

ARIZONA DEPARTMENT OF  
MINES AND MINERAL RESOURCES

ACTIVITIES REPORT  
F.Y. 1996-1997

58

by  
H. Mason Coggin, Director  
for the Board of Governors

August 15, 1997

Fife Symington, Governor  
State of Arizona  
1700 West Washington  
Phoenix, AZ 85007

Dear Governor Symington:

The Annual Report of the Arizona Department of Mines and Mineral Resources for the Fiscal Year 1996/97 is herein submitted in compliance with A.R.S. Section 27-106.

The Arizona Department of Mines and Mineral Resources was authorized under ARS §27-101.01 and given the directive to promote the development of the mineral resources of this state through technical and educational processes including field investigations, public seminars, publications, conferences, mineral displays and by providing mining, metallurgical and other technical information and assistance to prospectors, operators of small mines, the mineral industry and to all others interested in the mineral resources of this state.

The Duties of the Department defined in § 27-102 are as follows:

- Promote the development of the mineral resources and industry of this state by participating in conferences, seminars, forums, speaking engagements, public news media and other functions necessary to achieve its objectives.
- Conduct studies of the economic problems of prospectors and operators of small mines for the purpose of assisting in their solution and investigate their properties to assist in development.
- Maintain:
  - An information bank and library of mineral and mining information, including books, periodicals, films, videotapes and individual mine files.
  - Underground mine map repository files, mining district data and an archive of mine data.
  - A mineral museum as the state depository for collecting, cataloging and displaying mineral specimens of various ores, gemstones, lapidary material and other valuable mineral specimens.
- Provide quality mining data, evaluation and assistance relating to mineral development to the legislature and other state and county agencies.

- Make surveys of potential economic mineral resources and conduct field and other investigations which may interest capital in the development of the state's mineral resources.
- Serve as a center of mining information for this state in matters relating to its mineral resources and monitor current mining and exploration activities.
- Publish and disseminate information and data necessary or advisable to attain its objectives. The director may establish reasonable fees for publications.
- Cooperate with the State Land Department to encourage mining activity on state lands.
- Cooperate with the Corporation Commission in its investigations and administration of laws relating to the sale of mining securities.
- Cooperate with the Bureau of Geology and Mineral Technology and deliver to the bureau problems which the field work of the department shows to be within the scope of the activities of the Bureau.
- Cooperate with federal and other agencies in matters related to developing mineral resources in this state.
- Oppose congressional acts favoring reciprocal or duty free imports of foreign minerals.
- Use its authority in other ways to assist in more extensive exploration and development of the mineral resources of the state.

A board of governors was established by § 27-103 to consist of five members who shall be appointed by the governor. The term of each member shall be five years, one term to expire January 31 each year. Upon expiration of the term of a member, a successor shall be appointed for a full term of five years. A member may continue to serve until a successor is appointed and qualified. Appointment to fill a vacancy resulting other than from expiration of term shall be for the unexpired portion of the term only. Members of the board shall receive no compensation for their services.

The officers of the board shall be a chairman, vice-chairman, and secretary who shall be selected and appointed by the board. The office of the board shall be maintained with the department's main office. Regular meetings of the board shall be held quarterly, and special meetings may be called by the chairman or a majority of the members.

The Duties and powers of the board are to:

- Establish field offices as it deems necessary.
- Prescribe the number of field and office assistants.
- Formulate the program and policies of the department.
- Adopt rules and regulations for government of the department.
- Purchase necessary office equipment and rent or lease necessary office space.

- Accept gifts, bequests or legacies of real or personal property, or any other contribution, financial or otherwise, for use in accordance with the direction of the donor, or in the absence of an express direction, to be disposed of for the best interests of the state.
- Accept from the federal government or its agencies monies made available to the state for the purposes of this article.
- Enter into cooperative agreements with the federal government and its agencies or with any mining agency created by the law of any state for the purpose of carrying out this article.

Under the terms of § 27-106 the board shall transmit to the governor, not later than August 15 each year, an annual report of the activities of the department during the preceding fiscal year, which shall include the quarterly reports of the director and a complete financial statement. The report shall be printed and made available to each member or member-elect of the legislature and to the public.

Sincerely,

H. Mason Coggin  
Director for the Board



# **ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES**

## **ACTIVITIES REPORT F.Y. 1996-1997**

**by  
H. Mason Coggin, Director  
for the Board of Governors**

## BOARD OF GOVERNORS

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Richard Oldham  
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Ken Bennett  
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## STAFF

H. Mason Coggin, Director

### Department

Ken A. Phillips - Chief Engineer

Nyal J. Niemuth - Mining  
Engineer

Ann Turney - Admin.

Assistant

Diane Bain - Editor

Marianne Charnauskas -  
Secretary

### Museum

Glenn Miller - Curator

Susan Celestian - Cur. of  
Education

Alice Rosenfeld - Tour Guide

Joe McIntosh - Tour Guide

Ann Baker - Tour Guide

Doug Duffy - Tour Guide

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The Duties of the Department defined in § 27-102 are as follows:

## CONFERENCES, SEMINARS & FORUMS

*Promote the development of the mineral resources and industry of this state by participating in conferences, seminars, forums, engagements, public news media and other functions necessary to achieve its objectives.*

### SEMINARS AND CONFERENCES

February 26, 1997 Sixth Annual Prospectors Show and Family Day. The Museum and the Arizona Prospectors Association held the Annual Prospectors Show and Family Day. The event was a great success. Over 200 people attended and everyone enjoyed the visit.

March 22, 1997 The Fifth Annual Minerals of Arizona Symposium was held on at the Mining and Mineral Museum.. Seventy five people

attended the all day session. Eight speakers participated in the programs.

March 6, 1997 The Curator met with the Capitol School teachers and district administrators to begin planning a Mining and Mineral unit for Capitol Elementary School.

Sue Celstian and Glenn Miller have conducted seminars at Challenger Elementary, The Palo Verde Branch of Phx Public Library

Sue Celstian and Ken Phillips presented a 1/2 day workshop for Chapman University's summer class for teachers. Gold panning, mineral identification and uses of minerals in everyday materials were instructed.

Museum volunteers presented a program at Monte Vista Elementary School.

The Education Curator presented a program at the Arabia Ranch Branch of the Scottsdale Library.

The Curator presented a program to four different classes at the Capitol Elementary School.

### SPEECHES

The following speeches were given by Department personnel during the year.

<u>Date</u>	<u>Presentation</u>	<u>Audience</u>	<u>Speake</u>
Jun.5, 1996	Presentation on Bisbee	Mine History ASSN.	H. Mason Coggin
Jul. 5, 1996	What are Minerals For	Mormon Lake 4-H	Ken Phillips
Jul. 10, 1996	What are Minerals For	Mormon Lake 4-H	Ken Phillips
Jul. 13,1996	What are Minerals For	Mormon Lake 4-H	Ken Phillips
Aug. 13,1996	Cyanide Recovery of Gold	Yarnell PFW	Ken Phillips
Aug. 13,1996	Economic Impact of Mining in Arizona	Yarnell PFW	H. Mason Coggin
Aug. 15,1996	Cowboy and Miner	Sharlot Hall	H. Mason Coggin
Aug. 24, 1996	Dedication to Ed Schieffelin	Tombstone	H. Mason Coggin
Aug. 27, 1996	Miners Houses	Leaverites	H. Mason Coggin
Aug. 28, 1996	John C. Greenway and Ajo	Scottsdale Westerners	H. Mason Coggin
Sep. 6, 1996	Something about Fossils	Sun City West Gem	Sue Celestian
Sep. 10, 1996	Impact of Copper Mining	Belting Association	H. Mason Coggin
Sep. 17, 1996	Sand and Gravel Exploration	ADMMR	Leo Langland
Oct. 2, 1996	Destination Tombstone	Westerners	H. Mason Coggin
Oct. 7, 1996	Economic Impact of	PFW Payson	H. Mason Coggin

<u>Date</u>	<u>Presentation</u>	<u>Audience</u>	<u>Speake</u>
Oct. 7, 1996	Mining in Arizona	PFW Payson	Ken Phillips
Oct. 11, 1996	Mining for Music.	The Back Door	H. Mason Coggin
Oct. 11, 1996	Cowboy Miner	UofA Law School	H. Mason Coggin
Oct. 17, 1996	Mining and the Law	Roadrunners Prospectors	H. Mason Coggin
Oct. 18, 1996	Gold in Arizona	Apache Junction	H. Mason Coggin, etal.
Nov. 2, 1996	Cowboy and Miner	AZ Hist in Tucson	H. Mason Coggin
Nov. 4, 1996	Gold Mining in Arizona	Superstition Mtn	H. Mason Coggin
	Destination Tombstone	Treasure Hunters Association	
Nov. 13, 1996	Early Gold Mining in Arizona	AHS in Tucson	H. Mason Coggin
Nov. 18, 1996	Miner's Houses	Az Treasure Hunters	H. Mason Coggin.
Nov. 18, 1996	Cyanide processing	Wickenburg Council	Ken Phillips
Nov. 19, 1996	Miner's Houses	AZ Prospectors Assn	H. Mason Coggin
Nov. 23, 1996	From the Ground Up	Books etc.	H. Mason Coggin
Nov. 24, 1997	Miners Houses	Sun Lakes Rock	H. Mason Coggin
Jan. 1, 1997	Cowboy and Miner	Little Buckaroo's Rodeo	H. Mason Coggin
Jan. 3, 1997	Cowboy and Miner	Back Door	H. Mason Coggin
Jan. 8, 1997	Industrial Minerals	Trailer Village Gem	Ken Phillips
Jan. 9, 1997	Gold Mining in Arizona	Apache Junction Gem	H. Mason Coggin
Jan. 17, 1997	information Sources for Industrial Minerals Evaluations	Bureau of Land Management Training Center, Phoenix	Ken Phillips
Jan. 24, 1997	History of Mining in AZ	Gilbert High School	H. Mason Coggin
Jan. 25, 1997	Gold Mining in Arizona	Pro Mac South	H. Mason Coggin
Feb. 6, 1997	Mining Engineering	Bisbee High School	H. Mason Coggin
Feb. 7, 1997	Cowboy Poetry	The Cochise Gathering	H. Mason Coggin
Feb. 8, 1997	Cowboy Poetry	Huachuca City School	H. Mason Coggin
Feb. 10, 1997	We Mine That! in Arizona	Sun City West	Ken Phillips
Feb. 11, 1997	Gold Mining in Arizona	Motorola Gem	H. Mason Coggin
Feb. 13, 1997	Destination Tombstone	Gilbert Library	H. Mason Coggin
Feb. 18, 1997	Miners Classics	ASU West Social	H. Mason Coggin, etal.
Feb. 20, 1997	Destination Tombstone	Arizona Authors B&N	H. Mason Coggin, etal.
Feb. 24, 1997	Minerals in Arizona	Pam Turner's 4 <sup>th</sup>	H. Mason Coggin, etal.
Mar. 6, 1997	Western Literature Program	Barry Goldwater H.S.	H. Mason Coggin
Mar. 7, 1997	Frank Murphy, AZ Miner	Prescott Westerners	H. Mason Coggin
Mar. 8, 1997	Superstition Stew Cook	Apache Junction	H. Mason Coggin
Mar. 10, 1997	Miners Houses	Sun City West Gem	H. Mason Coggin
Mar. 10, 1997	Miners Houses	Black Canyon Gem	H. Mason Coggin
Mar. 15, 1997	Traildust	Pioneer	H. Mason Coggin
Mar. 25, 1997	Minerals I have known	Scottsdale Gem	H. Mason Coggin
Apr. 7, 1997	Traildust	Peoria Public Library	H. Mason Coggin
Apr. 8, 1997	We Mine That! in Arizona	Motorola Rockhound Club	Ken Phillips
Apr. 21, 1997	Gold Mining in Arizona	Bisbee AIME	H. Mason Coggin
Apr. 28, 1997	Gold Mining in Arizona	Maricopa AIME	H. Maosn Coggin
May 8, 1997	The Prospector	Arizona Poetry	H. Mason Coggin
May 30, 1997	The Prospector	Maricopa AIME	H. Mason Coggin

<u>Date</u>	<u>Presentation</u>	<u>Audience</u>	<u>Speake</u>
Jun. 13, 1997	Oysters	AMIGOS	H. Mason Coggin
Jun. 18, 1997	Minerals in the Home	School Program	Ken Phillips
Jun. 21, 1997	Get a Job	ABPA Awards Banquet	H. Mason Coggin

## **MEDIA**

### **DEPARTMENT INTERVIEWED BY PAYDIRT**

The Director, Ken Phillips and Glenn Miller were interviewed by Bruce Rubin, the new editor for Pay Dirt in April 22. He wants to write an article on The Department and the Museum for publication in Pay Dirt.

### **"WHAT DO YOU KNOW?"**

The Director was introduced on Chris Bannon's "What do you know?" radio program on December 14, 1996 for their show which was aired from 9:00 to 11:00 AM.

The program originates in Michigan and Mike Sullivan is the host. It was carried live by KJAZ It is designed for shut in's and school children.

## **ADVOCACY STATEMENTS**

### **WAYNE WINTERS LIFE CELEBRATION**

The Director, Ken Phillips and former Director John Jett attended a Life Celebration for Wayne Winters at St. Pauls Episcopal Church in Tombstone on January 18, 1997.

### **MINERAL DISCOVERY CENTER**

ASARCO Incorporated held a grand opening for their Mineral Discovery Center at I-19 and Pima Mine Road The Director and approximately 300 to 500 people attended the opening and toured the mine and exhibits. Feb. 15, 1997

### **SANTA CRUZ COMMISSIONING**

The Director attended the Santa Cruz In Situ project commissioning at Casa Grande with about 200 others. Apr. 1, 1997

## **ARIZONA OFFICIAL HISTORIAN**

The Director attended a ceremony designating Marshal Trimble as Arizona's Official Historian at the Capital Museum. Apr. 3, 1997

## **ARIZONA BOOK PUBLISHERS ASSOCIATION**

The Director participated in the Arizona Book Publishers Association, a group composed of local area writers, publishers, distributors and book dealers. The meetings consist of a program about publishing, selling books. The Association puts out a monthly newsletter, has an annual book fair and supports local publishing and writing events. In June the Association held a Glyph Awards Banquet to award those publications that were considered the best in their category. The organization is run through a board of directors and several officers. The Director currently serves as the inside secretary and is on the board of directors.

## **WESTERNERS INTERNATIONAL**

The Director is currently serving his second term in the position of Sheriff of the Phoenix Corral of Westerners, International. Westerners is an organization dedicated to the preservation of western history. It meets on the first Wednesday of every month except July, August and September. Meetings include a program on some aspect of western history, archeology or humanities. Westerners sponsors the program at Westerners Night at the Annual Convention of the Arizona Historical Society. This year the convention was held in Wickenburg,. Next year the convention will be held in Santa Fe, New Mexico.

## **MINERAL AND MINING MUSEUM FOUNDATION MEET IN THE MUSEUM**

The Arizona Mineral and Mining Museum Foundation Board meeting is held quarterly at the Department and is an example of how the museum accommodates gem and mineral clubs



and encourages the study of geology, mineralogy and prospecting in Arizona. Meetings and events held by the Foundation include four mineral sales, pot luck dinners and programs on mineral collecting, photographing, mining artifacts or how to catalogue a mineral collection. The foundation is currently providing the expertise to assist the Los Cabaleros Museum in Wickenburg in cleaning, cataloging and curating their mineral collection. Other groups meeting in the museum also have outside programs including the mineral collection at the Phoenix Central Library which is the on loan from the Arizona Mineralogical Society.

## FORUMS

### SOCIETY OF MINING ENGINEERS

The Department has participated in the Society of Mining Engineers and the American Institute of Mining, Metallurgical and Exploration Engineers since its inception. Currently the Director serves as the Chairman for the Maricopa Section and is on the Board of Directors of the Arizona Conference. This is his second term as Chairman and he has served on the executive committee for the past five years. The Director and staff members also participate in AIME meetings and field trips.

### DON'S TREK

The Director was invited to attend the Don's Trek to the Superstition Mountains to help push the book Destination Tombstone and showed many trekkers how to pan for gold. Brochures for the Department and the Museum were distributed. "Destination Tombstone, The Adventures of a Prospector" was the result of the Director pushing for publication outside of the Department and outside of state government that put the miner in a more human light. Thus far the book has been an unqualified success and people are beginning to recognize Tombstone as an Arizona mining town.

### GILA COUNTY ZONES OUT MINING

The Director attended and spoke out at a Gila County Board of Supervisors public hearing on the long range planning project for Gila County. The planning program was put together for bureaucrats by bureaucrats for the preservation of bureaucrats. There was very little public interest introduced into the document. It was an obvious

lobbying attempt by the Forest Service and National Environmental groups. Obviously this mining community has been had by those self serving environmental groups who want control of Gila County.

### SUPERIOR MARBLE DIVISION

H. Mason Coggin and Ken Phillips met with the officers of Mineral Development Inc. (Superior Marble Division) to talk about their operations on the Tonto National Forest and their processing plant at Queen Creek.

### PIMA COUNTY SLAPS AT ASARCO

At a meeting of the Pima County Board of Supervisors the divisive work of several environmental groups was apparent and show how shallow the County Board of Supervisors feels about the jobs and the economic well being of Tucson. On May 27, 1997 the Supervisors voted two to two in favor of opposing a BLM land swap that would have allowed ASARCO's Rosemont Project to operate on private lands instead of public lands. The laws and the liability would have been the same. The only possible difference would have been the direct responsibility of ASARCO for their own lands. The two to two vote was later overridden by a four to one vote when the third Supervisor was appointed. The Director was in attendance but was not called to speak.

### DIRECTOR IN JAIL TO SUPPORT KIDS

The Director was Jailed for good cause as he helped St. Jude's Children's Research raise money for projects. By calling on some industry friends to bail him out the Director was able to raise \$250.

### AMERICAN MINING HALL OF FAME

The Director and about 600 members of the Arizona Mining Industry attended the Annual Awards Banquet for the American Mining Hall of Fame at Lowe's Ventana Canyon Resort in Tucson on December 7, 1996. Inducted were Louis S. Cates, Donald H. McLaughlin, Richard W. Hutchinson and Charles Pillar. Industry Partnership Award was given to AMIGOS.

## ARIZONA MINING ASSOCIATION

The Director was the guest of the Arizona Mining Association at a Board of Directors luncheon held at the Westward Look Resort in Tucson on December 10, 1997. Also in attendance were the past Directors of the Department as well as many retired industry executives.

The Director was also invited to attend the Arizona Mining Association reception at the Phoenix Country Club to meet with the mining community and members of the Arizona Legislature.

## AMA PARTNERSHIP

Continuing the Department's partnership with the Arizona Mining Association, Curator Glenn Miller, and Diane Williamson, a middle-school science teacher, made a presentation to the ARIZONA ASSOCIATION FOR LEARNING IN AND ABOUT THE ENVIRONMENT (AALE) at their annual conference in Sierra Vista. As part of this presentation 24, K through 12 teachers toured Phelps Dodge's Copper Queen operations at Bisbee. John Zamar and Lisa staff explained the current operation. The teachers were impressed with the continuing work Phelps Dodge is doing to protect the environment.

The National Science Teachers Association Conference was held in Phoenix on October 17 - 19, 1996. The Curator, the Director, Museum staff and volunteers, worked at the SME booth during this conference. The Museum served as the storehouse for the educational literature and coordinated the minerals that were distributed at the conference. Fourteen hundred science teachers, which represented 61 percent of the conference attendees, visited the minerals coalition booth.

On January 17 and 18, 1997--Diane Williamson, 8<sup>th</sup> grade science teacher, and Curator Glenn Miller, conducted a two-day institute entitled "Copper Mining in the Classroom" for Prescott area teachers. The program consisted of programs to acquaint teachers with the Arizona Copper Mining Industry and included the following topics: • Copper - Its Many Uses • Copper Mining in Arizona • From Mine to Market - Overview of Copper Production • Labs: Hands-on Mining, and • Classroom Applications. The program included a field trip to Cyprus' Bagdad Open Pit Operation. Twenty-six Prescott area teachers attended.

## ARIZONA PUBLIC SERVICE PARTNERSHIP

Museum staff and volunteer Charlie Connell met with staff members of Arizona Public Service's Palo Verde Nuclear Power Plant (APS/PVNGS) to map out the fiscal year's academic activities. APS/PVNGS staff developed an informational letter and designed a new partnership letterhead. The letter was to be sent to the schools throughout the state. Museum staff and APS/PVNGS staff are planning a traveling exhibit that highlights the production of fuel minerals and the uses of these minerals.

On November 26<sup>th</sup>, 5 individuals, (2 from corporate communications, 2 from nuclear assurance and 1 from engineering) from the Palo Verde Nuclear Power Generating station (PVNGS) attended 6 hours of training at the Museum. They completed a draft Mineral Museum/PVNGS Partnership Statement and spent the rest of the day learning about minerals and working with the Museum's Teacher Kits. They learned how to identify rocks and minerals, followed by a trip to the river bottom to collect samples and field test what they had learned.

## LITCHFIELD ELEMENTARY SCHOOL PARTNERSHIP

It has been a long-term goal of the Museum to develop a relationship where 4<sup>th</sup> grade teachers work with the Museum to produce a minerals unit in the classroom. As a result the Curator, Glenn Miller and Curator of Education Sue Clestian led a field trip to the Bagdad Mine for the Litchfield Elementary School 4<sup>th</sup> grades. The bus costs were split between the school and a grant from the Arizona Mining Association.

In the first part of March, the Museum staff began training teachers in lab exercises that demonstrate the mining, milling, flotation, leaching, and electro-winning of copper ore. In the last part of April and the first part of May, students, teachers, and parents took a field trip to the Bagdad mine. Grant funds from the Arizona Mining Association and Litchfield School paid for the trips.

A parent involvement day was held on October 4<sup>th</sup>, with Museum staff, 4<sup>th</sup> grade teachers and 20 parents to provide preliminary training about the physical properties of minerals. On October 31<sup>st</sup>, the five 4<sup>th</sup> grade teachers, 20 parents, and the Museum staff took 150 4<sup>th</sup> graders to the Salt



River bottom on a field trip to collect "rocks." The Museum staff made several follow up trips to work with the 4<sup>th</sup> graders, their parents, and teachers.

### ACADEMY MINERALS IN SOCIETY PARTNERSHIP

Curator Glenn Miller was a staff member for the Tucson "Minerals in Society" July 28 through August 3, the Curator was a staff member for the. This year's program was quite different from past programs in that an extra day and a half and two new field trips were added to the program. The focus of the new trips were (1) to showcase the uses of Arizona copper and (2) to showcase the environmental efforts at Arizona mines. The teachers visited the Tucson Foundry and BPH's Pinto Valley operation. Planning for the Fall and Spring field trips and for the workshops schedule is in progress.

### MINING HISTORY RENDEZVOUS

The first ever Mining History Rendezvous was held at the Museum April 11-12 and included speakers on mining history, mining artifacts and a Friday evening auction of mining artifacts and books. Several dealers of mining related books and artifacts bought booth space at the event. Sponsors included the Arizona Treasures Unlimited, Inc.; Arizona Prospectors Association, Inc.; AZ Mineral & Mining Museum Foundation; Mineralogical Society of Arizona, and a host of others. Most of the attendees are looking forward to next year's event.

The Department received a \$500 donation from the Arizona Treasure Hunters Association for the Arizona History Rendezvous.

### OTHER FUNCTIONS

#### FOREST SERVICE TAKES MILLSITE SANS COMPENSATION.

On September 16, 1996 the Director appeared in McNamee's Federal Court to testify for a stay on behalf of Ray Shumway who was about to lose his millsite near Payson because he did not file a plan of operation with the Forest Service. The claim was being reviewed for patent and if the Forest Service could make Shumway move his mill he would not be able to show occupation. The court refused to hear any testimony other than

the lawyers pleas and then ruled in favor of the government. Shumway lost the millsite he had occupied for 18 years and had to move the equipment that he had erected at the time.

### MUSEUM SPONSORED EVENTS

Volunteer Appreciation Day was held on December 14, 1996 to honor the volunteers who had donated time and effort to the Department and the Museum. Those who had donated 1 to 100 hours were given a certificate; over 100 volunteer hours received a piece of rail from the Red Rover Mine with a plaque listing their name and numbers of hours. Special plaques were presented to volunteers who participated in special external projects. From 1990 through November 1996, this dedicated group of volunteers gave almost 40,000 hours of their time to this institution. This is a group of people who've given their time and energy to help others understand the subject of mining and minerals.

### MUSEUM SPECIAL EVENTS

December 6, 1996, the El Zaribah Shrine Temple placed a "Historical Plaque" on the front of the Museum. Approximately 150 people attended the ceremony.

January 23, 1997-The State Arts Commission held their annual Legislative Luncheon. Approximately 300 people attended.

For the fifth year, the Museum served as the "VIP Reception Area" during the "Fabulous Phoenix 4<sup>th</sup>". Over 350 people utilized the museum facilities during this event.

On Saturday, October 26, in conjunction with the Museum Foundation, the first Family Day and Gem and Minerals Show was held at the Museum. Over 300 people attended and everyone enjoyed the visit.

People for the West Luncheon on the mezzanine for about 150 members and guests on April 4, 1997.

### MUSEUM HONORS

#### SUE CELESTIAN

In May of 1997 Curator of Education, Susan Celestian attended The National Science Olympiad as Fossils Event Supervisor, representing the AZ Mining & Mineral Museum. This position

recognizes her contributions to education in sciences.

## GLENN MILLER

In May of 1997 Museum Curator, Glenn Miller received his Masters Degree With Distinction from Northern Arizona University in Elementary Education specializing in curriculum development.

## TEACHERS KITS

The Museum has been preparing and giving educational mineral kits to teachers in Arizona for several years. Over the years these "SEMINAR IN A BOX" kits have become a sought after item by teachers everywhere and the Museum has had to limit their gift to classroom teachers in Arizona. The value of the kits is approximately \$50.00 per kit and they are an exceptional tool for teaching students about minerals. This fiscal year the Museum staff prepared and delivered about 800 Teachers Kits.

In addition to Teacher Kits, the following was supplied to teachers: • Information on Fluorescence and the Tiger Mine • Rock samples, oxide ore and sulfide ore to Linda Avey, Tonto Basin School and Linda Cline Flowing Wells District, Tucson • Apache Tear Legend to Ms. Bustrin, Phoenix

The Museum also supplied: • glass plates, streak plates, and mineral samples to Laurie Smith Heritage Academy, Mesa, grades 7-9 • rock, mineral, and fossil samples to Ann Stirber, Kyrene de la Sierra Elementary School, Mesa • 35 pieces of petrified wood and chrysocolla to Nancy Young, exchange teacher to Australia from Alma Elementary School, Mesa

The Museum also supplied oxide ore samples to Jerry Taylor of Santa Maria Middle School.

## LAPIDARY SHOP

Lapidary and Silversmithing Class are now being taught in the Lapidary Shop by Doug Duffy.

During the Fiscal Year 25 students completed the course. This is an interesting use of Arizona's metals and minerals.

There have been some major revisions to the lapidary shop in the year. All of the equipment has been refitted and reconstructed, a silversmithing shop was completed and the area has been cleaned and reorganized.

## STUDIES AND INVESTIGATIONS

*Conduct studies of the economic problems of prospectors and operators of small mines investigate their properties to assist in development.*

The Department made several studies and investigations during the fiscal year for individual property holders and other governmental agencies. These items have been included in the list of publications and in the field trips.

## MAINTAIN

*An information bank and library of mineral and mining information, including books, periodicals, films, videotapes and individual mine files. Underground mine map repository files, mining district data and an archive of mine data.*

As well as maintaining the mine information data bases, mine files, and library the Department and several volunteers cataloged the following items during the year:

The Photo collection was cataloged by Keith Halsey.

Cataloging and indexing the Department's many maps is being conducted by volunteers Bill and Gene Manny.

The correspondence files in the R. Mulchey Collection are being catalogued by volunteers from the firm of Muchmore and Wallwork.

Many hundreds of general and technical information items have been added to the Department's site specific mine files.

Over 100 corrections and additions have been made to the site specific Departments AZMILS

## MINING AND MINERAL MUSEUM

*Maintain a mineral museum as the state depository for collecting, cataloging and displaying mineral specimens of various ores, gemstones, lapidary material and other valuable mineral specimens.*

## EXHIBITS

### MUSEUM STANDING COLLECTION

During the Fiscal Year over 39,014 people visited the Museum. Eighteen thousand five hundred of these were students in organized tours.

Eleven exhibit cases have been cleaned, re-lamped and re-labeled during the fiscal year. While this was being done the printed catalogue was checked and corrected.

A new display stand was constructed for the seven foot Ajo native copper specimen. This new stand allows the specimen to be taken out of the Museum for display. It was first displayed at the Tucson Gem and Minerals Show as part of the "Minerals of Ajo" exhibit.

A new display stand was also constructed to display a 600 lb. slab of Coconino sandstone containing tracks from *Laoporis Noblei*—a forerunner of the dinosaurs.

### TRAVELING EXHIBITS

A minerals display was placed in Mojave Middle School, in Scottsdale; a large specimen of Bisbee malachite was displayed at the annual meeting of the League of Small Cities and Towns, in Flagstaff; The Museum's photo exhibit "Minerals-Nature's Art" was on display at the Arizona Sonora Desert Museum from January 1, 1997 through February 18, 1997.

The Mining and Mineral Museum had exhibits at the following functions:

- Pima County Fair
- Maricopa County Fair
- Bisbee Gem and Mineral Show
- Arizona Mineralogical Society Gem and Mineral Show
- Tucson Gem and Mineral Show
- Wickenburg Gold Rush Days
- Maricopa Lapidary Gem and Mineral Show

### DEPARTMENT PHOTOS AT THE PHIPPEN

The Department provided many photos for "Early Transportation in Arizona History through Art", an exhibit at the Phippen Museum in Prescott. The Exhibit ran from January through March 31, 1997

### SUN LAKES EXHIBIT

The Director had an exhibit of his personal minerals and artifacts on exhibit at Sun Lakes from February until the end of May.

### DESERT CANALS CELEBRATION

On Feb. 23, 1997, at the request of the Arizona Historical Society the Department had an exhibit at the Desert Canals Celebration in Scottsdale. The exhibit shows how the canals were constructed using materials that were mined and processed in Arizona. The exhibit was visited by about 1,000 people and Museum brochures were distributed.

### DIRECTOR EXHIBITS AT MAIRCOPA

The Director exhibited mineral specimens from his personal mineral collection (acquired before joining the Department) at the Maricopa Gem and Mineral Show February 28 through March 2, 1997. The event was attended by thousands of people. It was one of the best attended mineral events in Phoenix.

### ADMMR IN BANK ONE

The Historic Mining Operations Photo Show at Bank One was installed on Mar. 31. It included photographs of several old mining structures that have been decommissioned. The program is a part of the Historic Preservation Week program by SHPO.

### MARICOPA COUNTY FAIR EXHIBIT

The Department personnel set exhibits at the Maricopa County Fair for the Arizona Mining Association and the Mining and Mineral Museum. April 30, 1997

### DONATIONS

One hundred and one separate donations were made to the Museum during the FY. These donations ranged from a single item to a 100 lb "intact" stamp mill. Other donations of note were "the Banquet of Rocks" which was purchased for \$3,000 by the Mineral and Mining Museum Foundation and donated to the Museum.; several flats of minerals donated by Les Presmyk to be sold in the gift shop. a photo collage of the

"Peralta Gold Mine Site"; over 100 lbs of garnets, 215 lbs of talc; 75 lbs of sulfur, 155 lbs of azurite; 12 lbs of quartz crystals, 60 lbs of obsidian; 100 lbs of rhyolite, 100 lbs of fossils; 100 lbs of beryl; 28 lbs of chrysocolla; 51 lbs shale; 80 lbs miss. rock and fossils; 17 lbs tumbled and polished stone; 150 geodes; 100 lbs quartz; 50 lbs Apache tears; 50 lbs pseudomorph; 1000 lbs tuff; 10 lbs chalcedony roses; 1487 lbs petrified wood; 215 lbs of oxide ore; 94 flats of minerals for gift shop; many hand crafted items earrings, etc.; 1000 items for gift shop sales and several large specimens. These are just the highlights. The list goes on. Thank you letters are available from the Department.

### BORAS HEADFRAME EXHIBIT

This exhibit was worked heavily during the year and came much closer to completion. Most of the work on the exhibit was conducted and supervised by Charles Connell with volunteers and donations of equipment, supplies and materials that he mustered. During the year the headframe was erected and placed on foundations that had been drilled, formed and filled with concrete. APS crews and equipment were used to drill the holes and erect the hoist. Lindco Equipment company played an essential part in providing services and a maintenance truck to weld on the structure.

APS crews also excavated the foundation for the Boras hoist and hauled off the surplus materials. Charles Connell and the department staff formed the hoist foundation and supervised the pour.

Charles Connell sand blasted and painted the hoist, cages, bonnets and other metallic parts and made them ready to place in their proper place in the exhibit. During the year all of this equipment was placed and at the end of June only the hoist house and a few details remained to be constructed.

### MEETINGS

The following groups hold regular meetings in the museum class room.

The Arizona Mineral and Mining Museum Foundation, Leaverites, Bottle Club, Arizona Treasurers Unlimited, The Arizona Mineralogical Society, The Carvers Association, Arizona Prospectors Club, People for the West, Maricopa Lapidary Society, 4-H Geology Group,

### MUSEUM GROUP VISITS AND MEETINGS

The following groups visited or met in the museum during year:

- 4-H Geology Group
- 4-H Meeting
- 4-H Mineral Club
- ABC Alternative Learning Center
- Acacia Elementary
- ADE Poetry Judging
- Alternative Education
- Alternative learning Center
- American Child Care
- Amigo Preschool
- Anasazi Elementary
- Anderson Elementary
- APA Gluing Party
- Apache Wells
- APS Training Workshop
- Az Mining and Mineral Museum Foundation
- Arizona Prospector's Meeting
- Arizona Treasure Unlimited
- Art Hamilton Elementary
- Awakening Seeds
- Aztec Elementary
- Bead Society
- Bellair Elementary
- Bethel Preschool
- Bicentennial Elementary
- Bicentennial South Elementary
- Borman Junior High
- Bottle Club
- Boulder Creek Elementary
- Boy Scouts
- Brisas Elementary
- Burton Elementary
- Camelback Desert
- Campfire
- Capitol Elementary
- Capitol School
- Carvers Meeting
- Casa Grande H.S.
- Central AZ Elderhostel
- Challenger Middle School
- Chandler YMCA
- Chaparral Elementary
- Chapman University Teacher's Workshop
- Cherokee Elementary
- Child Time
- Childcare
- Children's World

- Cholla Elementary
- Christ Lutheran
- Christian Heritage H.S.
- Christtown YMCA
- Civil Air Patrol
- Civil Air Patrol Public Affairs Officers Meeting
- Clarendon Elementary
- Cochise Elementary
- Copper Canyon Elementary
- Cotton Boll Elementary
- Coyote Springs
- Cub Scouts
- Day Camp
- Daycare
- Deer Valley H. S.
- Del Rio Elementary
- Desert Center Volunteers
- Desert Palms Elementary
- Desert Valley
- Desert View Learning Center
- Desert Winds Elementary
- Discovery Elementary.
- Dunbar Elementary
- Eagle Ridge
- East Globe Elementary
- Eduprize Charter
- El Dorado Elementary
- Emmanuel Lutheran
- Erie Elementary
- Esperanza Elementary
- Estrella Jr. High
- Fine Elementary
- First Arizona Youth Academy
- First Presbyterian
- Florence Elementary
- Fountain Hills Home School
- Fowler Elementary
- Garden Lakes Elementary
- Garfield Elementary
- Gary Tang Adult Education Center
- Gateway Elementary
- Gencroft Care Center
- Gila Ben Jr. High
- Gilbert Elementary
- Girl Scouts
- Glen L. Downs Elementary 75
- Glencroft Care Center
- Glendale American Elementary
- Glendale Community College
- Glendale Family Development Center
- Glendale High School
- Greenway Middle School
- Group of 15 in Wheelchairs

- Harris Elem.
- Hawthorne Elementary
- Heatherbrae Elementary 150
- Heritage Elementary
- Hi-Star
- Holiday Park Elementary
- Home School
- Hopi Elementary
- Horizon Charter School
- Hoteville Bacavi Community School
- Houston Elementary
- Humphrey Elementary
- International Studies Academy
- Ironwood Elementary
- Isaac Imes Elementary
- Isaac Middle School
- J.B. Sutton Elementary
- John F. Kennedy Elementary
- John F. Long Elementary
- John Jacobs Elementary
- John R. Davis Elementary
- Johnson Elementary
- Khalsa Montessori Elementary
- Kiddy Child Care
- Kindercare
- Knox Elementary
- Kyrene de la Paloma
- Kyrene del Cielo Elementary
- Kyrene del Sureno
- Kyrene do los Lagos Elementary
- Laguna Elementary
- Landmark (60)
- LaPetite Academy
- Lapidary Class
- Le Pera Elementary
- Learning Works
- Leaverites
- Lee Cornegay Elementary
- Light & Life
- Linda Cain & Family
- Litchfield Elementary
- Litchfield Teachers In service
- Littleton Elementary
- Loma Linda Elementary
- Longview Elementary
- Lookout Mountain Elementary
- M.C. Cash Elementary
- Machan Elementary
- Madison Park Elementary
- Marana Elementary
- Marc Center
- Maricopa Elementary
- Maricopa lapidary Society



- Mayer HS
- McDowell Mountain Elementary
- Melvin Sine Elementary
- Mercury Mine Elementary
- Mesa Rock Club
- Mesendick Elementary
- Mineral Educators conference tour
- Mineralogical Society of Arizona Meeting
- Minerals in Society Academy
- Mining History Rendezvous
- Mirage Elementary
- Monte Vista Elementary
- Montessori
- Mountain View Elementary
- Mt. Shadows Elementary
- Museum Staff Meeting
- Neely Elementary
- Nevitt Elementary
- Northwest Christian
- Palm Lanes Elementary
- Paloma Elementary
- Palomino Elementary
- Paradise Valley Christian School
- Paradise Valley H.S.
- Park Meadows
- Patterson Elementary
- Pecan Grove Elementary
- Pendergast Elementary
- People for the West
- People to People
- Peoria Migrant School
- Peralta Elementary
- Phoenix Alternative learning network
- Phoenix Christian School
- Phoenix Country Day School
- Phoenix Day School for the Deaf
- Phoenix First School
- Pick up exhibit in Wickenburg
- Pima Elementary
- Pinon Elementary
- Project Challenge
- Project PPEP 20
- Pt Coe Elementary
- Pueblo Middle School
- Red Mesa Elementary
- Richard E. Miller
- Roadrunner Elementary
- Roadrunner H.S.
- Roe Walker Center
- Rosa Linda Elementary
- Rose Lane Elementary
- Royal Palms Middle School
- Sage Private School
- Saguaro Hills Christian School
- Sahuaro Elementary
- Scott Libby Elementary
- Senate Staff Tour
- Senior Fun Times Tours
- Sequoya Elementary
- Sevilla Elementary
- Shrine Elementary
- Silversmithing Class
- Solomon Elementary
- South Mt. High School
- Southwest Christian
- Spitalny Elementary
- Springs of North Mesa School
- St. Agnes Elementary
- St. Gregory's School
- St. Mathews Elementary
- St. Thomas Elementary
- Starlight Park Elementary
- State Arts Commission Luncheon
- Sullivan Elementary
- Sun Lakes Rock Club
- Sunrise Elementary
- Sunset Elementary
- Sweetwater Elementary
- T.B. Barr Elementary
- Teen Court
- Tempe Christian School
- Tempe Montessori
- Tempe School District
- Tereract
- The Arch
- Tolleson H.S.
- Tomahawk Elementary
- Tonalea Elementary
- Tonto Basin Elementary
- Touchstone
- Town Meadow Elementary
- Trevor Browne H.S.
- Tvetta Ellis School
- Underdown Jr. Hi
- USI Mineral Id for Teachers
- Valley Cathedral Elementary
- Valley of the Sun
- Valley View Elementary
- Village Meadows Elementary
- Waggoner Elementary
- Watering Hole
- Webelos
- Westridge Elementary
- Westwind
- Whispering Wind Elementary
- Whiteriver Elementary

- Wilson Elementary
- YMCA
- Youth Center
- Youth ETC
- Zuni Elementary
- Zuni PAL

## DISCOVERY MUSEUM

The Department participated in several meetings to put a mineral leaning center near Safford in Graham County. The facility would include a panorama of the mining history of the area and then show how minerals are being used at the present time. The process is still going forward. Several people are involved in the process including the Arizona Museum, the Arizona Sonora Desert Museum, the University of Arizona and Phelps Dodge. Architects and designs have been hired to put the concepts into documentation.

## PROVIDE MINING DATA

*Provide quality mining data, evaluation and assistance relating to mineral development to the legislature and other state and county agencies.*

## JOINT LEGISLATIVE BUDGET COMMITTEE

The Director appeared before the Joint Legislative Budget committee on Feb. 21, 1997 to defend the Department's budget for two years beginning on July 1, 1997. He also appeared before the Natural Resources Committee to defend the ability of the state to issue prospecting permits and mining leases on state lands in the Governor's open space initiative.

## DEPARTMENT OF ENVIRONMENTAL QUALITY

On Oct. 9, 1996 Fred Brost and Mason Coggin met with Tim Steel of ADEQ to discuss Warff funding for the Three R Mine in Santa Cruz County. DEQ had the money, the mandate and many good reasons to work out a reclamation program for cleaning up this old mine but apparently did not feel that this was a suitable use of Warff funding.

## ARIZONA MINE INSPECTOR

The Arizona Mine Inspector and his deputies have made a special effort to work with the Department in resolving issues where the Mine Inspector and the Department can combine their efforts to support issues which promote the development of the state's mineral industries.

The Department has provided the Mine Inspector information allowing him to talk about the economic impact of BHP's San Manuel Underground Operations on the economy of Pinal and Gila Counties.

Department personnel were invited to join with the Mine Inspector in a meeting with Guy Johnson, formerly of the Bureau of Mines to discuss educational grants and work grants available from several agencies. Apparently a segment of the Bureau of Mines that does health and safety research has been transferred to the Department of Energy with \$35 MM to find five key health and safety issues that mining companies are interested in solving. Issues being considered are transponders to let a truck driver know when a smaller vehicle is approaching and warn of a hazard such as a shovel or a dozer. A second idea is to find some way of telling the truck driver when he is approaching the berm at the dump too fast or if there is no berm on the dump. A third issue is locking the jacks used for changing truck tires. These subjects may be discussed at a later date. Guy Johnson also said that there is no money available for new process development.

The Director and his family joined the Mine Inspector's retreat at Workman Creek Boy Scout Camp for a weekend of visiting with his staff and visiting some of the mining sites in the area. It was a good opportunity to review some of their federally funded programs and visit with his staff.

The Director was invited to attend and recite poems at a "We Dig Doug" celebration in support of the Mine Inspector at North Mountain Park. About 100 people including Sheriff Joe, several legislators and Secretary of State Jane Dee Hull were in attendance.

The Director was invited to be the evening program on October 12, 1996 at the Southwest Safety Conference. After a very generous introduction by the State Mine Inspector he talked about mining and recited mining poems for about 30 minutes. The daytime sessions on Thursday covered a unique accident in Idaho where the

bottom failed, drugs in the work place, Phoenix's Norton Salt Mine and safety meeting instructional programs. The Director for the Port of Guymas was at the meeting and had a listing of the ships of anode copper that Guymas had unloaded and shipped to electrowinning plants in Arizona and ships that Guymas had loaded with cathode copper and wire bar for shipment to other countries.

## HISTORIC PRESERVATION OFFICE

The Department has worked with the State Historic Preservation office in several ways. The restoration and preservation of the Boras headframe, hoist house and the baby gauge railroad locomotive are partnershiped with the State office of Historic Preservation. The Department placed an exhibit in the Bank One lobby characterizing the historic aspects of old mining towns with a collection of old photographs showing buildings and mine structures that have been completely destroyed, the sites leveled and reclaimed as the result of tax laws and unrealistic regulations and programs of state and federal governments.

## HISTORIC SITES REVIEW COMMITTEE

Arizona Historic Sites Review Committee met at the National Guard Arsenal Building in Papago Park to consider nomination of the John C. Greenway House in Ajo among other sites. The Director attended. Feb. 13, 1997

## PHOENIX LIBRARY ARIZONA ROOM

Kathleen Garcia and Fay Irujo from the Arizona Room at the Phoenix Library visited the Department's archives, photographs etc. on Feb. 4, 1997. This was done in response to a visit and a donation of one copy of "Destination Tombstone" to the Arizona Room. Many of the Arizona Room patrons were in search of information on mining and they are now being referred to the Department. Department staff also sends people looking for information on Arizona History to the Arizona Room and several other historical archives throughout the area. Through a simple program of awareness we have opened many doors. We have much to share with them in their programs.

## SURVEYS AND INVESTIGATIONS

*Make surveys of potential economic mineral resources and conduct Field and other investigations which may interest capital in the development of the state's mineral resources.*

## FIELD TRIPS

Ken Phillips visited 18 industrial mineral consumers in the El Paso and southwestern New Mexico to find markets for Arizona industrial minerals.

Ken Phillips visited manufactures in Cochise County who are users or potential users of Arizona produced mineral products.

The Director attended the Arizona Mine Emergency Association Board meeting at the Gold Road Mine in Oatman to tour the underground and review the mine rescue station.

The Director noted an unknown producer was working a property in T23N R18W in approximately Section 10. This could be the Silver Age, Copper Age or Midnight.

The Director visited Lodestar Steel's mini-mill west of Kingman. Mini-mill in no way describes this facility. It is much larger than imagined.

The Combined Metals Reductions property about 3 miles north of Cottonwood Road. was visited by the Director. Steve Sillar is the Plant Manager.

Department personnel visited with the watchman on Airmetco's Emerald Isle copper leach project. They did not have their permits at the time of the visit.

The Director met with Mr. Ray Shumway at his mill about 2 miles south of Payson and reviewed his situation. He claims that he is being harassed by the Forest Service.

Discovery Park Concept Committee meeting at The Environmental Research laboratory in Tucson was attended by the Director and 10 other people.

The Director visited the University of Arizona Mineral Museum in the basement of the Flandreau Planetarium.

Dave Hamn and the Director met at the Phelps Dodge Corp. in Bisbee, AZ to review the Copper Queen Mine Tour and presented them with a plan to join the organization.



Lyndon Denton, PHR, Director of Resources for Apache Nitrogen Products Inc. told the Director that they have not sold any explosives to small miners or any miners who cannot show tracking capabilities for about ten years.

The Director visited Cleator, Crown King, Savoy, Tiger, Oro Bell, and Button Mines with Hal Halpen of the Tonopah Belmont Mining Corp., Richard Franks and Richard Franks, Jr. There is no new activity on any of these mines and the activity on the Button has been suspended. We did notice however, that there has been some new work on the Alvarado Mine below Yarnell. Most of this activity appears to be directed toward recovering large yard rock for sale in Phoenix.

A Trip to My Arrow of Light Property on Bland Hill near Bumble Bee was made by the Director who met the owner and drove to the property.

On a trip to Morenci the Director was joined by writer Bill Case to discuss a possible article about the mine tours.

The Coggins toured the old mining camps of Gleeson, Courtland and Pierce. There were signs of recent activity in these districts but no new discoveries have been announced. The Mexican Hat property and the Santa Fe properties have known resources but it does not look like any of the recent activity has been directed toward these properties.

The Director made a Field Trip to the Fat Jack Mine to help layout a mining plan for the Forest Service. The Fat Jack claim has been producing a large number of high quality quartz (amethyst and smoky) crystals.

The Director visited the construction of the divided highway between Cordes Junction and Phoenix. The excavation had cut through a large deposit of travertine just north of Mayer. Several samples were gathered for the museum.

The director toured the Blue Bell mine area on his way to Mayer from Cleator. The Blue Bell mine area is being quarried by Whitey Webster and the Western States Stone Company for decorative stone.

The Director attended a board of directors meeting of the Arizona Mine Emergency Association Board meeting at Frank Montonati's home in Rocky Point, Sonora Mexico.

The Maricopa Coalition of Mineral Clubs held a Field trip to the Morenci Mine. Several Museum volunteers attended this event.

The Director visited the Bishop Property with Herk Finley to review the property and his recovery operation. A company calling themselves Black Gold Inc. is working on upper Weaver Creek. Herk Finley described an operation south of Gila Bend where micron gold is being recovered by a black box process.

The Director met with Victoria Green at her property near Oracle Ridge Mining Company on the back side of Mt. Lemon to look at her assay office and mine.

The Director visited the Oracle Ridge Mine. A crew of eight people are still at the mine.

Sue Celestian and Glenn Miller took 100 teachers from the Litchfield Park School the Gila River bottom for a program.

The Director, with James Ferris of Tucson, visited mining properties along the Mexican Border between Nogales and the Huachuca Mountains. James Briscoe and Associates are trying to acquire land in the San Raffel Valley area to start a small open pit copper mine. ASARCO is doing a great job of reclamation in the Duquesne area. Most of the good prospects in the Huachucas are well inside the boundary of the wilderness area.

Ken Phillips, with Tom Howell & Norm Eastmore visited several uranium occurrences in Northern Maricopa County including the New River Schist Quarry, Orizaba, Moore Gulch, and several other areas of interest.

Rockazona Rock & Gem Show was visited by the Director, Chief Engineer, and several of the volunteers and tour guides from the museum.

The Director met Richard Norman on Highway 96 at the Santa Maria River between Bagdad and Hillside. They reviewed his property just north of the River.

The Director joined the Sun Lakes Gem and Mineral Club for a field trip to Reymert.

The Director attended the Tucson Gem and Mineral Show at the Convention Center in Tucson. The Museum installed an exhibit at this show. The show was larger than the last few years.

The Arizona Mine Emergency Association Board of Directors met at Frank Montonati's home in Prescott Valley.

The Arizona Geological Society held their spring field trip to Quitovac, Sonora and Ajo. The

Sunday trip to Ajo was joined by Nyal Neimuth and the Director.

Ken Phillips made a two day field trip to look at diatomaceous earth mines and processing plants at Lompoc with BLM and Forest Examiners. The main quest was to help these agencies develop information for processing plant patent applications in Arizona.

Leaverite Field Trip to the geode picking area on the other side of the Hassayampa River at Morristown was attended by several volunteers from the Museum.

The Director visited the Vulture Mine to discuss the upcoming field trip at the Arizona Historical Society annual meeting in Wickenburg.

The Director and several museum volunteers joined about 60 members from the Maricopa Lapidary Society, The Leaverites, Apache Junction Gem and Mineral Club, and other gem clubs for a trip to Copperopolis.

Greg Scott met the Director of the State Parks Museum at the Courthouse in Tombstone to visit the South Pass property in the Dragoons. It does not look as if any drilling or serious exploration has been done on the property.

The Director and about 10 other miners attended the AIME Spring Mining Division field trip to Cyprus Sierrita Mining Division of AIME. The program included a talk about the mining operations including the drilling and blasting.

H. M. Coggin, Dr. James McBride and Lew Orell drove to Humbug to review the placer operations from 1899.

The SME Mining Division Spring Field Trip to the Cananea Mine was attended by the Director in the company of Chuck Bentzen and about 70 geologists and engineers.

Maricopa Lapidary Society took a field trip to Camp Wood, AZ. The field trip lasts for two days. Several volunteers from the museum attended.

Arizona Mine Emergency Association Board meeting was held at the Phelps Dodge safety building in Bisbee. All Board Members were present. An inspection was made of the Copper Queen Mine Tour.

## ZINC POTENTIAL

In June of 1996 after hearing about BHP's plans to shut down the Magma mine and after visiting

the Cominco smelter as Trail, BC. the director placed a call to Cominco Headquarters in Trail, B.C. and was eventually directed to George Cole of Cominco in San Francisco, CA. After explaining that the Trail smelter was losing some of its local supplies of zinc ore and realizing that Red Dog, far above the arctic circle, may not be a reliable source of concentrates I told him about the Magma Mine shutting down at the end of June. The mine has a resource of about the 6 MM tons of 4-6% Zn within 1000 feet of their present workings.

When the Magma shuts down approximately 363 employees and a 3300 TPD mill that can be converted to zinc ore concentration will be idled. It is operating, permitted, equipped and staffed with qualified people who know the rock and the mine. He said that he would follow up. If this one could have been put together, the Department would have saved 363 jobs and helped Arizona to produce about \$5 million per month in zinc with credits in copper, gold and silver. In a call to BHP at San Manuel the concept was introduced to management. Nothing ever happened. Either one company or the other was not interested in dealing over the zinc potential. However, exploration crews are still reported drilling at the Magma.

## MINING INFORMATION CENTER

*Serve as a center of mining information for this state in matters relating to its mineral resources and monitor current mining and exploration activities.*

## DEPARTMENT ANSWERS QUESTIONS ABOUT EXPLORATION

As an example of how the Department works: Lew Orell came in to the Department on May 6 and visited with the staff for about one hour. He had several questions concerning mineral exploration and how companies are formed. He left with a strong grasp of mineral exploration and mineral exploration companies. He was one of several visitors on that day to receive answers to a great many questions.

## PUBLICATIONS

*Publish and disseminate information and data necessary or advisable to attain its objectives.*

*The Department published the following documents during the fiscal year.*

## PUBLICATIONS

ADMMR Annual Report 1995-1996

ARIZONA ACTIVE MINE REPORT 1997

ARIZONA MINE EMERGENCY ASSOCIATION MEMBERSHIP MAP, showing current membership and location of the members of the Arizona Mine Emergency Association.

Circular No. 20 Maps and Books for Arizona Gold and Gold Prospecting, (revised)

Circular No. 58 Assayers and Assay Office in Arizona Circular (revised)

Circular No. 59, "Mining Scams", Revised March, 1997,

Circular No. 71, "Arizona's Mining Update-1997," K.A. Phillips, N.J. Niemuth, and D. Bain, Jan.1997

Circular No. 72, "Arizona Rockhound Information," Feb. 1997

Circular No. 73, "Amendment to the BLM Surface Management Requirements" March 1997

Circular No. 74, "Arizona Gem Shows" 1997-98, Alice Rosenfeld

Circular No. 75, "Earth Science Clubs, 1997-98, Alice Rosenfeld

Reference Book List 1997 "Suggested references for the Arizona prospector and mineralogist

MINERAL RESOURCE NEWSLETTER, 1<sup>ST</sup> QUARTER 1996-1997

MINERAL RESOURCE NEWSLETTER, 2<sup>ND</sup> QUARTER 1996-1997

MINERAL RESOURCE NEWSLETTER, 3<sup>RD</sup> QUARTER 1996-1997

MINERAL RESOURCE NEWSLETTER, 4<sup>TH</sup> QUARTER 1996-1997

Open File Report 97-15, *The Art of Making a Cabochon*, Walter Peck, Doug Duffy, Shirley Cote, April 1997

Royal Spectrum Publishing 1996, 132 pp, introduction by James McBride, index, maps, photos, examples of original hand written manuscript, \$14.95.

Coggin, H. Mason and Keith Halsey, "A. L. Flagg's Southwest: A Photographic Essay," *The Mining History Journal*, Third Annual, Denver, 1996

Coggin, H. Mason, "Roots of the Calumet and Arizona," *The Collector's Mining Review* issue No. 3, Reno, NV, Spring 1997

Coggin, H. Mason, "Sullies Bucket," in *Miner Details* the semi-annual publication News Letter of the Arizona State Mine Inspector, Vol. 4; No. 4 Vol. 5; No. 1, October 1996-March 1997, p. 11

*Destination Tombstone, The Adventures of a Prospector*, compiled by Marilyn Butler. The Department was responsible for getting the compiler, the editor and the publisher together. The book is selling very well.

Coggin, H. Mason, *John C. Greenway and the Ajo Experience*, *The Collectors' Mining Review*, Issues No. 1, 2 & 3. Fall 1996

*Mining History News*, Vol 7, Dec. 1996, No. 4 mentioned the Mining History Rendezvous and the January 1997 issue *Eureka* devoted an entire back cover to advertising the event. They also made favorable comments about the initial issue of *Mining Collector's Review*. The second and last installment of "John C. Greenway, the Ajo Experience" was printed in the *Mining Collectors Review* Issue No. 2. p24. This issue also carried the announcement of the Mining History Rendezvous.

Cox, Carroll, *Mission Of People For The West Is Reality Check*, in *Backbone Newspaper*, Vol 2, Issue 7, Oct. 11, 1996

*History of Mining in Arizona Volume III*, Mike Canty and Mine Greeley have asked the Director to assist them in editing and finding chapters for *The History of Mining in Arizona Volume III*. It looks like this publication will be out the spring of 1998 in time for the Mining History Association Conference in Bisbee the first weekend of June. Five of the chapters have been completed but an additional five need to be found before the volume is large enough to print. He believes that all he needs are the chapters. Apparently the funds to print are available.

## OUTSIDE PUBLICATIONS

Book Review, Marilyn Butler, *Destination Tombstone*, *The Journal of a Prospector*,

*Mining the Net* In conjunction with the Arizona Mining Association, The Curator, Glenn Miller, and Dr. McBiles, produced a mining video titled "Mining the Net". The video is aimed at fifth graders. Shooting of the classroom scenes was done in a Tucson school.

## STATE LAND DEPARTMENT

*Cooperate with the state land department to encourage mining activity on state lands.*

The Department has worked closely with representative of the State Land Department concerning several issues that involve mineral rights on the State Trust Lands. The Land Department makes extensive use of our files to investigate potential mineral leases.

On Sep. 24, 1996, the director attended an Interagency Coordination Meeting with BLM, The State Land Department, DLU and the Arizona Mine Inspector. The objective of the meeting is to work out the details for a Memorandum of Understanding for the implementation of the State Reclamation Rules. Some of the items being discussed will include aquifer protection, water and air quality issues, mining and reclamation on split estate lands, bonding, joint inspection and enforcement, and coordination of permit applications and environmental documentation.

## CORPORATION COMMISSION

*Cooperate with the Corporation Commission in its investigations and administration of laws relating to the sale of mining securities.*

The Department has cooperated with the Securities Division of the Corporation Commission several times during the year and several projects are ongoing.

## ARIZONA GEOLOGICAL SURVEY

*Cooperate with the Arizona Geological Survey and deliver to the Survey problems which the field work of the department shows to be within the scope of the activities of the bureau.*

The Department and the Geological Survey are partnershiping on several projects, unfortunately, the Department has not been able to complete these projects due to budget constraints.

## FEDERAL AGENCIES

*Cooperate with federal and other agencies in matters related to developing mineral resources in this state. During the fiscal year the Department cooperated with federal agencies as follows:*

### BUREAU OF LAND MANAGEMENT

During the fiscal year 1996-1997 the Department was interactive with the Bureau of Land Management and participated in several programs.

At an open house on November 19, 1996 given to celebrate their move to 222 N. Central Avenue the BLM showed several new maps explaining how the agency was planning to keep a closer control of the public's use of the lands including the activities of miners under the 1872 Mining Law and subsequent acts and regulations.

The Director was in attendance at a meeting on Jun. 18, 1997, when the BLM held an abandoned mines hearing at their office at 222 North Central. The meeting was held for the purpose of scoping out ideas for an abandoned mines demonstration where a property that has been identified as a perceived polluter would be reclaimed using federal funds. The property would be one where a responsible party for the property could not be located. Under these conditions it was obvious that the inventory of Arizona's abandoned mines was not completed and additional funding would be required to complete the study. This inventory should be essentially complete before any remediation should be initiated. If the work is started prematurely it will certainly be done on the wrong property.

Paul Bluff from BLM met with the technical staff of the Department to discuss the new mining regulations before they were announced. These new regulations would require extensive bonding and environmental studies even before a simple drilling program on a small parcel could be initiated. These regulations were very similar to those already adapted by the Forest Service. These regulations and requirements have greatly reduced mineral exploration on the Forest Service and will most certainly do the same thing for the rest of the public lands. We greatly appreciate Paul Bluff and the BLM for bringing these regulation changes to our attention. Bryan McAnallen from Bob Stump's office was been invited to attend the discussions at the



Department's office. We understand he attended a similar meeting at another agency.

BLM held a scoping meeting for Developing New Hardrock Mining Rules at the Best Western Executive Park Hotel, May 15, 1997. The meeting was attended by about 300 people and seemed to be equally split between people who knew the mining industry and those who did not.

Several Bureau of Land Management people met at the Department Offices to discuss their upcoming occupancy rules and several other programs being initiated by the BLM on Aug. 12, 1996. They have suggested help with a web site and funding its operation. As a result of this meeting the Director attended the first day of a three day school for BLM employees on these regulations. The classes were held at the BLM Phoenix Training Center and contact was made with other BLM offices by video conferencing via satellite. Several BLM employees would like for the Department to operate a Web Site to distribute this information on the Internet. They would also like for us to sponsor a minerals seminar at their training center. We may be able to work with them on some of their field examinations.

The Director and Ken Phillips have been in attendance at the BLM's Arizona Director's twice a year briefings. Attendees at these briefings are filled in on the BLM's proposed activities for the next six months. Items on the agenda included BLM's new occupancy rules, Wild and Scenic Rivers, Phelps Dodge Land Exchanges and exchanges for the Planet Ranch. One question asked at the meetings was how BLM intended to enforce some of the new regulations. Other matters discussed were the 3809 Surface Management Regulations, The Barry Goldwater Range renewal, Saguaro National Park Exchange, Southwest Willow Flycatcher, Fire Management Planning Process and the Resource Advisor Council.

## OTHER DUTIES

*Oppose congressional acts favoring reciprocal or duty free imports of foreign minerals and use its authority in other ways to assist in more extensive exploration and development of the mineral resources of the state.*

The Department has not opposed any of these acts this year.

## BOARD OF GOVERNORS

*A board of governors was established by § 27-103 to consist of five members who shall be appointed by the governor. The term of each member shall be five years, one term to expire January 31 each year. Upon expiration of the term of a member a successor shall be appointed for a full term of five years. A member may continue to serve until a successor is appointed and qualified. Appointment to fill a vacancy resulting other than from expiration of term shall be for the unexpired portion of the term only. Members of the board shall receive no compensation for their services.*

*The officers of the board shall be a chairman, vice-chairman, and secretary who shall be selected and appointed by the board. The office of the board shall be maintained with the department's main office. Regular meetings of the board shall be held quarterly, and special meetings may be called by the chairman or a majority of the members.*

## BOARD OF GOVERNORS

William Miller, Chairman - Phoenix

Richard Oldham, V. Chairman -  
Quartzsite

Sydney Hoff-Hay, Secretary - Phoenix

Eric A. Nordhausen, Member - Tucson

Ken Bennett, Member - Phoenix

## BOARD MEETINGS

The Board of Governors for the Arizona Department of mines and Mineral Resources held regular meetings during each quarter as required. Board meetings were held at the Department on September, 20 and December 6<sup>th</sup> of 1996 and on March 14 and May 30 of 1997.

Sydney Hoff-Hay was appointed by Governor Fife Symington to fill the vacancy left by Roy Miller when his term expired at the end of 1996.

*The Duties and powers of the board are to:*

*Establish field offices as it deems necessary.*

*Prescribe the number of field and office assistants.*

*Formulate the program and policies of the department.*

*Adopt rules and regulations for government of the department.*

*Purchase necessary office equipment and rent or lease necessary office space.*

*Accept gifts, bequests or legacies of real or personal property, or any other contribution, financial or otherwise, for use in accordance with the direction of the donor, or, in the absence of an express direction, to be disposed of for the best interests of the state.*

## DONATIONS AND ACQUISITIONS

### LOWER DONATION

The Department has received a large collection of books, drawings, papers and drafting supplies from Mrs. James Lower. Mr. Lower, a retired Staff Engineer from Hecla Mining Company when they shut down the Lakeshore property in the late 1970's, made his home in Tempe. Prior to joining Hecla in 1956 he served in the United States Army in World War II as a Quartermaster for the Corps of Engineers in the Northern Pacific Theater and was then self employed until joining Hecla. With Hecla and for several years thereafter he

continued to design things to make mines and mills work well. Examples are the Lucky Friday crushing plant, a shaft mucking machine; the Mayflower concentrator and surface plant; regrind mills; the El Paso flotation plant at Lakeshore; tailings treatment plants for Wallace, Idaho; a series of sand fill systems; water doors for underground water control and a drift jumbo at the Star,

### BOOK DONATIONS

The Department received the donation of books from Harvey Smith, Jerry Haggard, Joe Arundale and the Estate of Stewart Towle. Some of these books were added to our library and some were sold to raise money to buy newer books.

### WINTERS DONATION

Wayne Winters willed the department two bound volumes of the Western Prospector and Miner and a collection of photographs of Arizona Mines that he took while he was publishing the WPM.

*Accept from the federal government or its agencies Moines made available to the state for the purposes of this article.*

*Enter into cooperative agreements with the federal government and its agencies or with any mining agency created by the law of any state for the purpose of carrying out this article.*

No new contracts were accepted

1996/97 FISCAL YEAR

SUMMARY OF INCOME AND EXPENDITURES

Appropriated Fund #1000

Appropriation	\$706,500
Expenses	<u>706,438</u>
Reverted	\$ 62

Mines and Mineral Resources Fund #3156

Balance Forward 7/1/96	76,011
Revenue	86,411
Expenses	<u>88,889</u>
Balance Forward 7/1/97	\$ 73,533

Printing Revolving Fund

Balance Forward 7/1/96	\$ 5,373
Revenue	8,816
Expenses	<u>8,007</u>
Balance Forward 7/1/97	\$ 6,182

## Mineral Resource

### MINING NEWS

#### Carlotta Gets EIS - Finally

After many frustrating years Cambior U.S.A.'s Carlotta property near Miami has been granted its EIS by the Forest Service. Permits from the Army Corps of Engineers and the Environmental Protection Agency are still needed before construction begins.

Carlotta, the first major new mine in Arizona in 20 years, is expected to produce 900 million pounds of copper and employ 300 workers. The mine will consist of 3 open pits and will process by heap-leach and SX-EW.

#### Cyprus Miami Expansion EIS

The Draft Environmental Impact Statement for the Cyprus Miami Leach Facility Expansion Project has been released by the Bureau of Land Management and the Tonto National Forest. The proposed actions would increase the life of the Cyprus Miami operations from 16 to 20 years depending on the alternatives selected.

The EIS calls for recovering as much of the identified resource as possible and operating in an economic manner. It will maintain the work force of approximately 950 people and continue to use the existing facilities. This property has been in production for nearly 90 years.

#### Mission Gets Preliminary APP

The Arizona Department of Environmental Quality has made formal notice that it intends to issue an individual Aquifer Protection Permit to Asarco's Mission No. 4 Tailings facility near Sahuarita, Arizona in Pima County. The facility is necessary for their mining operation and will receive tailings in slurry form from the Mission Complex concentrators. The capacity will be approximately 309 million tons and hold about 30 years of tailings.



Do you need this information in an alternative format? Please call the Department office at 255-3791.

#### Addwest Adds Reserves

Addwest Minerals International is listed on the Vancouver Stock Exchange through the reverse takeover of Alina International. In recent months it has increased its proven and possible gold resources at the Gold Road mine by 17 percent. This was the result of adding 77,000 tons of 0.27 opt gold ore to its total reserves of 556,000 tons grading 0.234 opt. At the current production rate of 40,000 oz per year this mine is an important contributor to Arizona's gold production. Cash operating costs for the operation are estimated at \$219 per oz of gold.

#### Silver Bell

Asarco, in its joint venture with Misui & Co., has completed the construction of its new \$70 million SX/EW operation at their Silver Bell Mine, 40 miles northwest of Tucson. The facility has a capacity of 36 million pounds of copper per year at an estimated cost of \$0.50 per pound and an expected life span of 30 years.

Silver Bell's history goes back to the 1700's when Spanish padres worked the area for silver. By the 1860s the site was in production. Asarco acquired Silver Bell in 1915, the company's first Arizona property.

#### NEW PUBLICATIONS

Circular No. 71, *Arizona Mining Update-1997*, K.A. Phillips, N.J. Niemuth, and D. Bain, Jan., 1997

Circular No. 59, *Mining Scams*, Revised, March, 1997

Circular No. 73, *Amendment to the BLM Surface Management Requirements*, March, 1997

Circular No. 74, *Arizona Gem Shows 1997-98*, Alice Rosenfeld

Circular No. 75, *Earth Science Clubs*, 1997-98, Alice Rosenfeld

Open File Report 97-15, *The Art of Making a Cabochon*, Walter Peck, Doug Duffy, Shirley Cote, April, 1997



## TSE Calls For Standards in Assays

After the Bre-X debacle destroyed a large portion of the junior resource company stock market and made raising capital for new mines and exploration almost impossible, the Toronto Stock Exchange and the Ontario Securities Commission have formed a task force to examine the need to set standards for mining and exploration companies. Hopefully this will result in an investment atmosphere that will prevent another Bre-X.

## Private Land Shrinking

Only 13 percent of the land in Arizona is privately owned according to the latest compilation by the Arizona Farm Bureau Federation. Previously it was held that 17 percent of Arizona was privately owned. This quantity has been degraded by the purchase of private property by the Heritage Fund for the Game and Fish Commission and the State Parks Board. The federal government also buys land for game refuges and tribal land settlements. Cities and municipalities also acquired private property in the dedication of parks, water retention basins and open space. Tax revenues are directly effected because of the loss in property and sales tax revenues from the land and the products they produce. Arizona's lands are held as follows:

Private	13%
Indian Reservations	27.2
BLM	19.5
Forest Service	15.3
State Lands	12.9
National Parks	4.2
Department of Defense	3.7
Fish & Wildlife	2.4
Other Public Lands	1.3

Arizona Farm Bureau News, May, 1997

## USA Gets Its Power From Coal

Electric power is the backbone of industrial activity in the United States, and coal is the backbone of electric power according to Richard Lawson, president of the National Mining Association. Approximately 55 percent of the electrical power produced in the United States comes from burning coal. World wide energy consumption is projected to reach 562 quadrillion Btu in 2015. Most of this will come from coal. Consumption is projected at 2.3 billion short tons over the next 20 years.

Mining Week May 12, 1997

## Amigos Annual Meeting

Asarco's Executive Vice President, Frank McAllister, was the keynote speaker at AMIGOS annual meeting at the Phoenix Zoo Pavilion on June 13th. Congressman John Shadegg was on hand to accept the fourth annual Copper Scissors Award for his work in Washington on behalf of taxpayers. Amigos' President Bob Humphrey of J.R. Kennedy Company passed the gavel to Lyn Thomas of Pioneer Equipment. Also recognized at the meeting was State Senate Majority Leader Mark Spitzer, Senate President Linda Burns, and House Speaker Don Aldridge. Another year of growth and expansion is expected for Amigos.

## National Science Olympiad

Susan Celestian, Curator of Education, was one of the event supervisors for the 1997 National Science Olympiad that took place at North Carolina State University in Raleigh, NC in May of this year. The annual event is a nation-wide competition for young scientists to showcase their achievements over the year. They compete in 28 events and 6 trial events. Susan supervised the fossil division. The Department is proud to have a staff member participate in this prestigious national event.

## Tailings to Construction Material?

Enviro-Crete Products of Phoenix may have a use for copper flotation mill tailings in the manufacture of aerated autoclaved concrete. Tailings are mixed with other ingredients and processed to make strong, light-weight cementitious blocks.

The process involves mixing, filling molds, and allowing chemical reactions to proceed such that raw materials swell to three times their original volume. The expanded mixture is then treated in an autoclave to make a hard foam-like block. The finished block's high porosity gives the material insulating properties. Its light weight reduces strength requirements for any supporting structures. Light weight and large block size improve the efficiency of construction labor. It can be cut with a saw, chopped with an ax, and will hold a nail. Electricians and plumbers can use a router to cut out channels for cables and plumbing. Typical housing applications will be stuccoed on the outside and dry walled on the inside. Svanholm International of Rhode Island has also announced plans to build an aerated autoclaved concrete block manufacturing plant in central Arizona.

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## ATTENTION CLAIMANTS

Mining claim rental fees are due in the Bureau of Land Management state office by

**August 31**

Claim holders owning part or all of 10 claims or less may qualify for a waiver from rental fees. Applications for the waiver are also due by the same date.

### BOARD OF GOVERNORS

**William J. Miller** -  
Phoenix - Chairman

**Richard Oldham** -  
Quartzsite - Vice Chair-  
man

**Sidney Hoff-Hay** -  
Phoenix - Secretary

**Eric A. Nordhausen** -  
Tucson -Member

**Ken C. Bennett** -  
Phoenix - Member

### STAFF

**H. Mason Coggin** -  
Director

**Ken A. Phillips** -  
Chief Engineer

**Nyal J. Niemuth** -  
Mining Engineer

**Ann Turney** - Admin-  
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**Diane Bain** - Editor

**Marianne Char-  
nauskas** - Secretary

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### Tour Guides

**Alice Rosenfeld**

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**Ann Baker**

**Doug Duffy**



Arizona Department of Mines & Mineral Resources  
1502 West Washington  
Phoenix, Arizona 85007

*Address Correction Requested*

## Mineral Resource

### MINING NEWS

#### Morenci Produces 1 Billion Pounds of Copper in 1996

Morenci mine, Greenlee County, set a new record of 1,019,308,593 pounds of copper in 1996 making it the largest copper producer in the United States. The production represents 56 percent of Phelps Dodge's total production, 27 percent of the US production, and 5 percent of the world's production. Congratulations Phelps Dodge.

#### Gold Institute Predicts 20% Increase in Gold Production

According to the Gold Institute, the worldwide demand for gold is at a historic high and currently 44 percent above the total annual production of the world's gold mines. Gold Institute President John Lutley claims that higher productivity and competitiveness has placed the United States gold producers in a position to capture an expanding share of the world market. His position was supported by a study from the University of Nevada's Natural Resource Industry Institute which forecasts a 20 percent increase in gold production over the next two years.

The study claims that there will be a resurgence in capital spending in that time frame and the US will bring approximately 43 million ounces of new reserves into production by 1999. Current US production exceeds 10 million ounces and approximately two-thirds of this total was produced by Nevada. Arizona's production has slipped well below 100,000 ounces per year as our major copper producers continue to switch to solvent extraction electro win methods. Arizona's gold production would show a significant increase if we could find an extraction method for gold and silver that would piggyback on the solvent extraction for copper.



Do you need this information in an alternative format? Please call the Department office at 255-3791.

Arizona Department of Mines & Mineral Resources, 1502 W. Washington, Phoenix, AZ 85007  
602-255-3791, toll-free in Arizona 1-800-446-4259  
H. Mason Coggin, Director

#### New Bonding Requirements on BLM Lands

On February 28, 1997, the Bureau of Land Management published a final rule in the Federal Register that amends the surface regulations to require bonding of all operations greater than casual use on BLM land.

In brief, the rule requires submission of or certification of financial guarantees to cover 100 percent of the cost of reclamation for all operations greater than casual use. The rule also requires that all bonds submitted directly to or certified to BLM be accompanied by a Professional Engineer's certification of reclamation costs.

Existing notices are affected if there is change in any of the activities described in the notice or if there is any surface disturbance not described in the notice.

For further information contact any BLM field office or the State Office at 222 North Central Ave., Phoenix, AZ 85004, phone 602-214-9200.

#### Supreme Court Softens ESA in Landmark Decision

In a unanimous decision in the case of *Bennet et al v. Plenert et al*, the Supreme Court ruled that parties with economic interests, such as ranchers, farmers, and developers, have standing and can sue and challenge measures taken to protect species under the Endangered Species Act (ESA). This landmark decision restricted the ability of Federal agencies to 'take' lands through the process of restriction. This law was previously interpreted by some agencies as a way to tie up lands to do a study on habitats of a species that may be placed on the protected, endangered, threatened or nearly threatened status list.



ARIZONA MINE DEVELOPMENT			
Mine/County	Commod.	Company	Activity
Bagdad/Yavapai	Cu	Cyprus	Major expansion program
Cochise/Cochise	Cu	Phelps Dodge	Drilling and feasibility
Carlotta/Gila	Cu	Carlotta	Permitting near completion, record of decision & final EIS expected soon
Copperstone UG/ La Paz	Au	Royal Oak	Drilling, 500,000 oz. reserve defined
Cyclopic/Mohave	Au	Nevada Pacific	Permitted, now seeking funding
Florence in-situ/Pinal	Cu	BHP	Permitting is near completion
Helvetia- Rosemont/Pima	Cu	Asarco	Initial applications for land exchange
Magma/Pinal	Cu	BHP	Idle, exploration drilling continuing
Mineral Park/ Mohave	Cu	Cyprus	In-situ leach pilot, possible sale
Mission/Pima	Cu	Asarco	New underground division
Mohave/Mohave	Au, Ag	Combined Metals	Carbon column recovery plant constructed in '95
Morenci/Greenlee	Cu	Phelps Dodge	Expanded cathode production; Land exchange approved by BLM
New Cornelia/Pima	Cu	Phelps Dodge	Additional drilling and engineering feasibility
Old Reliable-Am. Eagle/Pinal	Cu, Au	AMT	Favorable drill results
Oracle Ridge/Pima	Cu	Hibernia	Idle, possible sale
Pinto Valley/Gila	Cu	BHP	Major expansion permitted
Ray/Pinal	Cu	Asarco	Major expansion in progress
Safford-San Jaun/Graham	Cu	Phelps Dodge	Land exchange, permitting open pit leach SX-EW
San Manuel/Pinal	Cu	BHP	Lower K-orebody start up complete
San Manuel/Pinal	Cu	BHP	Oxide pit shut down in '95, in-situ leach continues
Sanchez/Graham	Cu	Phelps Dodge	Permitted in '95
Santa Cruz/Pinal	Cu	Asarco	In-situ leach program achieves pilot production
Silver Bell/Pima	Cu	Asarco	New SX-EW, production expected by mid-'97
Tohono/Pinal	Cu	Cyprus	Closing down? no reserves listed in Cyprus 1997 Form 10-K
United Verde/ Yavapai	Zn	Phelps Dodge and Cominco	21 million ton resource of 6.6% zinc
Yarnell/Yavapai	Au	Bema Gold	Permitting Au heap leach



### New Board Member Named

Sydney Hoff Hay has been appointed to the Department's Board of Governors by Governor Fife Symington. Hoff Hay is the owner of the association management and political consulting firm of Southwest Policy Group. She is also Executive Director of AMIGOS, a trade association of companies that supply the mining industry, President of the Lincoln Caucus, and Executive Director of the Arizona School Choice Trust.

Hoff Hay earned her Bachelor of Science degree Summa Cum Laude with honors from Kansas Newman College. She resides in Scottsdale with her husband, Dan and her son Andrew. Her hobbies include skiing, golf, travel, and her 1955 T-bird.

### Copperstone Drilling Program Complete

Royal Oak Mines has completed the second phase of its exploration drilling program at the Copperstone gold property in La Paz, County. The program was to test the extension of the deposit that was mined by Cyprus about five years back and to see if the property could support an underground mining operation. The drill results were satisfactory and indicate a vein 20 to 25 feet in width carrying values ranging from 0.20 to 1.55 oz per ton in gold. Current estimates describe approximately 500,000 ounces of gold with a potential for additional tonnage and grade. The deposit is hosted in a relatively untested brecciated limestone near the open pit.

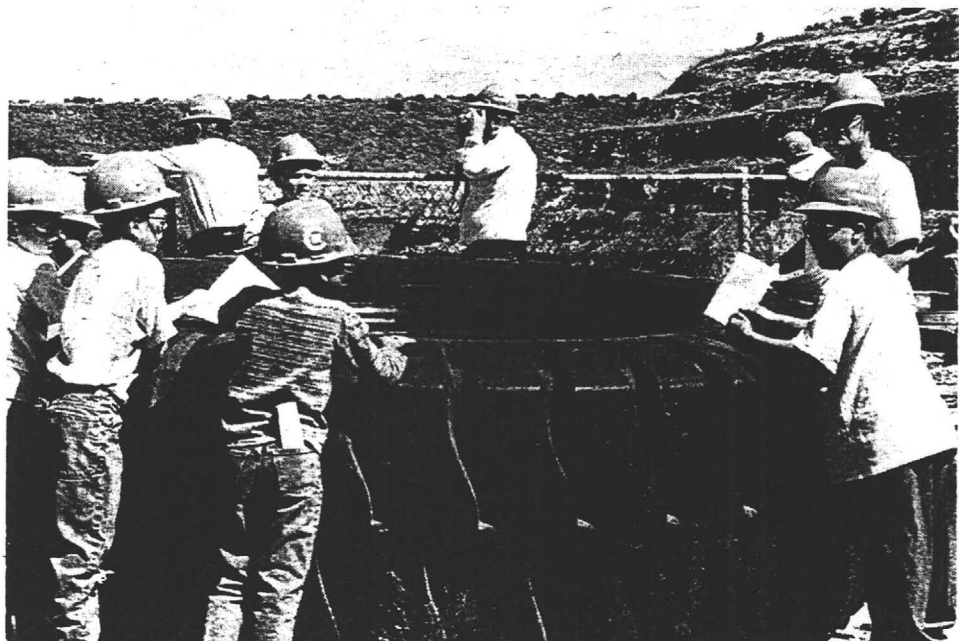
### Pinto Valley Expansion Permitted

A Decision Notice by the USDA, Forest Service reported finding no significant impact from BHP's planned expansion of the Pinto Valley operation in Gila County. This will add approximately 10 years to economic life of the Pinto Valley operation.

### AMT's Drilling Favorable at Copper Creek

Additional drilling at the Old Reliable and American Eagle properties in Copper Creek by AMT continues to show favorable results from a high grade (+1 percent) zone. This high and dry area may provide a source of quick return for the company if they decide to sink a decline on the property. They are continuing to drill in the area.

*Students from Litchfield Elementary School enjoy a field trip to Bagdad mine sponsored by the Museum and aided by a grant from the Arizona Mining Association.*





*Roy Miller, shown here with Polly Rosenbaum, is leaving the Department's Board of Governors after 10 years of service. Roy has been a tireless worker and a loyal friend to the Department and to the industry.*

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Arizona Department of Mines & Mineral Resources  
1502 West Washington  
Phoenix, Arizona 85007

*Address Correction Requested*

## Mineral Resource

### MINING NEWS

#### Hardrock Mining Reform

Frank Murkowski, (R-Alaska) Chair, Senate Energy Committee, is pushing a mining law reform for next year. The problem for the last several years has been caused by legislators bickering over whose policy will be followed. Phil Hocker, President, Mineral Policy Center, has already stated that his group will support only measures that include substantial royalties and insured reclamation. He claims this is not radical, but his unyielding position has been influential in preventing reform of the 1872 Mining Law. He has considerable support from Senators and Representatives in states without Federal lands.

#### Cyclopic Gold Mine Gets APP

The Arizona Department of Environmental Quality has issued authority for the Nevada Pacific Mining Company, Inc. to operate an open pit gold mining and hydrometallurgical precious metal leaching operation on properties located 19 miles northeast of Dolan Springs in Mohave County.

The proposed facility will consist of an open pit mine, crushing and agglomeration operations, a lined heap leach pad, pregnant solution pond, barren solution pond, process plant with cyanide tank, fuel tank farm, storm water conveyance channels, process solution ditches and process pipelines. Two phases of operations are planned to process 4.7 million tons of ore over a 4 to 6 year period. The ore will be stacked on the leach pads in 20 foot lifts to a height of approximately 100 feet and leached for 30 to 60 days with a dilute cyanide solution.

This operation will provide over 100 needed jobs in a portion of Mohave County that is badly depressed. It will also produce an important amount of gold and silver.

#### Morenci Land Exchange

An Environmental Impact Statement for the Morenci Land Exchange has been issued by the Bureau of Land Management. From reviewing the document it is apparent that a land exchange between Phelps Dodge and the BLM will have nothing but good effects for the environment and economy of Arizona.

The exchange will make very little difference in operations at the Morenci operation but it will put some of the sensitive lands along the Gila River back into the hands of the Federal government. It will also add to the Dos Cabezas Mountains Wilderness, (a potential source of gold and tungsten) and eliminate several inholdings.

#### Pinto Valley

The Arizona Department of Environmental Quality has approved the Aquifer Protection Permit for the BHP Pinto Valley operation between the mining camps of Superior and Miami, Arizona. This permit authorizes BHP to operate a pregnant leach solution and raffinate processing facilities, seepage/storm water retention facilities, surface run-on/run-off facilities, tailings impoundments and ponds, leach dumps, waste rock dumps, the concentrator area and ancillary facilities at the Pinto Valley operations.

The Pinto Valley operation employs over 620 and produced 189 million pounds of copper in 1995.

#### Explosive Stuff

Ammonium-nitrate based explosives used last year amounted to 2.24 million tons or 98 percent of the explosive consumption in the U.S. The mining of coal consumed about 65 percent of this total while metal and nonmetal mining accounted for only 25 percent. The rest was consumed by construction and miscellaneous uses.

Because of the use of ammonium-nitrate in terrorist bombings around the world, next year promises to bring more legislation controlling the production, distribution and use of this material. Expect fewer producers, higher prices and more red tape.



Do you need this information in an alternative format? Please call the Department office at 255-3791.



### Lower Donation

The Department has received a large collection of books, drawings, papers, and drafting supplies from Mrs. James Lower. James Lower was a retired staff engineer from Hecla Mining Company. With Hecla, and for several years thereafter, he designed things to make mines and mills work better. His designs included the flotation plant in Lakeshore and doors for underground water control.

### Phelps Dodge Plans to Reactivate Ajo

Although they did not foresee that it would happen, Phelps Dodge Corporation is apparently considering resumption of the Ajo operation. The mine closed in 1983 when the labor unions decided to strike in the middle of a depression in the copper industry. Since the mine was losing money at that time Phelps Dodge suspended operations.

In the following years Phelps Dodge sold off most of the equipment and dismantled and scrapped the mill and smelter. They realized however, that about 250,000,000 tons of potentially ore-grade material remained. Geology studies done in '94 and '95 were promising and the feasibility study conducted in '96 had favorable results. If the engineering study being done this year is also positive, they may start permitting and building a modern operation.

### Mining History Rendezvous

The Department is hosting a gathering of mining history enthusiasts, collectors, and dealers at the Arizona Mining and Mineral Museum on April 11 and 12. The event will include , demonstrations, artifact exhibits, dealer booths, and an auction.

Collectors can expect to find mining books, papers, maps, carbide lamps, miners' candles, photographs, scales, post cards, stock certificates, and other mining-related items for sale. Videos, slide presentations, and displays of mining artifacts will be featured.

The hours of the show are from 8:00 am until 5:00 pm on Friday, April 11 and 11:00 am until 5:00 pm on Saturday, April 12. Admission is free. Dealers contact: Paul Kouts, phone 602-789-8215, e-mail: plkouts@prime-net.com.

### EIS for Carlota

The Tonto National Forest anticipates the release of the final Environmental Impact Statement for the Carlota Copper Project, located 8 miles east of Miami, by early March of this year.

The mine, which is adjacent to BHP's Pinto Valley operation, will fill the gap in employment left when the Magma mine closed. The property consists of four ore bodies, Carlota, Cactus, and North and South Elder. Mineable reserves total 96 million tons grading 0.44 percent copper. Construction is planned to immediately follow permitting.

### Kayenta Permit Renewal Upheld

The Interior Department's Board of Land Appeals has decided that Peabody's Kayenta Mine permit was properly renewed and has overturned the decision made last March that would have shut down the Salt River Project Navajo Generating Plant.

The positive ruling reaffirms our faith in the eventual victory of science and technology over fear and superstition. If this power plant had been shut down by an environmental lawsuit it would only be a matter of time before Arizona would be having brown-outs and power shortages.

### Warren Pincock 1919 - 1996

by H. Mason Coggin

Kay Pincock passed away on November 21, 1996. He was one of many engineers who served in World War II and then took advantage of the GI Bill of Rights to study for a career in the minerals industry. I remember him starting his Arizona career when he joined the Copper Queen Branch of the Phelps Dodge Corporation in Bisbee, Arizona in 1947.

In 1968 Kay became an independent mining consultant and started the firm of Pincock, Allen and Holt in 1971. Pincock, Allen and Holt developed several new technologies for the mining industry in the areas of mine finance, slope stability and mine planning.

In his work and travels Kay made many good friends in the mining industry throughout the world.

## MUSEUM NEWS

### Coming Events

By popular demand, the Arizona Prospectors Association, in conjunction with the Museum, is sponsoring another **Prospectors' Day** on Saturday, February 27 from 11:00 am to 4:00pm. The event will feature hands-on activities for all ages including lapidary demonstrations and jewelry making opportunities. For a small fee, gold panning of 'salted' sand and metal detecting for coins will also be available. Admission is free.

The **Fifth Annual Minerals of Arizona Symposium** will be held Saturday, March 22, 8:00 am to 5:00pm at the Museum. The \$30.00 fee will include registration costs, program abstracts, and lunch and refreshments. Contact the Museum for more information.

### School Outreach

The Museum, with the support of the Arizona Mining Association, has initiated an outreach program at Litchfield Park Elementary School that emphasizes minerals and mining related subjects in the curriculum. Glenn Miller, Curator, and Susan Celestian, Education Curator, have spent many hours at teacher/parent training sessions.

Subjects covered at the training sessions include mineral identification, the copper mining process, and the importance of mineral resources to society.

These training sessions were followed by classroom visits and culminated in a field trip to the Gila River bottom. The field trip, involving 150 students, was a great success.

Further field trips, including one to the Cyprus Badgad mine, are planned for later in the year.

## ACTIVE MINES IN ARIZONA - 1997

The *Directory of Active Mines - 1997* (Directory 45) is now available from the Department. Arizona set an all-time record in copper production in 1995, producing 1.3 million tons valued at over \$3.6 billion. Arizona continues leading the nation in the production of copper as well as in total non-fuel mineral production. The value of all mineral output was \$4.48 billion, an increase of 24 percent over 1994.

Excluding sand and gravel, there are 113 active mines in Arizona producing 25 mineral commodities. The directory also lists 78 sand and gravel producers. More than 18,000 people were directly employed by the mining industry in Arizona last year.

The directory lists company name, corporate address, key personnel, mine, mill, or smelter location, commodities, number of employees, and a description of the operation.

Metal mines, non-metal mines (excluding sand and gravel), smelters, and company offices and plants are plotted on a 1:1,000,000 scale map that accompanies the publication. The directory is available from the Department office for \$5.00, or by mail for \$6.50.

### MINERAL PRODUCTION IN ARIZONA - 1995

COMMODITY	QUANTITY	VALUE
Clay	110,000	\$463,000
Copper (tons)	1,317,000	3,600,000,000
Gemstones		3,761,000
Gold (tr oz)	62,400	23,297,000
Sand & gravel	40,800,000	179,500,000
Silver (tr oz)	6,327,000	33,116,000
Stone-crushed (tons)	5,950,000	27,500,000
Pigments (tons)	85	62,000
Coal (tons)	13,000,000	310,178,000
Other <sup>1</sup>		309,178,000
<b>TOTAL</b>		<b>\$4,486,178,000</b>

Nonfuel figures from U.S. Geological Survey, preliminary.

1/ Cement, clays (bentonite), gypsum, lime, molybdenum, perlite, pumice, salt, sand & gravel (industrial), dimension stone, lead.

### **Wayne Winters, Miners' Publisher**

Wayne Winters, 81, of Tombstone died Saturday, December 7 at Sierra Vista.

Winters will be remembered for his fiery editorials in the *Tombstone Epitaph* and the *Western Prospector and Miner* that served the Southwest during the 1970s. He was fearless and dogmatic in reporting the activities of federal, state, and local governments that threatened to cramp the rights of miners. He was known as an antagonist by the Forest Service and the BLM, but most of the mining industry sympathized with the frustrations that ignited his editorial broadsides.

In addition to owning and editing western newspapers, Winters was an active small miner. He was a champion of miners' rights during a critical time and his passing has left a void.

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Arizona Department of Mines & Mineral Resources  
1502 West Washington  
Phoenix, Arizona 85007

*Address Correction Requested*



## Mineral Resource

### MINING

#### Occupancy on BLM Lands

On July 16, 1996, the Bureau of Land Management published new regulations governing the use and occupancy of lands under the 1872 Mining Law. The purpose of these regulations is to manage the use and occupancy of the public lands for the development of locatable mineral deposits. These regulations will prevent the abuse of the public lands while recognizing all valid rights and uses under the Mining Law of 1872. The new regulations apply only to BLM administered lands open to the operation of the mining laws where both the surface and mineral estates are in federal ownership. They do not apply to Forest Service or Park Service lands.

To legitimately occupy public lands under the Mining Law and these regulations, occupants must be engaged in activities which lead to, or are reasonably incident to, the extraction and beneficiation of minerals. Occupants must demonstrate substantial, regular work involving the use of appropriate equipment and produce observable on the ground changes. "Occupancy and use" includes full or part-time residency, the construction or presence of structures that could be used as a residence, the use of a watchmen or the construction of fences. Occupancies must be based on a need to provide public safety or protect property and appropriate equipment from theft or loss, or to allow workers to remain on-site at extremely isolated properties to work a full shift.

The regulations became effective August 15, 1996. Claimants or operators with existing occupancies who notify BLM by October 15, 1996 will be given until August 18, 1997 to comply with these regulations. Individuals currently facing trespass actions do not qualify for the extension.



Do you need this information in an alternative format? Please call the Department office at 255-3791.

BLM will review all proposed occupancies within 30 days. Appeals of the determination are made directly to the Interior Board of Land Appeals.

For further information contact: Ralph Costa, Mining engineer, Arizona State Office (602) 650-0349 or Denise Meridith, BLM State Director (602) 650-0500. (After October 29, see below)

#### Phelps Dodge Active in Safford

The Phelps Dodge Mining Company has formed a Safford District Team to prepare for development of the Dos Pobres/San Juan Project on patented lands about 12 miles north of Safford. The Safford office address is: 625 Main Street, Safford, AZ 85546, phone (520) 428-0205.

At these properties the company will develop open pit copper mines with a solvent extraction electrowin recovery system for copper. The program will be initiated this year with an Aquifer Protection Permit application with the Department of Environmental Quality and an independent feasibility study.

The Safford district probably represents the largest undeveloped resource of copper in North America.

#### Safford District Leach Resources

	millions of tons	Cu grade %
Dos Pobres	285	0.39
Lone Star	1,600	0.38
Sanchez	230	0.29
San Juan	270	0.28

#### BLM is Moving

The State Office of the Bureau of Land Management will be moving their office on October 29. The Public Room will be closed on October 28 and 29. Automated records will be unavailable from October 25 - 29.

Their new address is:

222 N. Central Avenue

Phoenix, AZ 85004-2208

New phone number (602) 417-9200.

### Phelps Dodge Sets World Record

On Sunday, May 26, 1996 Phelps Dodge's Morenci mine set a world record when they mined 1,327,800 tons of material in a 24-hour period. The previous record, set at Escondida in Chili, was bested by nearly a quarter of a million tons.

Although the attempt at setting the world record was deliberate and took planning and orchestration, the record was set in three normal shifts.

### Cyclopic Gold Mine

Nevada Pacific Mining Company, Inc. has passed the public notice phase for their Aquifer Protection Permit at the Cyclopic in Mohave County. The Cyclopic, first mined in the 1880s, produced over 13,000 oz/au in the early 1900s.

Nevada Pacific plans an open pit mine and hydrometallurgical precious metal leaching operation. The facility will mine and leach a low-grade ore that will be deposited in two phases on a heap leach pad. The pad has been designed to accommodate 4.7 million tons of ore. It is estimated that 750,000 tons of ore will be placed per year for a period of 4 to 6 years.



*Magma, #9 shaft. BHP's Magma Mine in Superior closed this summer. The mine produced 40 million pounds of copper in 1995.*

## BOOK REVIEW

### **Destination Tombstone, The Journal of a Prospector** by Marilyn Butler

Royal Spectrum Publishing, 1996, 132 pages, \$14.95

Introduction by Dr. James McBride.

The personal memoirs of Ed Schiefflin, discoverer of the Tombstone ore deposits, have been transcribed by his granddaughter, Marilyn Butler into a fascinating, readable text. Many photographs.

### **Arizona's Little-Known Gold Placers**

by Ronald S. Wielgus

ISBN 0-9635601-4-X

1996, 128 pages, \$22.95

This nontechnical, unpretentious book demonstrates that if you are diligent enough, you can find gold (colors at least) in many places in Arizona. Detailed descriptions and maps.

### **Mining Hall of Fame**

The 14th annual American Mining Hall of Fame Awards Banquet will be held by the Mining Foundation of the Southwest on Saturday, December 7 at Loews Ventana Canyon Resort in Tucson.

This year's inductees are Louis S. Cates of Phelps Dodge who was influential in early development of the open pit copper mine and Donald H. McLaughlin of Homestake Mining, an eminent gold mining spokesman. This year's featured speaker will be Richard de J. Osborne, Chairman and Chief Executive Officer of Asarco Incorporated.

Tickets are available from Clare A. Rosecoe, (520) 577-7519.

### **Tucson Area Residents**

The toll-free number listed for the Department in the Tucson telephone directory is incorrect. The correct number is 1-800-446-4259



## MUSEUM NEWS

### Gem Shows, Earth Science Clubs Circulars

Circular 68, *Arizona Gem Shows - 1996-97* and Circular 69, *Earth Science Clubs - 1996-97* are now available. *Arizona Gem Shows* lists the date, location, sponsoring group, and contact person for 27 Arizona gem and mineral shows this year. *Earth Science Clubs* lists rockhound, lapidary, and prospecting organizations that are active in Arizona.

Circulars 68 and 69 are available at the Museum or from the Department office. If ordering by mail please include \$.25 each for postage and handling.

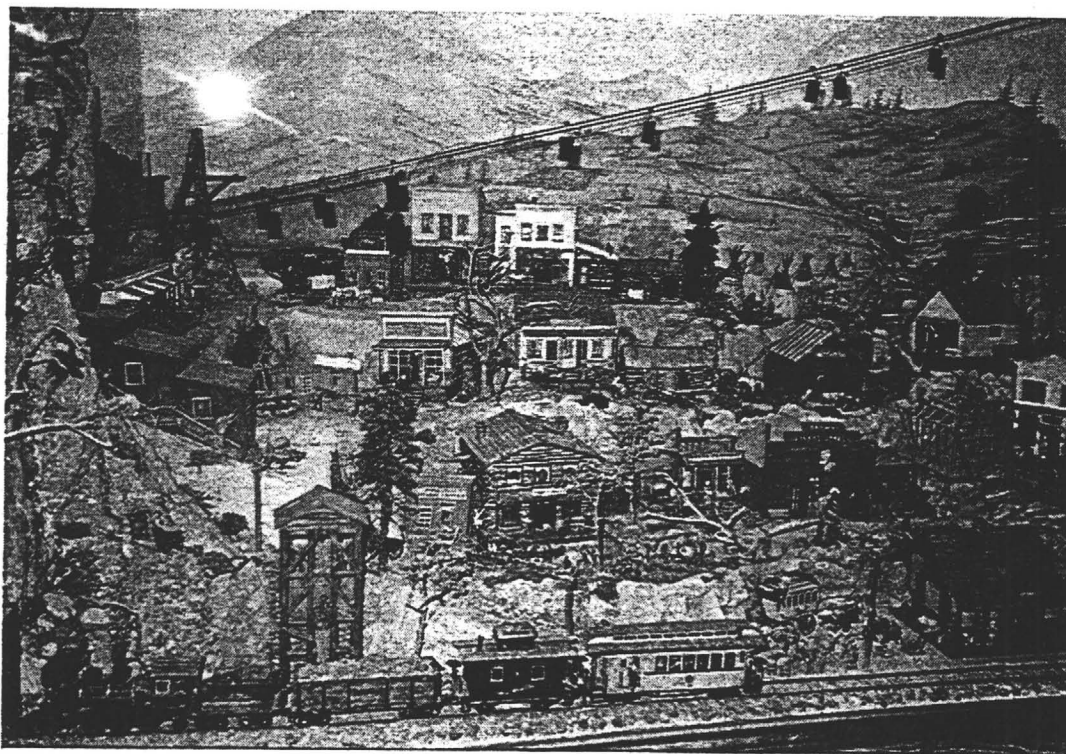
### Museum Family Day

The Arizona Mining and Mineral Museum, in conjunction with the Arizona Mineral and Mining Museum Foundation is hosting the Family Day and Gem and Mineral Show on Saturday, October 26 from 10:00 am to 4:00 pm at the Museum.

The Museum Foundation will be holding a mineral sale featuring minerals that have been in storage for the past 30 years. Local dealers will also be selling minerals. Jeff Scovil, internationally known mineral photographer will be available to sign his new book, *Photographing Minerals, Fossils, and Lapidary Materials* and demonstrating photographic techniques.

Fun, hands-on activities are planned for all ages. Museum volunteers will teach jewelry making and demonstrate lapidary techniques. Actors from the Screen Actors Guild will read stories at 10:30, 12:30 and 2:30. Admission and parking are free. Please join us for a great time.

### Updike Mining Town



If you have not yet seen the model mining town display, make a point to come upstairs on your next visit. Lisle Updike spent 8 years hand crafting each piece in the model from natural materials. Each human figure is comprised of 15 different pieces of wood; each horse of 18. Updike gained fame as the inventor of the semiautomatic photo machine (4 poses for a dime) in 1930 and helped develop the Polaroid camera in 1948.

### BLM Training Facility Available

If you can imagine the lecture room of the future you have a concept of the Bureau of Land Management's National Training Center at 9828 N. 31st Avenue in Phoenix. The main convention room can seat 225 people and allows them to break into smaller work groups. Each room is equipped with the latest high-tech audio-visual equipment. For instance, many of the rooms have Elmos, a video device that allows projection screen viewing of small objects. This is the finest facility of its type in the southwest and perhaps in the nation.

The BLM rents the rooms at reasonable rates. The large theater is \$450 per day, a 35-person classroom is \$170. They are also able to provide satellite teleconferencing, video filming and other services. For more information contact Larry Bauer at (602) 906-5527.

America's idle mine count is a mystery, as estimates vary from 2,500 to 560,000 sites on public and private lands depending on who is estimating and why.

E&MJ, 8/96

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