
FIRST ANNUAL REPORT

•
**DEPARTMENT OF
MINERAL RESOURCES**

STATE OF ARIZONA

July 1, 1939 to June 30, 1940

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J. S. COUPAL, Director

OFFICIAL FILE

DEPARTMENT OF MINERAL RESOURCES

Board of Governors:

Charles F. Willis, Phoenix, Arizona, chairman
Dr. N. H. Morrison, Phoenix, Arizona, vice-chairman
J. Hubert Smith, Kingman, Arizona
Shelton G. Dowell, Douglas, Arizona
Loyde C. Edmonson, Globe, Arizona

Personnel of Department:

Phoenix, Arizona office
J. S. Coupal, director
W. J. Graham, assistant to the director
Jess R. Fickas, secretary
Larry G. Houk, statistician

Field Engineers:

Carl G. Barth, Jr., Prescott, Arizona
Miles M. Carpenter, Tucson, Arizona
Elgin B. Holt, Kingman, Arizona
Newton Wolcott, Globe, Arizona

Offices:

Phoenix, Capitol Bldg.
Globe, County Engineer's Office, Court House.
Kingman, Mohave County Chamber of Commerce
Prescott, Chamber of Commerce, Court House Bldg.
Tucson, Chamber of Commerce, 113 S. Stone Ave.

DEPARTMENT OF MINERAL RESOURCES

Statement of Expenses

July 1, 1939 to June 30, 1940.

Allotment\$30,000.00

ADMINISTRATIVE

Salaries	\$6015.54	
Travel	419.43	
Printing	303.88	
Postage	204.12	
Telephone & Telegraph	161.57	
Miscellaneous	687.99	\$ 7792.53

Statistical

Salaries	\$1864.77	
Travel	13.00	
Engineering & Drafting Supplies	245.57	2123.34

Publicity

Salaries	\$ 977.77	
Travel	11.64	989.41

Capital Expense	\$ 512.41	512.41
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FIELD WORK

Headquarters Engineering Expense		
Salary	\$3150.00	
Travel	1608.18	\$4758.18

Central District—Prescott

Salary	\$2032.26	
Travel	858.91	2891.17

Eastern District—Globe

Salary	\$2400.00	
Travel	1368.99	3768.99

Southern District—Tucson

Salary	\$2400.00	
Travel	1100.83	3500.83

Western District—Kingman

Salary	\$2400.00		
Travel	1262.94	3662.94	\$18,582.11

Returned to State			\$.20
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In compliance with Chapter 27, Laws of 1939, creating the Department of Mineral Resources, the following annual report of the department for the first full year, July 1, 1939, to June 30, 1940, is respectfully submitted.

To Honorable Robert T. Jones, Governor

State of Arizona

Phoenix, Arizona.

Dear Governor Jones:

The importance of mining, the greatest primary industry in Arizona, to the future welfare of the state is more apparent today than it has been at any time in many years. The undeveloped mineral resources of the commonwealth offer the only large opportunity for increased industrial growth.

The limited rainfall and water supply in Arizona definitely controls the progress and extent of agricultural and livestock development; never before in the history of the state has this been demonstrated as forcibly as in the past year. Arizona's remaining frontiers are downward—into the ground—which must be intelligently and persistently exploited if the state is to progress.

Any material increase in basic industry production can only come about through the creation of permanent new payrolls by the exploration of the state's untapped mineral opportunities. The nonmetallic mineral resources in particular offer a most fertile field for new development and there has been a ready market created on the Pacific Coast for many of these.

Furthermore, the national defense program in which this country is now embarking likewise offers great opportunities for the production of certain strategic or critical minerals which are essential to an armament program, and with which this state is richly endowed. With a better knowledge of its own resources Arizona is now able to contribute a greater share of national defense resources.

It is toward the opening and development of deposits of these and other minerals, both metallic and nonmetallic, that the department has concentrated its efforts this past year. The results have been most gratifying, particularly when it is considered that the work of the state department has so recently gotten under way.

The records show that already at least 21 mining operations have been started, either directly or indirectly, as a result of con-

tacts made by the department. It has provided facilities, never available before, for bringing capital and mine owners together to promote the mineral development of the state, giving confidence to the buyers and opportunities to the sellers.

Some of the work that has been initiated is still in its initial stages and its ultimate importance cannot be measured definitely. However, when the mining operations which the department has assisted in getting under way are in full operation, a conservative estimate indicates that employment for at least 400 men with a yearly payroll of approximately \$600,000 will be provided. Total expenditures of the companies will exceed \$1,500,000 annually.

From these new mining activities alone the state will receive, from various tax sources, approximately \$60,000 a year or double the \$30,000 cost of the first year's operation of the Department of Mineral Resources. This is based on the reasonable assumption that at least 10 per cent of the yearly payroll will be paid to the state by the mining companies in taxes. In addition, there will be the taxes paid by the employees themselves and the fact that these new operations may continue to be employers and taxpayers for many years to come.

That the 10 per cent estimate is extremely conservative is shown by the fact that the mines paid \$1,861,274 directly to the state in 1938 in property, sales, and income taxes. The mining wage payments during the same year, as reported by the Arizona Unemployment Compensation Commission, amounted to \$17,088,308, showing that the mines paid better than 10 per cent of their payrolls in state taxes.

Before the concrete results of new mines could be obtained, however, a great deal of ground-work was necessary. A resources survey had to be made, markets had to be studied, close contact with small mine operators through the Arizona Small Mine Operators Association had to be provided, and it was necessary to assemble information regarding sources of capital for development. Work was done along this line both in private fields and with the federal government by urging small government loans for primary mineral development and enlarging the present loan setup.

A great deal of attention was devoted to statistical studies of economic conditions and their effects on the mining industry. It was during the early statistical work that an opportunity presented itself to the department to be of the utmost service to the state. About a year ago, an announcement was made in Washington

Personally, as director of the Department of Mineral Resources, and on behalf of the Board of Governors and the personnel of the department, I wish to acknowledge the hearty cooperation and sympathetic understanding of the work shown by his Honor, Governor R. T. "Bob" Jones, first, in his wisdom and attitude in favoring and assisting in the creation of the department, and, later, in the utter absence of any and all attempts to make any political use of or influence the work of the department.

Extreme appreciation of his assistance and participation in the work of securing a better and stabilized price for silver and for cooperation in holding the 4-cent excise tax on copper is expressed not only by the department but has been repeatedly and unanimously expressed by the members of the Arizona Small Mine Operators Association at their respective council meetings.

It has been most gratifying to me to serve as director of a state organization which, notwithstanding public belief regarding state departments, has been entirely free from political influence or favor and able to devote its attention exclusively to the accomplishments of its objectives.

A statement of expense of the Department for the year July 1, 1939 to June 30, 1940 is attached and made a part of this report.

Respectfully submitted,



Director
Department of Mineral Resources.

Phoenix, Arizona
August 5, 1940.

time devoted to the discussion of plans and policies of the department work at their quarterly meetings but also in the personal service rendered by them at all times, is gratefully expressed and acknowledged.

The Board of Governors as originally appointed consisted of Charles F. Willis of Phoenix, chairman; Dr. N. H. Morrison of Phoenix, vice-chairman; A. C. W. Bowen of Winkelman, Shelton G. Dowell of Douglas, and J. Hubert Smith of Kingman. On January 31, 1940, Loyde C. Edmonson of Globe was appointed to fill the vacancy caused by the expiration of the term of appointment of A. C. W. Bowen and the fact that he had moved from the district which he represented.

Special mention of appreciation must be made for the time and effort devoted by Charles F. Willis, chairman of the Board of Governors, to the study, research, consultation, and advice on the work of the department. He has given most generously of his time and attention to all details and has personally directed the statistical research. His versatile experience on the economic side of mining and his years of experience and contact with this particular type of work have been of primary importance in the success that has attended the department.

Appreciation of the work of the field engineers, Carl G. Barth, Jr., of Prescott, Miles M. Carpenter of Tucson, Elgin B. Holt of Kingman, and Newton Wolcott of Warren, is gratefully acknowledged. Without their full cooperation and their service-mindedness the accomplishments could not have been made. They have had extremely long hours to cover the ground needed, extreme patience to work on the other fellow's problems and establish the confidence that was so necessary to this work. They have regarded seriously their obligation to the taxpayers. They have traveled many thousands of miles and have kept sustenance and mileage costs at a minimum. They have been truly cooperative and ever mindful of the opportunity which they have had to be of service and taken every advantage of it.

The assistance of those in the Phoenix office, which consisted of William J. Graham, assistant to the director; Jess R. Fickas, secretary; Jackson Hoagland, publicity director; and Larry Houk, statistician, has been highly appreciated and without their full cooperation and assistance it would have been impossible to have attained such satisfactory results.

to the effect that the State Department was considering a cut in the 4-cent copper excise tax in negotiating a reciprocal trade agreement with Chile. It was essential that data be presented to Washington immediately and, through the facilities of the Department, that was done.

At the time, it was generally conceded that the excise tax would be cut. But the effective preparation of the state's argument by the Department of Mineral Resources, together with the excellent work done by the Arizona Small Mine Operators Association in staging mass meetings all over the state, resulted in what had seemed almost impossible. The tariff was not cut.

At present, in view of unsettled foreign conditions, the state's copper industry needs protection as it never has in the past—and Arizona's mines are operating. They have not been forced to curtail or shut down to make room for copper from South America that is vainly seeking a market. If the department had accomplished nothing else, its creation was more than justified by that single outstanding piece of work which could not have been done without the new facilities offered.

ORGANIZATION AND BASIC TRAINING

When the Department of Mineral Resources was created, it was necessary to start from nothing. It was but an idea at that time—a theory that, with the proper encouragement and help, new industries could be started and new taxpayers and employers could be created.

The short period prior to July 1, 1939, was devoted to making plans for organizing the work of the department; equipping the office and engineering staff; selecting and training the field engineers in the work contemplated; and in a study and compilation of the laws and regulations governing mining on the many and various types of land within the state.

In addition to this a series of conferences were arranged with the heads of the various bureaus, departments, and commissions, both state and federal, whose rules and regulations were in part related to the mining industry. There were 17 such conferences held within a two-week period and a transcript made of the presentation and discussion of each subject. These have been compiled and bound into book form for reference. Copies have been distributed to the field engineers, the secretaries of all councils of the Arizona Small Mine Operators Association, the various

libraries throughout the State, to each of the department heads taking part in the conferences, and to many others who were actively interested in the work.

The object of these conferences was not only to instruct each field engineer in the contacts that the mining industry had with the other departments but also to work out ways and means for the Department of Mineral Resources to coordinate its work with these state and federal departments and to cooperate in the carrying out of their policies.

OBJECTIVES

The objects outlined by the Board of Governors, in order to comply with the act creating the department, may be broadly stated as follows: to increase new mining activity within the state, with particular attention to the small mine industry; to stimulate a more extensive development of the mineral resources of the state, with particular attention to the nonmetallic minerals; and to do everything possible to assist current mining activities and to create new industry.

An analysis of the economic considerations necessary in order to accomplish these ends showed the following headings under which the work could be classified:

1. Bringing new capital into the state for exploration of undeveloped resources.
2. Direct and personal assistance to the small mine operators on problems which were confronting them.
3. A survey of the markets for Arizona mineral products and a search for new deposits to fill existing markets.
4. A study of the conflicts of mining with other rules and regulations in order to attempt to reconcile differences.
5. A study and analysis of the factors retarding a normal healthy growth of the mining industry.
6. A bureau of reliable information on all phases of the mining industry for mine operators, prospectors and capital seeking investment.

RESOURCE SURVEY

The first and most important problem was to make a comprehensive mineral resource survey of the state, so as to be able to present to capital seeking investment information as to where they

Through the direct assistance of the department new and permanent industries have been or are now being started on three not commonly known nonmetallics, namely: diatomaceous earth at Mammoth, muscovite mica at Buckeye, and vermiculite at Kingman. Stress is being laid on the opportunities of the nonmetallics by the field engineers and information is being gathered by the department which may result in the opening up of other non-metallics which would attract new industries into the state to utilize and process these products.

A close cooperation with similar departments in other states and the exchange of information and operating procedure has been extremely helpful to us as well as to them. This interchange of information has been developed by meetings of representatives of the other states at special conferences called in connection with the annual conventions of the Western Division of the American Mining Congress held last year in Salt Lake City, Utah, and it is to be continued at the meeting this year to be held in Colorado Springs, Colorado. In addition to the exchange of information at these meetings, plans are made for the intimate cooperation of each state on all mining problems of national importance.

Through the field engineers and the various councils and mine operators collections of minerals, ores, and rocks of geologic interest have been started which are displayed at the Department of Archives and Library at the Capitol Building, and at the office of the Department of Mineral Resources. Plans are now being made to arrange for an exchange of such specimens between the various councils so that at each meeting place there may be a collection, open for the inspection of the public and prospectors, of the common and also the rare minerals now in demand.

The creation of the Arizona Department of Mineral Resources and the survey which has been made came at a very opportune time to be of great assistance to the federal government in its national defense program. Information as to the location of tungsten, cinnabar, manganese, and the other strategic or critical minerals has been available, not only to those seeking such properties, but to federal departments concerned with cataloging the prospective sources of supply in the event of war.

BOARD OF GOVERNORS

Appreciation of the work done by the members of the Board of Governors, who serve without compensation, not only in the

conditions affecting the industry and kept posted as to the changing situation and new markets and new developments that are taking place. Thus each meeting serves as a school for the promotion of more intelligent and extensive mining activity.

To further the state wide interest in mining a sound motion picture projector was purchased and the film "Arizona, Its Mineral Resources and Scenic Wonders," prepared by the U. S. Bureau of Mines and distributed through its film library, has been shown at the council meetings and before many of the civic and service clubs. Other films will be borrowed from the U. S. Bureau of Mines Film Library from time to time, and will be shown as time permits. This is proving to be an important part of the educational program. The director and the field engineers have been called upon in many instances to make addresses on Arizona mining before chambers of commerce, civic and other service organizations.

As problems arise at the council meetings and elsewhere studies are made as to the existing legislation affecting such problems and investigation made of changes in legislation which seem to be advisable to correct inequalities. In this work the effect of such legislation on other industries in the state is carefully considered as there is no desire on the part of the mining industry or the small mine operators to benefit themselves at the expense of others. A tremendous amount of good has been accomplished in this line in getting the Arizona Small Mine Operators Association to think and work unselfishly, and along lines for the good of the whole state rather than for the promotion of personal gain.

FUTURE DEVELOPMENT OF STATE

As a direct result of the activity of the Department of Mineral Resources the people of the State are more understanding of the mining industry than ever before and more conscious of the need to work for the development of the natural resources and the creation of new taxable wealth for the State.

The nonmetallic resources of the state have been sadly neglected and offer a most fertile field for new development. There is a ready and hungry market to be supplied on the Pacific Coast for certain nonmetallic and industrial minerals in which this state abounds. A lack of knowledge of these minerals and the difficulty of knowing just where to market or contact the industrial users has handicapped this development.

could find the particular type of property or mineral product desired and to find such property with a minimum of effort on its part. If you are preparing to sell something you must first acquire and catalog your stock of merchandise.

In order to make this survey, the active mining areas in the state were divided into four convenient districts and a registered field engineer assigned to each district. The central district, with the engineer's headquarters at Prescott, covers Yavapai and part of Maricopa county; the eastern district, with headquarters at Globe, covers Greenlee, Graham, Gila, part of Pinal and part of Maricopa counties; the southern district, with headquarters at Tucson, covers Cochise, Santa Cruz, Pima and part of Pinal counties; and the western district, with headquarters at Kingman, covers Mohave and Yuma counties.

Incidental to making the survey by gathering data on all the available properties and mineral resources in their districts, the engineers were to contact the mine operators and prospectors and to render such personal engineering service as was possible; seek out prospective areas that warranted attention for the development of metallics and nonmetallics and to investigate any special local economic problems within a given area that might be holding back progress. To do this work, close cooperation with the various councils of the Arizona Small Mine Operators Association was necessary.

In order to establish a close and intimate contact with the small mine operators and to be able to learn of and discuss their problems in groups, the schedule of meetings for the small mine operators councils was so arranged that the engineers could attend meetings of each council within his district while in the field on his regular duties. Through the council meetings the engineers have been able to make many of their contacts with a minimum amount of travel and participate in the discussion of the various economic problems which came up for consideration at the meetings.

The engineers also were immediately available for special work on any emergency problem which occurred and the small mine operators always knew when and where they could personally contact a field man. One fact immediately became very obvious, that a large number of the small operators had problems but did not realize that their difficulties were such that could be easily and quickly solved by competent engineers.

The work of inventorying the proven and developed metals and nonmetals worthy of further exploration, together with the gathering of reports, took practically six months of the first year, but, of course, does not have to be done again. This was a necessary foundation work for the task of interesting new capital and assisting it in finding the type of mine or mineral in which it was interested.

The policy adopted by the department relating to inquiries from parties seeking investment or mining property was of a rather unusual nature and based upon a study of the existing situation. It was not to sell them any Arizona mine but to try to find the particular kind of mine in which they were interested and to show them properties which, with proper development and operation, it was believed would make permanent and profitable undertakings. The idea was not merely to find customers but to create permanent payrolls and taxpayers.

MINING ACTIVITY STIMULATED

The results along these lines have been highly successful. During the second six months — after the resources had been inventoried—at least 21 new operations have been started either directly or indirectly through contacts made by the department between mine owners and capital. Some of this new work is just now starting and therefore its importance cannot be definitely measured, but when these mines are in full operation it is conservatively estimated it will mean the employment of at least 400 men and a yearly payroll of approximately \$600,000 just for this meager beginning alone. The total expenditures will exceed \$1,500,000 annually.

It is reasonably estimated that state taxes constitute about 10 per cent of the payroll. Thus, in the first year's work—half of which was used in getting ready—the new department has created new tax revenue for the state of about \$60,000. It has cost the state but \$30,000 a year to establish and maintain the department so that its creation has been doubly justified as it has already proven itself to be a profitable investment rather than an expense to the taxpayers and the state.

That is not the whole story for the new employment of 400 men, at good wages such as are paid in the mining industry, provides, according to competent statistics, direct and indirect employment and support for 10 additional persons per man employed.

time we have inquiries for more than 160 items, either properties or products. To take care of this demand we have had to curtail, to a certain degree, the personal service offered by the field engineers and devote more of their time to trying to find properties which answered the special requirements and specifications presented by these inquiries.

The work being started on at least 20 new properties that we know of has been the most tangible and visible evidence to the general public of the value of the department to the state and it has more than taxed our facilities. It is to be regretted that there is no immediate possibility of expansion of this fruitful activity under the present budget to better meet these demands and to increase our accomplishments along these lines.

PRINTED MATERIAL

The publications issued have been rather limited as this is not a primary function of the department. A brief was prepared on the production of copper and the dependence of the state on a continuation of the 4-cent copper excise tax. This included tables and charts prepared by the statistical department. The Proceedings of the School for Field Engineers, covering the contacts of the various other state and federal departments, bureaus, and commissions with the mining industry of Arizona was made and distributed. In process of preparation is a nontechnical codification of the laws, rules, and regulations for mining on the various types and classifications of lands within the state.

Under Float items in "Pay Dirt," and in a summary, a list with brief specifications of the types of mines and metals for which special inquiry had been made was published and distributed. Also a tabulation of the mines on which owners reports were available and which were offered for sale, lease or financing was compiled and distributed. We have made available lists of the users and buyers of each of the various metals and nonmetallics. A compilation of the statistics and charts showing the relation of the mining industry to the welfare of the state is now being worked up.

Along educational lines the field engineers have been in attendance at the various council meetings to assist in the discussion of various state and federal problems confronting the industry. Questions as to operating details are also covered at meetings and in the field as emergencies call for. In this manner the operators are kept fully informed as to the rules, regulations, and

which has been rapidly increasing in the past six months, a good part of which has been due to the publicity which the newspapers have generously given.

This publicity program has not been limited to our own state but has been extended throughout the country and has resulted in a widespread interest in the new work being started in Arizona and the facilities offered by the Department of Mineral Resources for investors and investigators of mining property. The publicity has also served to keep the people informed on matters pertinent to mining and concerned with the general welfare of the state.

Through the cooperation of "Pay Dirt" we have been able to publicize the requirements of buyers of both mining properties and mineral products and to make contacts for them with the operators who had either properties or production of minerals to sell.

In this program of publicity, acknowledgment and thanks must be given to the most generous aid and cooperation of the newspapers of the state, especially the Arizona Republic, Pay Dirt, and The Mining Journal. Other mining magazines in the country have also noted and brought to the attention of their readers the renewed activity and interest in Arizona and the service being rendered.

COOPERATION WITH BUREAU OF MINES

The work of the department was carefully planned so as not to overlap or duplicate the work of the Arizona Bureau of Mines. Our work has been limited to the economic side of mining and to the field problems confronting the small mine operators. In this we have had the full cooperation of the Arizona Bureau of Mines and they have made available their services on the technical and laboratory problems arising.

It has been demonstrated that neither the bureau nor the department could do the work of the other, one being of a technical and research nature and the other being more or less promotional. An even closer and more cooperative plan is being worked out between the two in order to fully cover the requirements but eliminate any possibility of overlapping.

As the work of the department became better known we have been literally flooded with inquiries for mining properties. At this

Furthermore, most of these properties will continue to produce, give employment, and be taxpayers for many years so that the state revenues are cumulative and will pyramid from year to year as the department's activities in getting new mines started continue and expand.

In addition to the 20 new operators mentioned as having actually started, there are at least a dozen investigations now being made on other properties, contacts for which have been made by the department. These will undoubtedly add several more to the list of specific accomplishments of the first year's work of the department.

SERVICE RENDERED TO BUYERS

Through publicity, and the knowledge by mining people that such a department and service was available, a large number of inquiries for properties have been made. We now have on hand over 160 inquiries; some of them are unreasonable in their requirements; others are under financed for the type of operations they desire; but a large number are bonafide seekers after properties or prospects which can be found and are adequately financed to carry out successful operations.

When the specifications on such inquiries are made known statements from the department files are submitted on these properties which reports show should fulfill the requirements and specifications and the inquirer is supplied with the name of the property, its location, and the name and address of the owner. Only properties fulfilling the specifications are submitted.

In addition to this method of direct contact, when permission is given, an item is placed in the Float column of "Pay Dirt" stating the name, address and the nature of the inquiry. "Pay Dirt" is the official publication of the Arizona Small Mine Operators Association which is issued monthly and goes to about 4000 members. On such Float items we know that from 50 to 75 replies to inquiries have usually been received. We can secure no official record of the returns from such items but we do know that in a number of instances new contacts have been made and new work started as a direct result. This work should also be credited to the department efforts.

WORK ON MINING PROBLEMS

A study of the conditions retarding the small mine activity opened up a multitude of new fields for the department to work

upon. The difficulty for the man in the hills to find markets, prices, and specifications on the various less common metals and non-metallics has retarded the opening up of a number of worthwhile properties.

To supply this need a list of the buyers and users of all the various metals and nonmetallics was compiled and copies made for distribution to those making such inquiries. Data as to the prices and the specifications on the metals and minerals are maintained up to date and are available for distribution.

Another factor retarding operations was the high transportation rate to smelters on low-grade ores and the need for local milling to allow shipping as concentrates, or to convert direct into bullion, the values in the ore. Through a survey made in one district and showing one mill operator that a sizable tonnage of ore could be handled, crushing and sampling equipment was installed and custom ore received.

At present eight properties, within a radius of 10 miles are shipping their ores to this mill. Preliminary surveys to show that there are other areas which warrant an investigation as to the feasibility of installing custom milling plants have been made by the department. Two of these are now being examined by capital contacted by the department and it is hoped that mills will be erected. One of these is at Cherry and the other at Arivaca.

CUSTOM SMELTER

The Kingman-Chloride area in Mohave county has long felt the need of a local custom smelter to handle the complex lead-zinc ores encountered at depth in a large number of properties. The ores are unable to withstand the cost of the long freight haul to El Paso for the lead ores and to Amarillo, Texas, for the zinc ores. This problem was put up to the department by the mine operators of that area.

A reconnaissance survey of the economic possibilities was made by the department. When this was complete private capital was contacted by the department and as a result an intensive engineering survey and estimate is now about financed to carry out the preliminary work. Major capital for the erection and operation of such a plant has indicated it was ready to go ahead if the engineering survey checked with the reconnaissance made by the department and showed such a plan to be economically feasible.

gathered by the Department of Mineral Resources and the work done by the small mine operators in the organization of the mass meetings throughout the state it is doubtful if a cut in the tax could have been prevented. At least, no adequate case could have been established in relation to this subject if the department facilities had not been available.

FINANCING OF SMALL MINES

Another of the major factors retarding the growth of the small mine industry has been the lack of funds for primary exploration and development of prospects. The severe restrictions imposed by the Securities and Exchange Commission on the raising of funds by public financing for venture or speculative mining work has during the past six or eight years practically stopped the flow of money into exploratory mining work.

In conjunction with the previous work done by the Yavapai County Council on their Mines Finance Plan a revised plan for Class "C" loans to small mine operators was proposed and a representative, whose time and travel expenses were paid by the department, was sent to Washington to work on this project.

The main objectives of the bill have not yet been accomplished but a decided gain was achieved in bringing to the attention of Congress the plight and need of assistance to the small mine operators in the exploration and development of worthy prospects. Progress has been made and this work will be continued.

PUBLICITY

Publicity relating to the undeveloped opportunities and resources of the state and of the activities of the small mine operators is essential to increased activity and the attracting of new capital into the state. A part time publicity man was assigned to this work in order to correlate news of the many diversified activities and to bring to the attention of the public the fact that there were more than 1000 small mine operations in the state whose production and employment amounted to approximately $\frac{1}{3}$ of the total production and employment in mining and that the Arizona mining industry does not consist of merely the five or six large copper producers, as is the common belief.

This work has resulted in the state, as a whole, being more mine-minded during the past year than at any time in the past 20 years. A renewed interest has been created in mining operations

pectors are often loath to explain their troubles and problems by letter but, when this service is brought to them in the field, they eagerly make use of it.

The same type of service is offered at the headquarters office in Phoenix. The department has become known as a reliable and resourceful bureau of information on all mining matters and when the answer to a question is not known it is very quickly found.

RESEARCH WORK

In order to determine satisfactorily the progress and trend of the mining industry in the state, the interrelation of the industry to the state and the other industries and to find out, by statistical evidence, the factors that were retarding the growth of the industry, a special department was set up for such studies.

Various tables for comparison have been assembled from many sources; charts and graphs were prepared to present visually the results. All of these tables and charts have not been made available due to the lack of sufficient funds for such purposes but the major statistical studies have been published in "Pay Dirt" and form a permanent economic history of the mining industry and its relation to Arizona and the other state industries.

The need and importance of having available these statistical studies were clearly shown when the question of the inclusion of the copper excise tax in the reciprocal trade agreements with Chile suddenly faced the state's largest single tax paying industry. The Arizona Copper Tariff Board was without adequate funds to gather such data, and the time was too limited to gather it even if the funds had been available. A brief was prepared by the department from information already assembled and a campaign was made possible to present this to the Committee on Reciprocal Trade Agreements.

The services of the field engineers, the publicity department, the statistical department, and the entire office were assigned to this work during the emergency and the harmful effects of a cut in the excise tax on copper to the welfare of the state were forcefully presented to the State Department and resulted in a decision not to discuss copper in the trade agreement with Chile.

Information from authoritative sources in Washington indicated that it was a foregone conclusion that copper would be included and a cut in the excise tax result. Without the data previously

The cost of such a plant and its operation, together with the reopening of some of the old mines to supply adequate tonnage, will be around \$2,500,000. This project is a direct outcome of the department activity and is being carefully and hopefully watched and assisted by the department. Incidentally, it is worthy of mention that the site of the plant may be on the Nevada side of the line as its sponsors have expressed themselves as fearful in making an investment of this magnitude in the face of the Arizona tax situation. While a Nevada location of the plant would not be as valuable to Arizona mines as though it were located near Kingman, it still would be a wonderful help to Mohave county properties.

There are many such projects within the state that are worthy of study, research work, and preliminary surveys. Until the creation of the department there had been no funds or agency available to make a disinterested gathering of data. It offers a fertile field for investigation by the department for, if such projects can be shown to be economically feasible by preliminary surveys, it is comparatively easy to interest substantial capital to further investigate and check such surveys with a view to the establishment of new industry.

STRATEGIC MINERALS

The demand for strategic and critical metals and minerals, so vital to our present active plan for national defense, has been greatly assisted by the resource survey started a year ago. With the information available in the department files as to the properties and prospects capable of supplying such metals and minerals, Arizona will be able to share to a much larger degree in increased activity along these lines than would have been the case if the department had not existed. Not only is the state better equipped to serve the nation and help this national crisis but at the same time it will be able to increase its income, cut down the unemployment, and create new sources of wealth.

Another factor holding back the small mine industry is the lack of adequate mine-to-market roads. This problem has been brought to our attention by discussions at various council meetings. Where whole districts are being held back by lack of good roads, surveys have been made by the field engineers with the assistance of the small mine operators. These are mainly community or state responsibilities and no one mine can, as a rule, stand the expense.

These surveys were made in line with the proposal by Governor Jones that first offenders in our penal institutions be used in field camps to construct such roads. This plan has been suggested and discussed at the various council meetings throughout the state and has received the whole-hearted support of all. The field engineers have also been called in at various meetings of county boards of supervisors to give information on the need of such roads and the possible increased production that would result from them.

An important branch of the work has been the personal service both by the engineers in the field and through the office at Phoenix. Service report records show an average of over 300 such personal services each month where definite aid is rendered to an individual to make his problems less troublesome.

SETTLEMENT OF DISPUTES

Many conflicts arise, due to the overlapping of the rules and regulations of other state and federal bureaus, departments and commissions with the very general laws governing mining, which require adjustments to prevent injustice to small mine operators. All such cases which come to the attention of the department are assigned to William J. Graham, assistant to the director, whose duty is to investigate both sides of the question and then try to obtain relief or an amicable settlement of the difficulties. Ofttimes this calls for a field investigation to determine the true facts and in such event the work is assigned to one of the department engineers.

In some instances, patents have been granted to land on which pre-existing mining locations had prior rights. Both the state and general land offices have willingly cooperated with the department in a just determination of the respective rights. Withdrawals of mineral land from entry and exchange selections of land have been made which have deprived the miner of the right to locate claims within such areas. In numerous instances we have been able to have the mining rights on specific areas restored.

Many conflicts have arisen due to ingress and egress on mineral land and mining claims being interfered with by the widespread fencing on leases granted under the Taylor Grazing Act. Numerous permits to sell stock in mining companies have been held up pending an examination and report by the field engineers on the physical characteristics of the mine involved.

Procedure to file on and protect water rights; the proper steps to locate mining claims on the many different types of land within the state; and a large number of similar problems have been referred to the department for assistance and adjustment.

More than 30 such major cases have been investigated and in a large majority of them decisions have been obtained which permitted the mining work to proceed or resume unmolested. In all such cases the facts are first ascertained and investigations made and, where injustices to those engaged in the mining industry have existed, steps have been taken to try to correct them. Inasmuch as no cases are contested unless it is determined that the mining men are acting within their rights and only asking justice, the work has been very successfully carried out.

This work is being done largely for people who do not have the funds with which to prosecute, and carry to conclusion, their own cases. Therefore, this phase of the work has proven most valuable in preventing abuse and injustice to innocent parties.

SERVICES OF FIELD ENGINEERS

In the field the engineers are available at the council meetings where the mine operators may contact them regarding their particular difficulties. If the problem is one that can be satisfactorily settled by advice at the time, the operator is relieved of his worry and can proceed with his work. If it is an emergency case and calls for personal investigation the engineer arranges to make the call at his earliest convenience. In case an answer cannot be given promptly and calls for deeper investigation the matter is referred to headquarters, the investigation made and the findings transmitted back through the field engineer as quickly as possible.

These services have covered a wide field and almost every conceivable subject relating to mining, such as operating and management details, technical and geological advice, questions of conflict or contact with other departments, and rules and regulations.

A great many difficulties confront the small operators which it is impracticable for them to explain by letter due, in some instances, to the nature of the problem and in other instances to the fact that they do not understand it well enough to write it down on paper. In the field trips the engineers often see and anticipate prospective difficulties and are able to offer suggestions and give advice as to eliminating them. The small mine operators and pros-