible in mineral supplies, and if they were, we might all live to enjoy the blessing and the security with which nature so richly endowed us.

gold base for its currency with the least distubance and with confident expectation that it could be successfully maintained.

"We again recommend the enactment of specific legislation to compensate lode and placer gold miners for the severe losses of capital caused by the arbitrary shutdown imposed during the war years. This is in no sense a request for a subsidy, merely a just claim for restitution for the damage suffered through an act of doubtful legality and mistaken policy on the part of a government agency.

"Furthermore, to the extent that the mine owners are not compensated or their losses in war years through such legislation, they should be allowed the right to carry their losses forward in computing taxable income, without the virtual denial of these unjust benefits through technical intricacies of the Internal Revenue Act and regulations.

"We continue to favor a currency with the traditional base of gold and silver, with anticipation of stabilization of the prices of these metals eventually at levels that reflect their true world values.

"The United States Geological Survey and the Bureau of Mines perform technical services of vital importance and great value to the Nation and to the mining industry. They are now headed by exceptionally able engineers of highest integrity in whom we have great confidence.

"Appropriations for personnel and for the performance of the duties of these agencies as prescribed by Congress are relatively small items in the total cost of the Federal Government, and should be made available in adequate amounts to continue all their essential activities.

"We commend the action of the Secretary of the Interior in creating the National Minerals Advisory Council, and we heartily approve the program of this Council in connection with current mining problems. The personnel is made up of outstanding mining men and we urge full consideration of the policies which it recommends.

"To avoid the present difficulties and delays in financing primary mining ventures, we recommend that the Securities and Exchange Commission laws be amended so that only the fraud sections of the present Federal laws, rules and regulations be applicable in offering and selling primary mining securities to the public, and that the various State laws, rules and regulations go no further than that in their requirements.

"The mining industy in the United States has been built by individual initiative under our free competitive enterprise system.

"We recognize our responsibility to defend this system against every attempt, from within or without, to substitute government control of the lives and activities of our people.

"We oppose those social, economic and political idealogies which subordinate the individual to the will of the State.

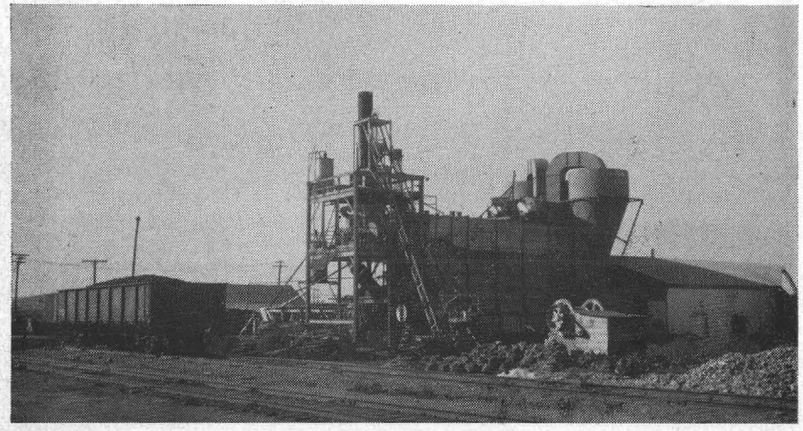
"We believe in equality of opportunity, and that ability and character coupled with hard work, thrift and initiative should be awarded. This is the essence of the American way of life.

"There may be merit in the argument that $100 will not produce the amount of mine development in 1949 that it would have produced in 1939, although the $100 requirement has never been more than a token evidence of a locator's good faith. We believe, however, consideration should be given to the fact that the Federal Government's take in taxes from everything the miner produces increases his burden and risk to an extent that may well offset the proposed increase in the annual labor requirement; and this requirement should not be increased.

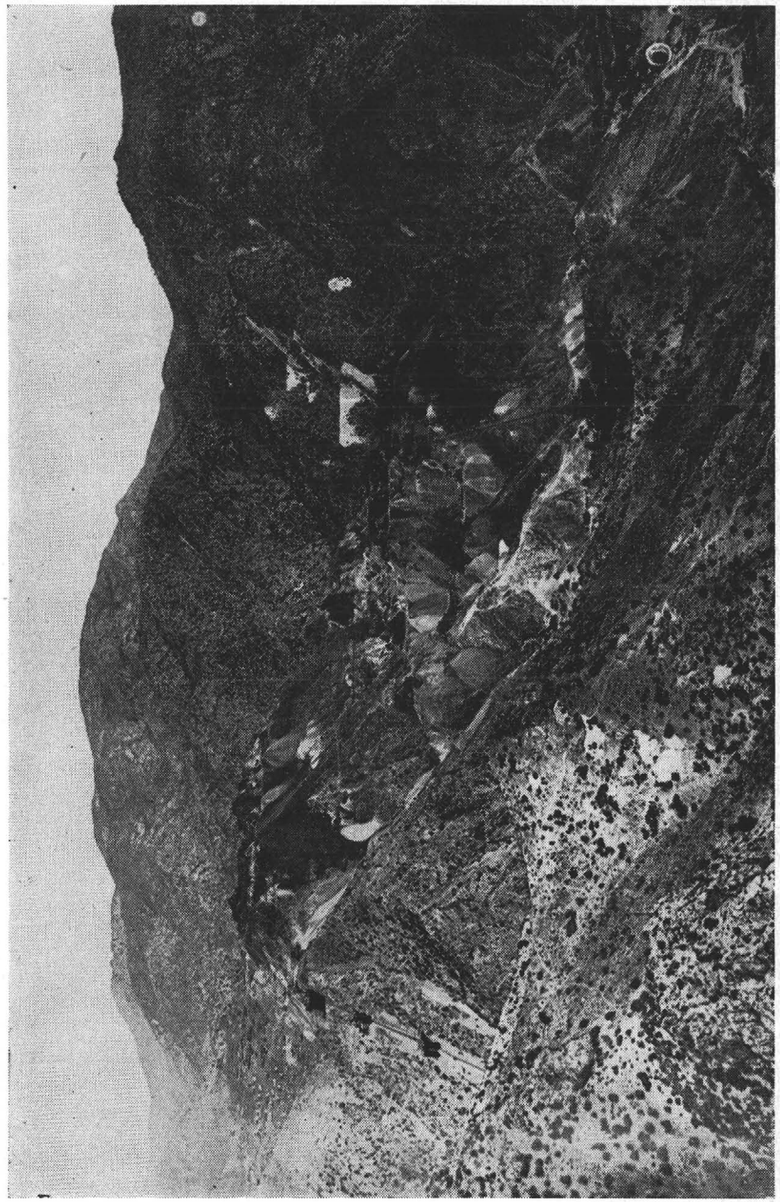
"We oppose discriminatory pressure on the mine as compared with other classes of land claimants in the matter of making final proof of right to patent. We submit that increases in applications for mineral

"yes" or "no". Few of these publicly promoted mining ventures have made any profit for the casual stockholder in the last generation. And yet it is never impossible. We have neither the staff nor the means (and we are not advising that we do have) to make the detailed examinations that would be necessary to render an advisory type of report in these cases. We have adopted a policy of not discouraging, but at the same time warning the prospective stockholder that "all mines are highly speculative in their early stages and one should not invest money in them that they cannot afford to lose."

May we again call attention to the fact that there is no direct connection between this department and the Arizona Small Mine Operators' Association. While we work together for the betterment of mining in Arizona, our functions, organization and personel are entirely different. We are purely a state department created to augment the mineral wealth of Arizona, whereas the Arizona Small Mine Operators' Association is a membership organization of persons affiliated with or interested in mining.



Rock Wool Plant, Phoenix



Early Operations Near Morenci

Ameican producers and workers. Ore reserves in foreign countries cannot be depended upon to meet the emegencies of an atomic age.

"We oppose inter-governmental commodity agreements and cartels that call for state control over industry, or involve the regulation of production, trade and prices, in conflict with the traditional liberal, individualistic principles of Western civilization.

"A large stockpile of metals and minerals is essential for preparedness against a war emergency. But national security must also be supported by producing mines, mills and smelters, with organized working forces and capacity for sustained and adequate production of materials important for military and civilian needs. This is the real and fundamental backbone of national defense.

"We recommend the building up of stockpiles. The best time to build up stockpiles is when world output exceeds demand. We recommend that Congress authorize the extending of ore commitments over a long period of time in order to justify investment in mine development and equipment.

"We recommend that greater consideration be given to the maintenance of sources of production of strategic and critical metals and minerals within the United States where, otherwise, these vital mineral resources may be lost or become unavailable for national security.

"Tariff reductions, high postwar costs, heavy taxes and unstable metal prices have discouraged mine development since the end of the war. We recommend an incentive to encourage prospecting, exploration and the development of mines producing essential minerals.

"Mineral discoveries and development of ore reserves add to our production resources and create new national wealth and taxable income. The search for new ore deposits by individuals and small corporations is being blocked by excessive taxes. The small mine needs venture capital to assist in the speculative endeavor of prospecting for and developing new mines.

"A constructive tax policy is important to the further development of our mineral wealth. We urge prompt tax revision to create a favorable climate for venture capital in mining.

"Restoration of gold in its historic function in the monetary system of our country is believed by us to be an essential move in relieving the chaotic currency conditions that seriously handicap all efforts toward economic recovery.

"In order to establish the value of the present dollar in terms of gold, at which a gold standard could be restored with best hope of permanence, we advocate removal of the present restrictions that prevent our citizens from buying, holding or selling gold domestically or abroad. Pending restoration of a true gold standard, we urge that the United States Treasury continue its policy of buying all gold that is offered at $35.00 per ounce, and that the domestic producer be given the choice of accepting paper dollars for his gold at the stated rate of receiving his gold in appropriate coins, such as pieces containing one ounce, authenticated as to gold content but without designation in dollars.

"The price of such coins in the free market would afford a fair measure of the current value of the American dollar. In turn it would provide a similar measure of the value of all foreign currencies now exprressed in dollars. By this empirical means, a realistic price of gold should be revealed within a reasonable time, whereupon Congress should take effective steps to restore a sound currency with unconditional convertibility of the dollar into gold at the indicated level. By such procedure, which we most earnestly recommend, the country could return to a

INDUSTRY NEEDS

At a meeting of the Western Division of the American Mining Congress at Spokane last fall, a Declaration of Policy was adopted. This declaration runs into many printed pages, but the following excerpts from same should portray the picture of the mining industry's needs in Arizona in better words than any other way we know.

"The mining industry has an essential role to play in the preservation of a free America. The production of minerals is pre-eminent in insuring our national safety and the well-being of our people. We urge a better understanding, on the part of those who enact and administer our laws, that the economy of our nation, the happiness and welfare of our people, and the safety of the Republic itself depend in large measure upon continued mineral discovery, development and production.

"Government policies as to public lands, taxes and venture capital should be formulated and administered as to encourage exploration and development of mineral deposits by private capital and free enterprise.

"Our present Federal taxes remove practically all incentive for effort and investment in risk enterprises, including the discovery and development of additional mineral reserves. They should be promptly revised if our system of free enterprise is to function and to yield adequate production, employment and long-term government revenues."

"In paritcular we are deeply concerned about legislative proposals for an expanded 'social security' program. The stongest emphasis should be placed on self-help and ambition to produce.

"Unemployment benefit payments should not be increased to the level where employment is unattractive to the recipient.

"Although many abuses which flourished under the Wagner Act have been ended, there still remain uncurbed certain practices of some labor leaders and unions which interfere on an increasing scale with civil liberties and the free flow of commerce. Particularly objectionable are: control of whole industries by powerful labor leaders; the power of minority groups to force workers to strike unwillingly; picketing abuses against which the remedies provided by law are inadequate; and the disruptions and strife resulting from Communistic influences within unions.

"We recommend that it be made a Federal criminal offense for either labor or management to engage in violence in connection with a labor dispute.

"The nation must see to it that the mineral industries, as among the greatest of national assets and safeguards for the protection of its people, are maintained in sound and healthy condition. Tariff reductions that jeopardize productive ability and are detrimental to mine development weaken our economy, and are not in the best interest of the country. Recent reductions have eliminated production of at least one of our strategic metals." (This was mercury, but since then there have been several others.)

"We recommend that Congress exercise its constitutional authority over tariffs through the Tariff Commission, to be administered for the welfare of the American people, with suitable safeguards and strict accountability to the Congress. Proper consideration should be given to the effect of foreign wage differentials in cheap labor areas on the American worker, and also to the effect on the domestic mining industry of loans and grants for the development and expansion of foreign raw material production to be imported into this country to the detriment of

GENERAL ACTIVITIES

GOVERNMENTAL:

Premium Price Plans: Continued attempts have been made by factions of the industry to pass mine incentive bills through congress. The O'Mahoney Bill failed to pass the House but more recently new bills of a similar nature have been introduced.

There is no doubt but that the mining industry needs incentive, but the majority of operators do not want it in the form of subsidies with consequent government control.

Metal Tariffs: The department has been active in preparing data for the Arizona Copper Tariff Board and for organizations of the producers of other metals.

Import tariff on copper was suspended until June 30, 1950 at which time 2c per pound will be automatically reinstated unless government regulation prevents it. Strong pressure is being exerted in Washington by a bloc of copper fabricators and foreign producers to continue the free entry of foreign copper.

Mechanized Handling of Ore Underground
(Courtesy Alloy Steel and Metals Co.)

One argument they use is that the United States is not producing as much copper as it consumes. It is just as much of a fact that the reason we are not self-sufficient in copper production is that we don't have enough mines, and the reason we don't have enough mines is that there is not enough incentive for venture capital to develop new mines, although we have the dormant resources. Assurance of a reasonable tariff would add a measure of incentive.

The situation is similar in lead and zinc. A survey by the department showed that during the past year in Arizona 46 out of 58 lead-zinc mines closed down and 6 curtailed operations. Approximately 1094 employees were thrown out of work. This situation is entirely due to foreign dumping. Arizona production of lead and zinc actually increased but this increase was brought about by the change from copper to lead-zinc mining by the largest producer on a temporary basis. The 1950 story may be different.

Taxes: Producing mines assume a greater proportion of taxes in Arizona than any other group—in comparison. These large mines do not object to paying their fair share of taxes, but they would no doubt feel better and be more willing to develop additional prospects if they had assurance that there would be no further inroads on their rather precarious profits.

It has long been a fact that the method of assessing the large mines in Arizona has extracted more taxes from them than if they had been located in any of our neighboring states. After all the production of metals is a world wide competitive thing—prices are not set by any state's producers—and the state that has the highest tax rate is not likely to induce the most venture capital to develop its intrinsic resources.

While the word is abhorrent to most producers, it has been suggested, not without forethought, that Arizona institute a Severance Tax in place of the existing producing mine taxes. If properly done this would probably be the fairest method of taxing producing mines. It would enable the producing mine to pay according to its good or bad years and directly according to its production.

There is great fear, however, that the institution of such a new tax would work out not "instead of" but "in addition to."

State or local taxes, however, become insignificant beside the tax burdens imposed by the federal government. It is an indisputable fact that the development of a new mine is highly venturesome—more so than the initiation of other industrial enterprises. When the national tax policy is such as to take the lion's share from a successful enterprise, while letting the unsuccssful ones stand their losses, it serves admirably to drive

been postponed until the water flow becomes lessened. In this regard it is planned to drill horizontal holes from the bottom of the shaft to accelerate drainage and thus accelerate further development.

A new deposit of high grade copper ore was recently exposed in the Magma Mine in a development drift on the 3000 level. This discovery lies some 2000 feet east of the most eastern ore heretofore found. The ore is a replacement in limestone and thus quite different from thir past ore which mostly occurred as a mineralized fault fracture in disbase.

* * *

The Mammoth-St. Anthony Co. have optioned and are developing a group of lead claims in the Canada Del Oro section of the Catalina Mountains, known as the Burney property. No results of exploration have been announced.

* * *

Dr. Robert J. Wright, geologist for the Atomic Energy Commission, has been stationed for the summer with headquarters at the U. S. Bureau of Mines office at Tucson. He will examine finds and prospects of uranium in Arizona, with special attention to those in Central or Southern Arizona, rather than those in the Northern quarter of the State.

Mineral Building, Fairgrounds, Phoenix

Some notice is being given to a relatively new method of prospecting for hidden ore deposits known as Geochemical Prospecting. The method depends on in-the-field analyss of soils, ground water, and studies of plant life. A few papers have been published describing the results in foreign fields. The most satisfactory results have been in exploration for zinc, copper, molybedenum, chromium, nickel and tungsten.

* * *

The Miami Copper Co. has acquired a proven deposit of copper at the "Sleeping Beauty" section north of Miami. It is the announced plan to move equipment there from th Castle Dome Mine when that ore body becomes worked out in the next two or three years. Present plans also anticipate that the Miami Mine itself will be forced to close because of exhaustion of ore in the next four or five years.

* * *

Judge W. E. Patterson of the Superior Court of Yavapai County recently rendered a decision that the collection of a sales tax on the premium portion of metal prices (when premiums were allowed some operators during the war) was illegal.

* * *

The New Jersey Zinc Company has instituted a field office at Prescott and are looking over areas in that vicinity. Prominent engineers with Tri-State lead-zinc connections are engaged in geological reconnaisance in central Yavapai County.

* * *

At the San Manuel Mine, controlled by the Magma Copper Co., an exploratory shaft within the ore body, and a working shaft in the footwall have both been completed to a depth of over 1400 feet.

The San Manuel is a recently developed (by drilling) copper ore body, with a proven tonnage upward of 500,000,000 that may be one of our chief sources of copper in the future.

The company reports that a very large amount of water has been encountered in this area and it has been advisable to temporarily suspend development until drainage would reduce the pumping demands. The shaft that is within the ore zone, though ordinarily expected to carry the greater water load, has not been so difficult because the ore mass contains clayey seams that restrain the flow, but the shaft in the footwall has required pumping of around 1000 gallons per minute. It is not economical to handle such an amount of water and at the same time proceed with sinking operations, so further development has

necessary venture capital away from mining, or to mining enterprises in foreign countries (where they may actually obtain a form of U. S. subsidy).

Constructive thought in this regard would permit the new mine to be released from **all** taxes until the investors had received the return of their capital for, after all, there is no profit in a mine until the invested capital is returned. Both Canada and Mexico have some such provision and that is where our venture

Drilling Blast Holes
(Courtesy Chicago Pneumatic Tool Co.)

mining capital, needed so badly here, is finding more of a haven. Countries which have such a plan are also finding that their taxable assets quickly increase as the added incentive develops new mines into the net profit category.

Gold and Silver: Attempts to bring about an increase in the price of gold or to permit the producer to sell his gold on an open market have not been successful, and President Truman has declared that there will be no increase in the price of gold as long as he is President.

Gold is a commodity just as any other metal or product and became an historical backing for currency because of its durable characteristics, its widespread occurrence, its relatively high cost of production (thereby making small quantities valuable in terms of money) and its value as a commodity in the arts and industries.

This industrial value of gold is proven by the fact that for over thirty years the average consumption of gold in the United States in the arts and industries alone (not including currency backing) has been over 30% **more** than the United States production.

Recently a movement has sprung up to initiate a test suit against the government to permit the gold producer to sell his product on the open market at whatever price he can obtain. The theory is that gold mining claims and contained gold are "property" and are protected by the Fifth Amendment of the Constitution of the United States which holds that no person "shall be deprived of property without due process of law, nor shall private property be taken for public use without just compensation." It is claimed that when gold producers are denied an open market by Treasury Regulations, and forced to sell to the Treasury at a lower price than the open market offers, it is a violation of the Fifth Amendment.

Persons interested in knowing more about this movement, or wishing to join it, should write to Mr. Harry Sears, President, Calaveras Central Gold Mining Co., Angels Camp, California.

Perennial attempts, led by eastern farbicators of silver, to upset our basic silver regulations are again prevalent. At this writing there are no definite results but there could be at any time before congress adjourns.

The silver manufacturers' bloc is no doubt desirous of obtaining cheaper silver. The world price of silver (under a free world-wide market with plenty of suppliers available) has averaged about 72c per ounce for many months. The U. S. Mint, by law, pays the domestic producers of silver 90c per ounce, such silver to be used for paper currency backing.

MISCELLANEOUS NEWS ITEMS

The U. S. Bureau of Mines is carrying on a concerted program of exploratory development by tunnels and drill holes, of manganese deposits in the vicinity of Artillery Peak in Southern Mohave County. Coordinated with the exploration is research work on beneficiating the ore at their laboratory in Tucson.

The Artillery Peak deposits are one of the largest manganese deposits in the world but not high enough in manganese content to be used directly without concentration or beneficiation. The Bureau had previously done considerable research work on concentrating Arizona low grade manganese ores, and has worked out successful methods on some ores, while others have proven more difficult.

The Bureau is also currently carrying on exploratory drilling at the Old Tiger Mine at Crown King.

* * *

The Verde Exploration Co., an outgrowth of the old United Verde Extension Mining Co., financed by several of the large mining companies, will continue exploration work in the area around Jerome. No announcement of discoveries has been made.

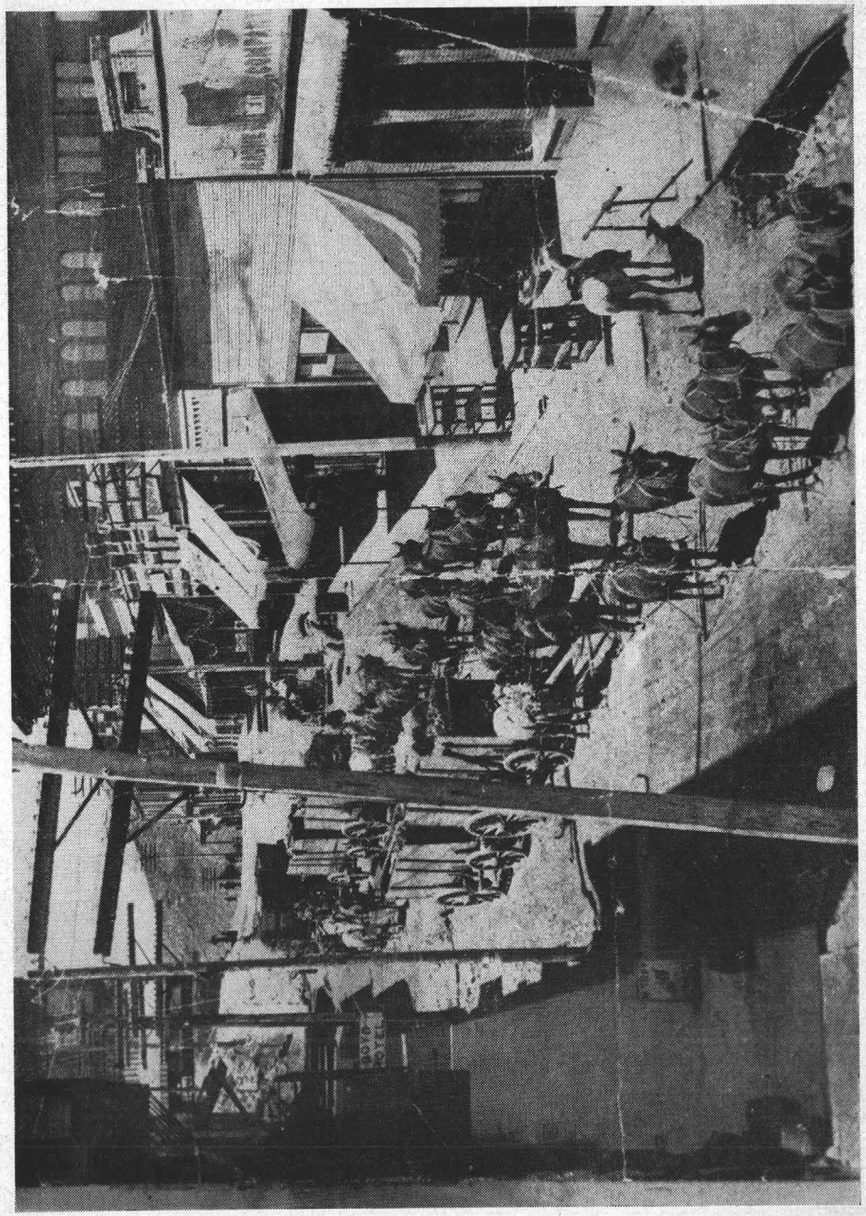
* * *

The Consolidated Copper Mines Company, who have extensive holdings in Nevada, have optioned a large group of claims of various ownerships north of Safford in Graham County. This is a monzonitic type of copper mineralization. A broad program of diamond drilling is underway but they have not yet made any announcement of detailed results.

* * *

Concerning forthcoming operations at Bisbee, Ajo, and Jerome, the management of Phelps Dodge Corporation advises as follows:

> "After over a half century of production, the United Verde Mine at Jerome has reached the cleanup stage of copper mining, necessitating the permanent closing of the copper smelter in June of 1950. The mine and mill will continue to operate on a declining scale for a short time.
>
> "A smelter will be completed and placed in operation at Ajo in July to smelt the New Cornelia mill concentrate, thereby eliminating the long rail haul to Douglas.
>
> "Underground mining operations at Bisbee which for several years have been divided between copper and lead-zinc ores will be continued on copper ores, the lead-zinc working force being switched to the copper stopes."



Jerome About 1900

The fabricators claim this is a subsidy for the benefit of the silver miners and include a bit of name calling of the western senators who refuse to budge from the producer's position.

To the uninitiated the silver situation may have an odor reminiscent of subsidies, but let's look at the facts.

Every ounce of domestic silver that the Mint buys at 90c per ounce is immediately sold to the public at $1.29 per ounce—thus making a profit for the government of 39c per ounce. This profit is called seigniorage. It is accomplished by the fact that the silver dollar you get (or the silver certificate redeemable in silver dollars) is based on a silver value of $1.29 per ounce.

Who then is subsidizing whom? The miner sells his product to the Mint and gets back a coin or a certificate representing only 78 per cent of his original silver.

It hardly seems to compare to those cases where the government pays, say, $2.00 per unit for some commodity and then sells it for 1 cent, although the silver manufacturing bloc would have you think so.

Furthermore, as in the case of gold, the United States is consuming some 30 per cent more silver than it is producing. This is in the arts and industries alone without coinage consideration.

The fabricators of silver have a world-wide market to purchase from. If foreign countries, when hard-up may choose to dump a bit of silver here at a "price", why should they demand that the U. S. producer do likewise when every bit of U. S. production is needed for coinage and has an intrinsic value 30 per cent greater than the producer receives?

It is often used as an argument that nearly all gold and silver in the United States is produced as a by-product of base metal production and, therefore, that there is no **cost** of production. The by-product part may be true, but it is such an important by-product that the entire economy of base metal production could easily be upset by not giving gold and silver their just due. Users of base metals should beware!

Mining Law Revisions: Various bureaus in Washington have for some time attempted to bring about changes in our basic land or mining laws. Many persons have feared that the real reason is an inborn desire to nationalize the mining industry and bring it under bureaucratic control.

The original suggestions that the Bureau of Land Management made were not well received in the field. After consultations with the Public Lands Committee (of which Charles F. Willis of Phoenix is Chairman) of the National Minerals Advisory Council, the following concrete proposals have been presented:

"1. Notices of mining claims to be filed with the district land office, as well as with the county recorder as at present.

2. Mining claims to be adequately identified with reference to established public survey points or natural landmarks, the cost of such survey work to be allowed as part of the annual assessment work. A system of numbering claims to be instituted.

3. A bill of particulars as to the nature of the assessment work performed on mining claims to be filed. Proof of assessment work to be filed with the land office as well as with the county recorder as at present.

3. Surplus assessment work performed in a given year to be allowed, within reasonable limits, toward meeting assessment requirements in succeeding years.

5. All right and interest in a mining claim to be forfeited to the government upon failure to perform annual assessment work or file proof thereof for three years. (Not to prejudice the right granted under the present laws to other mineral claimants to relocate immediately following a year of default.

6. A mineral claimant whose claim has been forfeited or adversed to the government to be denied the right to relocate, directly or indirectly, such claim or any portion thereof for a period of three years.

7. The government to retain a right-of-way across any unpatented mining claim for official government use or for the use of government permittees or licensees, subject to payment to the mineral claimant for damages, if any, caused by the use of such right-of-way to property developed on the claim for mining purposes. Mining patents to include right-of-way reservations to the government similar to those included in other types of patents.

Contact with a large number of mining people in Arizona shows that the majority (and this department concurs) think that most of the proposals are unnecessary. Most of them appear to be harmless; but one school of thought fears that once the door has been opened to revisions, revision will follow revision, and bureau regulation will follow law until there is no more basic law. Another school of thought fears that if the industry is too adverse to reasonable revision that more drastic means will be used and more drastic revisions accomplished.

We do need the compulsory filing of an affidavit of assessment work, but this is a state regulation rather than national.

rock wool for insulation. This plant has a daily capacity of thirty tons, using raw materials secured in Arizona, ninety per cent of which is smelter slag.

Currently the greater part of the output goes into residential construction but a wider use for industrial insulation may be possible in the future. Bulk wool has been used almost exclusively in the past, but during the year now batt making equipment was installed. While batts are relatively new in the Valley, the use is increasing because of their convenience.

Silica:

The Meteor Crater Silica Company at Winslow has continued to supply high grade silica for the glass industry in the Southwest. Some difficulty has arisen because of the smog control in the Los Angeles area which limits the proportion of dust sized particles that can be used. They may possibly be required to remove such particles by washing, but they have demonstrated by repeated tests and trials that Meteor Crater silica is of exceptional high quality.

Strontium:

A large deposit of strontianite, in the Aguila area, which has been known for some time is being reviewed for the purpose of determining its extent and quality. The surface would indicate that it is extensive.

Strontium is used in signal flares and has been utilized as a flux for removing sulphur from steel.

General:

Each year it is evident that the production and demand for Arizona non-metallics is increasing. It is noteworthy that this year's brief resume includes 19 different products.

These materials must usually be inexpensive on a per ton basis, so must be produced near the places where they are consumed. The growth of non-metallics' production in Arizona therefore becomes closely correlated with the growth of Arizona itself, and the Southwest in general.

It has already become an important factor in our state's economy and, with our great untouched resources, will become more important in the future.

Seven Springs in Maricopa County. The quarry has been idle since before World War II. The new owners will build a plant southwest of Phoenix for the production of patented prefabricated slab, terrazo, and novelties. The plant will have a capacity of 1000 square feet per day of prefabricated slab which will be used for wall panels, flooring and building trim. The terrazo output will be up to fifty tons per day. At capacity the Phoenix plant will employ upwards of one hundred men with fifteen to twenty at the quarry.

Some onyx was produced at the old quarries at Mayer during the year. This also has excellent quality.

Perlite:

Activity in the perlite field has fallen off during the past year. Local consumption is mostly confined to plastering material. Small shipments of crude perlite have been made to points in the Midwest. Pumice blocks are more in demand for building, while rock wool as an insulating material in residences and commercial buildings has taken the place of perlite to a large extent. Other insulating applications have advanced beyond the purely experimental stage but are not yet in general us. Problems of processing and uniform quality continue to be the chief reasons for holding back further development of the perlite industry.

Pumice:

The market for pumice blocks for all types of building construction continues to expand. Production of pumice blocks in Arizona during 1949 reached nearly twenty-five million. The chief state sources are located in the vicinity of Williams, Flagstaff and Safford. The principal manufacturer of building blocks is the Builders Supply Company with plants in Phoenix and Mesa.

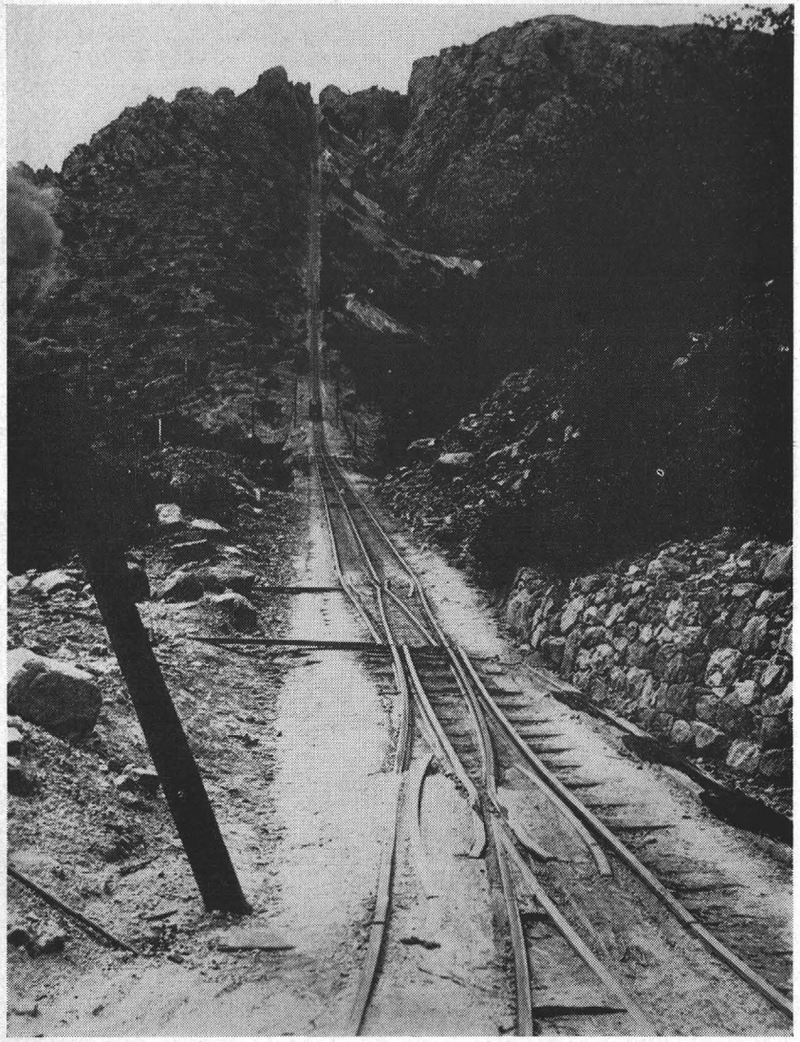
The output of crude pumice in Arizona amounted to more than 10,000 tons during 1949, which was inadequate to supply the local demands. To meet the deficiency approximately 50,000 tons were brought into the state from a large deposit in California in the vicinity of the Salton Sea.

Several promising occurrences in various parts of the state are being explored, but development has not reached a point of either determination of the potential tonnages available or regular production. The demand for superior quality of pumice continues to expand and has stimulated active prospecting.

Northern Arizona pumice has the drawback of a high moisture content which increases weight and freight costs, and the disadvantage of limited seasonal operations.

Rock Wool:

At the present time the Sun Valley Manufacturing Company of Phoenix operates the only plant in the state producing



Early Day Tramway in Rough Country
The Loaded Car Pulled the Empty Back

We also need to enforce a clearer and more definite description of the location of a mining claim to prevent "floating locations" and make it easier to prove a clear title. But this is a matter of customary tolerance with the law rather than the law itself.

Another school of thought would throw out the entire original law under the theory that although it may have been admirably adequate in 1872, it is entirely obsolete today. So is our inch-yard, ounce-pound system of weights and measures, and it would be just about as difficult to change our mining laws basically as it would be to require the adoption of the metric system.

Office: Personal calls at the office average about 200 per month and phone calls approximately 300. Reasons for these calls are as widespread as the functions set up in our law. Perhaps the largest class is composed of amateur prospectors who bring in samples of their finds and want advice as to identification and possible value or market. In this regard we give visual identification only and, if positive determination cannot be made in that way, we refer the sample to the Arizona Bureau of Mines at Tucson. This type of service helps to maintain an interest in mining and, in several instances, has resulted in discoveries of importance to the state.

Average outgoing first-class mail is about 300 pieces per month, with about 50 pamphlets, booklets, etc. This is exclusive of our annual report which has a mailing list of about 4,000.

The average time per caller is considerably longer than in the usual business office. It is thus evident that our nominal office force is kept quite busy, although we have slack and rush times like any other office. Slack times are well filled in by work on special projects.

FIELD: Field service has been greatly curtailed by our decreased travel budget. At the start of the year we set up a field program that would permit an engineer from the department to be present in all districts of the state at least once during the year and those districts having the greatest attendance at Arizona Small Mine Operators' Association meetings, or those places requiring a minimum of travel expense, would be visited twice during the year.

This curtailment has brought some complaints from persons who need our field service before "several months hence." Also, when we had an adequate field force they kept in close touch with all activities in their district which made the department a valuable bureau of information on Arizona mining. Some deplore the fact that we can no longer keep up to date and accurate in such matters.

The expanding building program is contributing also to the increased use of gypsum. The minimum consumption of gypsum for all building purposes is on the order of 2,500 tons per month with every indication that it will increase appreciably during the next year.

Most of the production originates from large deposits near Winkelman with minor shipments from some excellent deposits in northwestern Yuma County.

Lime:

The Grand Canyon Lime and Cement Company of Nelson has been producing at the rate of about 40 tons of lime per day, but plans to increase to 150 tons in the near future. This is an excellent deposit and their slogan for a long time has been "the finest lime on earth."

The Paul plant at Pauls Spur near Douglas also remained in active production and supplies many of the metallurgical needs in Arizona.

Lithium:

Prospecting in pegmatite areas for mica and feldspar, as well as for beryl, has revealed moderate quantities of three lithium minerals, lepidolite, spodumne and amblygonite. No production has been undertaken because, for the moment, developed sources seem to be supplying the demand. Whenever the demand increases materially it seems probable that lithium minerals, especially spodumene and amblygonite, can be produced in Arizona.

Lithium was used extensively during the war to make potable water from sea water for stranded service men. While this need has passed, it is one of the lightest of metallic elements and new uses are continually being proposed or found.

Mica:

The production of ground mica in Arizona has been greatly enhanced by the installation of a custom grinding mill by Philip S. Hoyt of Aguila. Hoyt is buying the crude mica ore from any producer and currently paying $30.00 per ton for the recoverable mica. This has opened up an outlet for small lots of crude mica from a large area and is taken advantage of by a great many small producers. Hoyt grinds the ore and separates the mica into various grades and sizes which find a ready and growing market.

The plant of Tocco and Smith at Buckeye also produced throughout the year, largely the sericite variety.

Onyx:

During the year the Rainbow Onyx Company purchased the quarry formerly owned by the Arizona Onyx Company, north of

being brought in from Fierro, New Mexico. This New Mexico iron analyzes some 85% iron oxide, and is very low in silica—qualities that it may be difficult to duplicate in Arizona.

The product of this new cement plant Is declared to be of the finest quality obtainable anywhere.

Flagstone:

The production of flagstone from northern Arizona, principally by Mills Inc., at Drake, and the M. C. quarries near Ash Fork, together with many smaller quarries in the same general area, continues on an upward trend. Approximately two hundred men are employed in this industry. In some instances the operations are carried on by two or three men who are owners or lessees of these smaller properties. Most of the tonnage is exported from the state and most of it is shipped by truck. The Arizona consumption amounts to more than 10,000 tons per year.

Because of its excellent quality and the variety of soft colors which blend well with any surroundings, it finds wide application for interior wall facing, fireplaces and indoor plant boxes, as well as floors, walks and outside facing on many types of buildings including fine residences.

Fluorspar:

Fluorspar production was not active in Arizona in 1949 and known shipments were confined to the Benson area. More lately there has been renewed inquiry and as fluorspar prospects are widespread in Arizona a stimulated demand could be met by increased production.

Feldspar:

The Kingman Feldspar Company remained in active production of about a carload per day of ground feldspar throughout the year. Feldspar is used mostly in the ceramics industry.

Gypsum:

Two factors combined to increase the production of gypsum during the past year. The cement plant at Rillito, referred to elsewhere in this report, has stepped up the demand by approximately 400 tons per month. Gypsum is calcium sulphate and the Agricultural Department of the University of Arizona, together with other state and federal agencies, has encouraged the wider use of gypsum as a soil conditioner. The federal government subsidizes the use of agricultural gypsum to the extent of 1½c per pound of available sulphur which means for the farmer more than $3.00 per ton of gypsum applied to the land. The consumption of agricultural gypsum in Arizona is about 30,000 tons per year.

The greatest damage, however, has arisen because we cannot take the aggressive attitude necessary to seek out mining properties or deposits for those requesting something definite or special. This type of service requires considerable field search and research because we cannot recommend a property without a field examination and report either by one of our own engineers or some well known private engineer. In several instances promising resources may remain neglected because we cannot provide the definite and reliable data that a possible purchaser demands.

Again may we say that mining is a competitive business and capital for the development of mines will naturally flow to the state rendering the best service—other conditions being equal.

Public Relations: The various ills of the mining industry stem largely from a lack of understanding by the general public of its importance to our economy and security, and the difficulties peculiar to the industry itself.

The department feels that with a better understanding on the part of the non-mining public, many of the ham-stringing difficulties encountered by mining would automatically disappear.

We have, therefore, adopted a policy of helping public relations and increasing public knowledge at every opportunity, usually by articles or talks that reach the non-mining public.

This policy will be augmented in the future and frequent consultations will be held with large mining companies, as well as the small operators, to determine the ways in which such results can best be accomplished.

In the case of the large mines, for instance, few residents of Arizona appreciate the large proportion of their gross income which is spent within the state for labor, supplies, freight and taxes, and the very small portion that goes to "Wall Street." Few appreciate the fact that mining pays nearly one-third of the state's taxes and that the economy of the state would be seriously disrupted, and the tax burden on agriculture and other industries would become quite unbearable, unless production is maintained.

The national picture is similar and also involves the national security angle, for any nation is very insecure unless it is quite self-sufficient in mineral supplies.

	GOLD	SILVER	COPPER	LEAD	ZINC
	oz.	oz.	lbs.	lbs.	lbs.
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	77,223	3,558,216	574,406,000	45,734,000	80,452,000
1946	79,024	3,268,765	578,446,000	47,860,000	87,330,000
1947	95,860	4,569,084	732,436,000	57,132,000	109,288,000
1948	109,487	4,837,740	750,242,000	57,798,000	108,956,000
1949*	110,600	5,070,000	731,000,000	66,800,000	140,100,000

*Figures for 1949 are preliminary

RELATIVE 1949 PRODUCTION

Metal	United States Production	Arizona Production	Arizona Percentage	Arizona's Place Among States	Leading State	Production
Gold (Oz.)	1,949,000	110,600	5.67	5th	South Dakota	457,000
Silver "	34,090,000	5,070,000	14.87	4th	Idaho	9,730,000
Copper (Tons)	907,652	351,345	38.82	1st		
Lead "	404,032	33,400	8.26	3rd	Idaho	77,100
Zinc "	583,882	70,050	12.00	2nd	Idaho	74,150

Barite:

Operations of the Arizona Barite Company at Mesa continued throughout the year although markets were injured by increases in freight rates and curtailment of oil well drilling because of importations of foreign oil. The largest use of barite is to make a heavy mud through which the drill string can operate but which holds down the escape of gases encountered in drilling.

Bentonite:

Shipments of bentonite clay from the area east of Holbrook, Arizona continued at the rate of about 40 carloads per week. This bentonite is used in oil filtration and is all currently shipped to oil refineries in California.

Another type of bentonite—the swelling type—which swells to many times its volume when mixed with water, and remains suspnded in water, is eagerly sought but not yet found of desired quality in Arizona. Supplies for local use are brought from Wyoming. The Arizona Barite Company of Mesa would be interested in a local deposit.

Beryl:

New occurrences of beryl have been discovered during the year. Several shipments of crude beryl have been made and two new deposits are being explored extensively at this time.

Practically all the beryl marketed today is recovered from its ores by cobbing and sorting. Few, if any, deposits in this country are mined exclusively for the beryl content. The demand for beryl stimulated during the last war brought about an increase up to approximately ten times the pre-war price. This, in turn, has stepped up prospecting for new deposits and a further study of mechanical means of recovery in a more economical manner. The Bureau of Mines has carried on research in flotation methods with encouraging results and a new process of sorting ore dependent upon a nuclear reaction is in the experimental stage and gives some promise of practical application.

Beryl is in demand for beryllium-copper alloys, and in atomic energy apparatus.

Cement:

The new plant of the Arizona Portland Cement Company at Rillito, west of Tucson, started production in early December 1949 and has continued steadily at the rate of 2,000 barrels per day.

The limestone and alumina required for making the cement is quarried near the plant site. Some 12 tons per day of needed gypsum is obtained from the deposits near Winkelman. A search in Arizona for a suitable supply of iron, of which about 15 tons per day is required, was not successful and their iron is

deeper levels of the mine but recent lateral extension of their development work on the 800 level has encountered new ore with a good uranium content. This would be a by-product in the extraction of lead and zinc and such ore is being conserved.

The Carl Larsons have discovered a large area of intense radio activity in a quartzite bed some 35 miles north of Globe. Development has not been sufficient to determine the extent or the uranium content but it has large possibilities.

It is the hope of this department that enough discoveries of uranium may be made in central and southern Arizona to warrant a centrally located treatment plant adapted to the type of ores that prevail there. Such a plant would provide an outlet for small discoveries and enable the prospector to dig further.

Recent discoveries of uranium near Marysvale, Utah have induced the government to institute a purchase depot there with view to installing a plant. Ores in that locality are also different from the Four Corners carnotite and would require a different type plant. This will provide an outlet for the ore previously discovered at Hacks Canyon near Fredonia, Arizona, and plans are being made to place that property in production.

After all, we know of no other mined product for which the government gives a five year price guarantee, together with haulage and milling allowances.

ARIZONA NON-METALLICS

Asbestos:

Improved market conditions during the year brought about a marked increase in both development of new properties and production of fiber. Several new properties have been brought into production. Output of old mines has been increased.

Globe, as usual the center of activity, has two mills operating steadily. Roger Kyle and the Globe Asbestos Company operated by Grady Gullage, are treating both their own and custom ore. Guy Phillips also produces a finished product at his mill located on his property north of Globe. A new mill has been erected on the property of the Pleasant Valley Asbestos Company and will be in operation in the near future.

In addition to the above, principal producers include Mr. Enders, Reynolds Falls, Bear Canyon and Metate Asbestos Company.

At the Antlers Mine in southwestern Mohave County they are making trial shipments of the mineral Cummingtonite which forms the wall rock along their vein. Cummingtonite is an asbestos type rock of the amphibole family and could very well fill a demand for a cheap short fibre for such uses as asbestos shingles and transite pipe.

ARIZONA'S METALLIC MINERAL PRODUCTION

Major Metals:

Arizona maintained first place in the tonnage and combined value of all non-ferrous minerals in 1949. In copper it ranked a decided first, producing over one-third of the production of all the states and more than any two other states. Incidentally, Arizona produces approximately 16.13% of the copper of the world.

In gold we ranked fifth and in silver fourth. Most of Arizona's gold and silver is produced as a small quantity along with its copper, lead and zinc. There are possibly three or four straight gold-silver mines in production which hardly compares with the 1000 or more that operated before the government closed the gold mines during the war.

In lead Arizona ranks third and in zinc second among the states. Production of both these metals has come up sharply for the past 10 years, but the acceleration will probably not be maintained in the next few years.

The tables on Page 16 show Arizona's production of the five principal metals for the past ten years, together with the total United States' production and Arizona's relation thereto.

Minor Metals:

Production of MANGANESE was practically nil in Arizona in 1949. The Bureau of Federal Supply is offering contracts for the delivery of manganese for stockpile purposes. The price, however, must be comparablee to the open market price and the market price has been quite low due to heavy receipts from abroad. The United States produces only a small percentage of the manganese it consumes and this has caused an increase in interest because of national security angles. Manganese is a very important component of steel and most of our imports are from Brazil, Cuba and Africa, and formerly from Russia.

Arizona contains some very large but low grade deposits which should work out to be of economic importance in the future. (Additinal notes under Miscellaneous News Items).

MERCURY and TUNGSTEN. The United States has given way to cartel metal from abroad and domestic production has practically ceased. In fact recent news items indicate that the last remaining mercury producer in the United States has decided to close down.

MOLYBDENUM is still produced by the Miami Copper Company and their 1949 production was 250 tons of molybdenum in the form of concentrates. Molybdenum is used as an alloy in certain steels, and Colorado, which has an enormous deposit at Climax, is the chief U. S. producer.

VANADIUM, which is also used in certain steels, is produced as a by-product from carnotite ores which are mined chiefly for their uranium content. The Four Corners area of Utah, Colorado, New Mexico and Arizona produces a goodly portion of this total.

There is a small but growing production in Arizona of the RARE ELEMENTS. Microlite and Columbite, containing tantalum and columbium, have been produced by the Anderson Brothers east of Morristown. The mineral Samarskite, which contains cerium, yttrium, niobium and tantalum, as well as thorium and uranium, has been produced in commercial quantities northeast of Kingman and shipped to chemical concerns. L. L. Edgerton, Oatman Route, Kingman, is mining and concentrating Fergusonite, which contains a number of rare elements. Rhenium is obtained as a by-product from the molybdenum concentrate produced by the Miami Copper Company. Our department receives many requests for information regarding Gallium, as it is widespread in occurrance in Arizona and is often noticed because it has very prominent spectrographic lines. Gallium has peculiar properties of being liquid at ordinary temperatures like mercury, but having a very high boiling point. Gallium is produced only as a by-product in the refining of zinc and of aluminum. The Eagle Picher Company, one of the few producers of gallium, reports as follows:

> "Our experience has been that a spectrographic analysis is the only reliable method of determining the amount of gallium in a crude ore and this requires considerable experience. . . . We know of no method of concentrating gallium from a crude ore. . . . The refined metal is now selling for $3.00 per gram in 1000 gram lots."

In general regard to the minor and rare metals we quote the following interesting paragraphs from a recent release by the U. S. Bureau of Mines: (Some of the elements mentioned below are included in our chapter on non-metallics.)

> "Some of these metals, notably barium and strontium, are used in the electronics industry for 'gettering', which is removing the last traces of gas from an enclosed space, such as a tube. A number of them have been found useful for one purpose or another in the atomic energy field. Extremely minute quantities of others, introduced into alloys of the better-known metals such as copper or iron, add strength, resistance to corrosion, heat resistance, or some other property important for a special use.
>
> "As examples of the multitude of ways in which these so-called minor metals are used, Dr. Boyd cited watch balance wheels of beryllium-nickel alloy; glass-cutter parts made of boron carbide, hardest known substance except

> diamonds; cigarette lighter 'flints 'made of cerium; television equipment functioning with the aid of cesium and rubidium; high-grade camera lenses made partly of tantalum oxide; thermometers able to record temperaturs up to 1,200 dgrees Centigrade, in which gallium replaces the mercury used in ordinary thermometers; video detector circuits containing germanium diodes; antihistamines in which lithium amide is an active ingredient; anti-knock compounds in the production of which rhenium is used as a catalyst; radio and television rectifiers made of selenium; rodent poisons made of thallium sulphate; and flash-light powders made of zirconium.
>
> "This list barely scratches the surface, the Bureau Director said, in announcing that the reprint of the 'Minor Metals' chapter of the Bureau of Mines Minerals Yearbook, 1948, by Jack W. Clark, Bureau economist, is now on sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 15 cents a copy. This publication is NOT distributed by the Bureau of Mines."

The occurrence of many of these minor or rare metals is widespread in Arizona and the possibility of increased and important production in the future is excellent. They have just begun to intrigue both the experienced and younger generation prospector and this department can be of important service in helping them in the field and in the markets.

Uranium:

There have been several new discoveries of uranium in Arizona during the past year but actual production is still confined to the northeast corner of the state where the regulations of the Navajo Indians still inhibit prospecting and development.

Discoveries made in central and southern Arizona, except for the Hillside Mine, are mostly raw prospects and will require time and incentive for development into the producing stage. The uranium mineralization in this area is quite different from the carnotite in the Four Corners area; and as the only existing uranium ore treatment plants (which are in Utah and Colorado) are tuned to the treatment of carnotite, there is no outlet for the ores from central or southern Arizona to help the prospector carry further development.

At the Hillside Mine in western Yavapai County considerable metallurgical test work has been done on occurrences of uranium remaining in the upper mined out levels. Results of this work have been satisfactory and it is planned to build a pilot plant at the mine in the near future. It was originally thought that the uranium content became too low grade in the