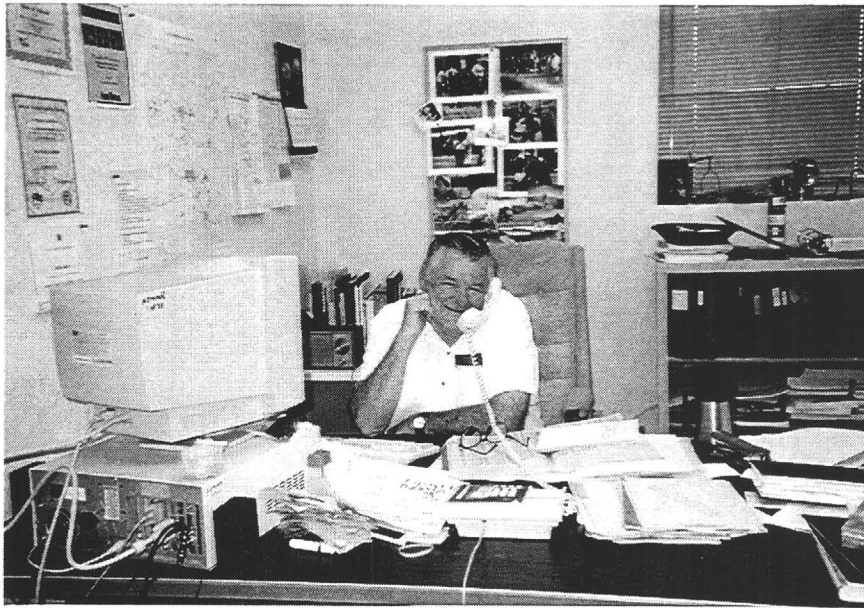




ARIZONA DEPARTMENT OF MINES & MINERAL RESOURCES

Annual Report 1995 - 96

LEADERSHIP



H. Mason Coggin was appointed director of ADMMR in August of 1993. Coggin is an Arizona native who worked his way through college as a mucker and miner in Bisbee. He received a B.S. in Mining Engineering from the University of Arizona in 1961.

He was senior vice president of mining for Coe and Van Loo Consulting Engineers from 1970 until 1981 when he started his own consulting firm.

Coggin is committed to the wise development of Arizona natural resources for the benefit and enrichment of mankind.

DEPARTMENT OF MINES AND MINERAL RESOURCES



57th ANNUAL REPORT FY1995/1996

by
H. Mason Coggin
Director



**STATE OF
ARIZONA**



STATE OF ARIZONA

DEPARTMENT OF MINES AND MINERAL RESOURCES
ARIZONA MINING AND MINERAL MUSEUM

Phone (602) 255-3795 1-800-446-4259 (IN ARIZONA ONLY)

FAX (602) 255-3777

July 10, 1996

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

Dear Governor Symington:

The Annual Report of the Arizona Department of Mines and Mineral Resources for the Fiscal Year of 1995/96 is herein submitted in compliance with A.R.S. Section 27-106.

The statutory directive of the Department of Mines and Mineral Resources is to promote the development of the state's mineral resources through technical and educational processes, to all interested parties for the purpose of improving the economy of Arizona and providing society with the raw materials to build and support a civilization. The Department accomplishes this directive through field contacts, public seminars, publications, holding conferences, displaying minerals and providing mining, metallurgical, marketing and other technical information and assistance to prospectors, operators of mines, the mineral industry, other governmental agencies and others interested in Arizona's mineral resources. In this effort the Department has designed and implemented a Strategic Plan and is committed to a Program of Excellence in Government.

The Department maintains a mineral museum that acts as the state's official repository for collecting, cataloging and displaying various ores, gemstones, lapidary material and other valuable mineral specimens. It also provides school children and others with a general understanding of society's need for minerals and mineral products. The Department also serves as a meeting place for seminars and gathering of people interested in minerals and mining.

The present staff consists of eight FTE's funded by the general fund, five part-time employees (funded by profits from Museum Gift Shop), and a dedicated group of volunteers provide quality service to the Department's patrons and visitors.

Arizona leads the nation in the production of nonfuel minerals. The value of this production in Arizona in calendar year 1995 was in excess of 4.177 billion dollars an increase of about \$400 million from 1994. Copper was the number one product, representing about two thirds of the U.S. production and 85% of Arizona's nonfuel mineral production. Revenues to the state and its legal subdivisions were over \$ 500 million dollars in direct taxes. The industry employed over 15,000 people directly and over 60,000 indirectly. Arizona copper mine reserves increased in 1994 despite the large tonnage that was taken by mining. Several mining companies announced plans to start new mines in Arizona or expand the production capabilities of operating properties.

Mined fuel production in Arizona was an important part of Arizona's contribution to the nations energy consumption. In 1995 Arizona produced 13,192,000 tons of coal and minor amounts of other fuels. Most of these fuels were used in Arizona to generate electricity.

Organizations claiming to support environmental preservation are trying to block every new mining operation and every expansion of existing operations in the state. They claim that mining is environmentally damaging and socially unacceptable. Misconceptions such as these can be remedied through public instruction. An informed and educated public will not voluntarily cut off its sources of supplies. The Department strives to inform the general public of mining's important contribution to their daily lives.

These programs are provided by the Mineral Resources Information Center and the Arizona Mining and Mineral Museum. Through these programs Arizona's school teachers, students and the public are provided with the information that they need to make intelligent decisions concerning our dependence on minerals, look for ways to bring new deposits on line and how to use their resources wisely.

Respectfully yours,

A handwritten signature in dark ink, appearing to read 'H. Mason Coggin', is written over a horizontal line.

H. Mason Coggin, Director

For the Board of Governors



This year's report showcases the Department's facilities. Above, 3 of the 17,824 children who enjoyed the Museum last year.

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95/96 FISCAL YEAR FINANCIAL STATEMENT

Appropriated Fund #1000

Appropriation	\$688,400.00
Expenditures	686,760.65
Reverted	1,639.35

Mines and Mineral Resources Fund #3156

Balance Forward 7/1/95	53,055.70
Store Sales and Donations	76,677.72
Expenditures	57,239.57
<hr/>	
Balance	73,603.96

Printing Revolving Fund #4004

Balance Forward 7/1/95	7,717.41
Publication Sales	11,899.60
Expenses	5,372.78
<hr/>	
Balance	14,244.23

PERSONNEL

Board of Governors

Ken C. Bennett
Chairman - Phoenix
Eric A. Nordhausen
Vice Chairman - Phoenix
Richard Oldham
Member - Quartzsite

Roy Miller
Member - Phoenix
William Miller
Secretary - Phoenix

Staff

H. Mason Coggin, Director
B.S., University of Arizona
Registered Mining Engineer, Registered Land Surveyor
Legislative liaison

Ken A. Phillips - Chief Engineer
B.S., Calif. State Polytechnic University
Industrial Minerals and Minor Metals
Commodity Market Research
Technical Writing

Nyal J. Niemuth -Mining Engineer
B.S., University of Wisconsin
Registered Geologist
Precious and Base Metals
Network Administrator
Technical writing

Glenn Miller - Museum Curator
B.A., University of Arizona
Museum management
Exhibits

Susan Celestian - Education Curator
B.A., Wittenburg, Univ. of Ohio
M.S. Northern Arizona University
Education, Museum field trips

Ann Turney - Administrative Assistant
Administration, Accounting, Budget officer
Operations Manager

Diane R. Bain - Clerk/Typist,
B.A., University of Arizona
M.A., University of Calif., Irvine
Editor
Technical Information Officer
Technical research

Marianne Charnauskas - Clerk/Typist
Publication sales, Clerical support
Accounting assistant

Part-time Employees*

Ann Baker - Tour Guide
Doug Duffy - Tour Guide
Joe McIntosh - Tour Guide
Jerry Myers - Tour Guide
Alice Rosenfeld - Tour Guide

* Non-appropriated funds

DEPARTMENT OF MINES AND MINERAL RESOURCES

STATUTORY ASSIGNMENT

The Arizona Department of Mines and Mineral Resources (ADMMR) is authorized by A.R.S. Section 27-101 to 27-110 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 the state.

For purposes of reporting, the Department is divided into two functions: the Mineral Resources Information Center and the Arizona Mining and Mineral Museum.

Mineral Information Center

Mineral Development

Arizona leads the nation in the production of nonfuel minerals. The value of this production in Arizona in calendar year 1995 was in excess of \$4.177 billion, an increase of about \$400 million from 1994. Copper was the number one product, representing about two thirds of the U.S. production and 85% of Arizona's nonfuel mineral production. Revenues to the state and its legal subdivisions were over \$500 million dollars in direct taxes. The industry employed over 15,000 people directly and over 60,000 indirectly. Several mining companies announced plans to start new mines in Arizona or expand the production capabilities of operating properties.

Fuel production in Arizona was an important part of Arizona's contribution to the nations energy consumption. In 1995 Arizona produced 13,192,000 tons of coal and minor amounts of other fuels. Most of these fuels were used in Arizona to generate electricity.

Public Inquiries

Inquiries from the public for information and assistance consume a large portion of staff time. The ADMMR technical staff responded to more than 15,000 requests for information and helped 4,160 visitors during the fiscal year. Appendix A on page 16 is a listing of some the mining companies that contacted ADMMR for information during that time.

Information requests generally fall into the following categories:

- ◆ determination of land status, mining law, and acquisition of mineral rights
- ◆ acquiring properties and purchasing mineral commodities
- ◆ researching mineralization and prior activity/history of mine sites
- ◆ concerns involving investments in mining companies and properties
- ◆ mining and mineral recovery technology
- ◆ assistance with permitting and regulatory functions
- ◆ prospecting and recreational gold panning

Advocacy

The Department maintains a proactive role in encouraging the development of Arizona's mineral resources. Short impromptu speeches, written statements, an identified presence, or attendance at meetings, conferences, and events took place in the last year. In each case we believe our involvement helped provide a favorable framework for development of Arizona's mineral resources. Appendix B, page 16, is a listing of some of the Department's advocacy activities.

Events

An *event* is a formalized and planned meeting of any group where the Department's presence will support Arizona's position as the most important mining state in the United States. The Department, through both its Information Center and Museum, plays an important function in the continuation and success of these organizations. Appendix C on page 18 is a listing of ADMMR events during the last fiscal year.

Speeches and Programs

Department personnel gave speeches during the year to a great variety of groups with interest in mining or minerals. A speech or program varies from an advocacy statement in that several days of preparation and perhaps a paper for publication has been written on the subject. Appendix D, on page 29, is a listing of programs presented by the Director or the Department staff.

Field Trips

The Department makes field trips to view the operations of proposed and existing mining operations or to review inactive operations to obtain information for the agency's mine files and AzMILS Database (Arizona Mineral

Industry Location System). Appendix E on page 20, is a listing of Department field trips.

Publications

The Department produced the following publications during the year.

1. *56th Annual Report of the Department of Mines and Minerals Resources.*
2. *Arizona Mineral Resource*, Vol. 10, 11, 12, 13. The Department newsletter is published quarterly to provide an overview of mining activity in the State, summarize and announce Department and Museum activity and report on any mining or mineral matters of interest to the industry or general public.
3. Directory 44, *Directory of Active Mines in Arizona - 1996*. An alphabetic listing giving company name, address, key personnel, mine name, and location. A separate listing of sand and gravel operations is included.
4. *Arizona Active Mines Map, 1996*. A 1:1,000,000 scale map showing the locations of the metal mines, industrial mineral mines, and mine offices and plants.
5. Circular 20, *Maps and Books for Arizona Gold and Gold Prospecting* - revision. Authors, titles, and publisher's names and addresses are provided.
6. Circular 62, *State Agencies Concerned with Mining and Mineral Resources in Arizona*, July, 1995.
7. Circular 63, *Reference Material List*. Department library holdings covering mines, mining, and recovery technology.
8. Circular 64, *Arizona Mining Update - 1996*. A review of current mining activity in Arizona. Includes gold, copper, uranium, gemstone, industrial mineral, and coal activity.
9. Circular 65, *Arizona Industrial Minerals and their Processing Methods*.

10. Circular 66, *County Agencies Concerned with Mining and Mineral Resources in Arizona*.
11. Circular 67, *Federal Agencies Concerned with Mining and Mineral Resources in Arizona*.
12. Circular 68, *Arizona Gem Shows*. Includes date, location, sponsoring group, and contact person.
13. Circular 69, *Earth Science Clubs*. Includes rockhound, lapidary, and prospecting organizations.

Outside Publications

1. Nyal Niemuth, *Exploration Activity in Arizona*, Mining Engineering April 1996
2. H. Mason Coggin, *The A.L. Flagg Photo Collection*, Mining History Journal 1996
3. H. Mason Coggin supplied maps for *Destination Tombstone*, *Journal of Prospector Edward Schieffelin Founder of Tombstone*, compiled by Marilyn Butler

Projects

The following projects were started or completed in FY 94-95.

Boras Headframe The Boras headframe, a gift of the Phelps Dodge Corporation was moved from Bisbee to Phoenix with the help of the Arizona Public Service Company in FY 94-95. In FY 95-96, with the continued support of APS and the State Historic Preservation Office the structure was erected at the Department facilities. Further work will place the mine hoist together with the other exhibits.

Mine Maps Volunteers continue to catalog and preserve the Department's extensive collection of mine maps. Information on each map is being included in a database that will be related to the Department's AzMILS database. The Department's mine map collection is an



The old Swallow stamp mill awaits assembly

important part of the agency's resources. About 1,000 maps have been cataloged and archived.

Mine File Collections The Department has received donations of mine reports and technical literature from the personal collections of Roland Mulchay, Grover Heinrichs, John E. Kinnison, and Richard Mieritz. Much of the sorting, cataloging, and archiving is being done by volunteers under the supervision of Department staff. Current plans are to maintain the files as individual collections and reference them to pertinent, specific Arizona mining properties in the Department's AZMILS database.

Photograph Collection. Cataloging is ongoing of the donated Flagg photograph collection and the Department photo archives by volunteers.

Phoenix North 30' x 60' Quadrangle.

The Department and Arizona Geological Survey are co-operating to produce several overlays to the recently completed Arizona Geological Survey's Phoenix North 30' x 60' map. The project should be completed during FY 1996/1997. It will provide metallogenic province information and mining history for an area that has largely been overlooked in the past.

Library

ADMMR's library includes the Arizona mine file collection and a reference library. The mine file collection consists of the AzMILS database with 10,500 records, about 4,000 hard copy files, and many thousands of mine maps. The files contain information about mine location, mineral content, size, assay and drill data, technical and economic production potential and bibliographies. This data is unique and by far the most-used portion of ADMMR's library. Newly developed information is added and additional files/records are created as new mineral occurrences are documented. Staffing/funding limitations contribute to a growing backlog of entries and limit the amount of literature abstracted and field work conducted.

The reference library contains an estimated 15,000 volumes that includes the publications of the ADMMR, mineral resource related publications and maps of the U.S. Geological Survey, the former U.S. Bureau of Mines, the Arizona Geological Survey, and other state and federal agencies. Also included are technical works covering economic geology, mining and mineral recovery methods, mining law, land reclamation, mining history, and commodity data. Current and historical collections of mining periodicals are also maintained.

Volunteers

Almost 2,000 volunteer hours were donated to the Mineral Resources Information Center last year. Current projects include cataloging and computerization of the Departments map files, cataloging the Departments photos, compiling mailing lists, filing books and papers, and indexing department files.

Dr. Ray Grant of Mesa Community College recently completed a 4-month sabbatical with the Department. The sabbatical provided the Department with the opportunity to further develop our Metallogenic Map. While here he offered a course in physical mineralogy for the staff and volunteers.



In the stacks at the ADMMR reference library.

Problems

During the last few years budget cuts and the resulting loss of personnel have caused the department to fall behind in many areas. With the help of one new FTE, along with a continued program of recruiting and training volunteers, a fund-raising program and improvements to strategic planning these shortfalls can be reduced or even eliminated in perhaps five or six years.

Some of the areas that need improvement are:

- Addition and validation of information to AZMILS database
- Abstract publications/theses for mineral resource information
- Provide current detailed permitting information and assistance
- Integrate data from closed Tucson office
- Catalog and index new collections
- Complete metallogenic map project
- Conduct industrial mineral market studies
- Write and publish publications on the following subjects:

- Gemstones
- Gold
- Copper Production History
- Gypsum
- Dimension Stone
- Industrial Mineral Consumption
- Directory of Exploration Companies
- Directory of Environmental Consultants
- Mineral Development Projects,
- Precious and Non Copper Base Metal Reserves

- Catalogue, organize, preserve, and index library
- Increase field investigations
- Conduct more seminars and speaking engagements
- Participate in more public meetings

Industry Trends

Insitu Mining

A research project involving Asarco and Freeport continues to test the insitu leaching of copper from the Santa Cruz deposit in Pinal County. BHP, (formerly Magma) announced in early 1996 that they plan a similar program for their Florence Project and will spend \$22 million over the next year for planning, permitting and feasibility studies.

The mining industry continues to be concerned about proposed legislation that would revise the federal mining law. Of special concerns are proposed royalties and tenure of title.

Magma Mine Closed in June

An outpouring of sympathy for the people who worked at Superior was generated by the local news media because BHP closed the Magma Mine in June. The operations at Superior had reached a point where it was uneconomical to mine for copper. This emotional coverage was proceeded by a much covered press conference by a small group who want to stop a new mine, Carlota, about 10 miles away. The new mine would employ about the same number of employees that were laid off at Superior

Bagdad Plans Expansion

The Bureau of Land Management has prepared a Draft Environmental Impact Statement on Cyprus Bagdad's proposed expansion that will extend the mine life to 35 years. This expansion will have a positive impact on the Arizona economy.

According to the document, the direct impact on the Arizona economy will be about \$198 billion in the purchase of goods and services. The income to Yavapai County from wages and salary is estimated at \$29.0 million per year or about \$1.1 billion for the life of the project.

Asarco Expansion at Ray

Spending \$10 million on its Ray Complex, Asarco plans to increase production, reduce costs and expand control of emissions by modernization of the Hayden concentrator and smelter. The mill was returned to its 28,000 TPD capacity in June of 1995 using equipment originally installed by Kennecott in the late 1950's. Emissions from the plant were reduced by several previous programs and will be reduced further through the installation of a bag house unit for the converters. Asarco plans to further clean their plant's emissions even though ongoing studies have concluded that their fugitive emissions represent no potential health problems to their workers or the community.

Silver Bell to Proceed with SX-EW

Asarco's construction of a new mining and solvent extraction-electrowinning (SX/EW) facility at Silver Bell has commenced. When completed the plant will produce approximately 18,000 tons of copper cathode per year at an estimated cost of \$0.50 per pound. Initial construction costs are estimated at \$70 million. The facility will be owned jointly by Asarco Incorporated and Mitsui & Co., Limited and will be called Silver Bell Mining L.L.C. Asarco will have a 75% interest in the project while Mitsui will have a 25% interest which it purchased for \$15 million and a proportionate share of funding for the construction. The new plant will operate under a unique and innovative BADCT from the Arizona Department of Environmental Quality.

Arizona # 3 in S & G

Arizona ranked third in sand and gravel production in the United States for the year 1994 and the first quarter of 1995. The second largest sand and gravel producer in the United States, Salt River Sand and Rock, is an Arizona company. The average value of

Arizona's sand and gravel is \$4.10 per ton and \$5.80 for crushed rock.

Holistic Reclamation

For years mining companies have been trying to promote plant growth on their tailings ponds with limited success. Now in a cooperative effort with several ranchers and farmers they are succeeding. After ore is crushed, ground and the valuable minerals recovered through flotation or other methods, whatever is left is ground rock. When Gary Jones of Cyprus Miami's Environmental Department started his Holistic Resource Management Plan (HRM) of using cattle grazing to effect reclamation he quickly covered the surface with lush green grass.

When feed is placed at the top of the tailings pile and water and salt on the bottom, the cows quickly fertilize, water and mulch the tailings into a fertile soil of organic composition.

Once established, grass roots, mulch, and organic matter further advance the growth of grass and the development of sod. Cyprus and other mining companies are currently extending the program to other areas.

Arizona Mining and Mineral Museum

The Arizona Mining and Mineral Museum serves as the state's depository for collecting, cataloging, and displaying mineral specimens of ores, gemstones, lapidary material, fossils and mining artifacts. The Museum collections are used as the tools to accomplish its mission. The mission is:

"To educate Arizona's citizens about our mining and mineral heritage and to demonstrate that minerals are the cornerstone of mankind's existence; that minerals have aesthetic value; and, that minerals have functional value."

Since moving into the Polly Rosenbaum Building in 1991, the Arizona Mining and Mineral Museum has provided activities and services to 156,132 visitors from around the world and all 50 states, including 60,626 school children. Over the same period, the Museum has provided services to the visually impaired, the hearing disabled, the mentally challenged, and other Americans with disabilities.

The Museum is staffed by a full-time

Curator, a Curator of Education, 5 part-time tour guides, and over 100 active volunteers. The part-time tour guide positions are funded with non-appropriated funds.

Museum Exhibits

The Arizona Mining and Mineral Museum maintains and exhibits over 3,100 mineral specimens in over one hundred display cases. Written interpretation identifies each specimen or explains each display. The mineral exhibits are supplemented with a number of mining related displays and photographs.

During this fiscal year 38,131 visitors toured the Museum exhibits.

New exhibits and improvements to existing exhibits were as follows:

- ◆ Significant improvements were made in Museum lighting
- ◆ A new display featuring private collectors was prepared
- ◆ Relabeling was completed for 5 cases
- ◆ New stands were built for the "Copper Pigs"
- ◆ A Denver Equipment Company mucking machine and an ore car from the Red



Arizona Mining & Mineral Museum, main floor.

Rover were painted and installed in front of the building.

- ◆ The headframe was erected in the outside exhibit yard on its footings.
- ◆ The meteorite was secured and stabilized
- ◆ Interpretive labels and white light cases were added to the fluorescent exhibit
- ◆ The mining artifacts exhibit was moved into a better case and relocated
- ◆ The "Polly Rosenbaum" exhibit was moved
- ◆ Fund-raising name bricks were set in-place
- ◆ A Fossil and Energy Resource exhibit is in preparation
- ◆ Three display cases were remodeled by the Mineral and Mining Museum Foundation

Outside Programs

In addition to its other functions, the Museum provides programs to mineral clubs and social organizations. In FY 1995-1996 the Museum gave the following programs:

- ◆ Rockhounds West, Sun City West, a presentation by Susan Celestian
- ◆ Physical Science Experience Day, Grand Canyon University
- ◆ Science Fair, Deer Valley School District
- ◆ Desert Sands Elementary School, *Minerals in Society*, by Glenn Miller to 5th graders at PS 222 New York, NY and 5th graders in Raleigh NC, by Glenn Miller
- ◆ Education Management Group Distance Learning program, *Rocks and Minerals: What are they? Where do we get them? and What do we do with them?* beamed to 5th graders at Crestview Elementary School, Indianapolis, 3rd and 4th graders

at Molina Elementary School, Camden, NJ, Glenn Miller

- ◆ Taft Elementary School, *Physical Properties of Minerals*, Susan Celestian and Glenn Miller
- ◆ Education Management Group Distance Learning program, *Rocks and Minerals*, by Glenn Miller
- ◆ Students at Heritage Square, Gold Panning
- ◆ Education Management Group Distance Learning program, *Museums: The Inside Story*, beamed live
- ◆ Aire Libre Elementary School, *Physical Properties of Minerals*, by Susan Celestian
- ◆ Cartwright School district 6th graders, *Physical Properties of Minerals*, by Glenn Miller
- ◆ Chauncy Ranch Camp near Cordes Jct., *Mineral ID*, by Glenn Miller
- ◆ Webster School, *Rocks/Minerals and How They are Used*, by Susan Celestian.
- ◆ Rocks, Minerals and Fossils competition at the Science Olympiad, Glendale Community College, Susan Celestian, supervisor and presenter.

Events

Events including those sponsored by the Museum and those sponsored by other organizations or agencies provide a direct benefit or exposure for the Museum and the Department. Events held in FY 95/96 included the following:

- ◆ Prospectors Association
- ◆ Prospectors Day sponsored by the Arizona City of Phoenix, Fabulous 4th "VIP Reception" and "Meet and Great" interviews

- ◆ Arizona Legislative Luncheon Arts Council
- ◆ Arizona Community College Association, legislative reception
- ◆ Arizona Department of Education, Poetry Judging
- ◆ Arizona Travel Industry Association, Tour of the Museum
- ◆ Minerals in Society Academy, Tour
- ◆ Mineral Educators Conference, Tour
- ◆ Earth Science Clubs Meetings
- ◆ Museum Advisory Committee Meetings
- ◆ Mineral and Mining Museum Foundation's, Annual Arizona Mineral Symposium and Sale

Special Programs

The Museum is working to develop and present programs to Americans with disabilities. During this fiscal year with the help of Jay Frankel, a hearing-impaired

volunteer, the Museum presented a program to multi-handicapped (wheelchair, emotional problems and physically disabled) students from the Phoenix Day School for the Deaf, and programs to two groups of middle school students from the Phoenix Day School for the Deaf. In this program students, toured the Cyprus Bagdad Mine.

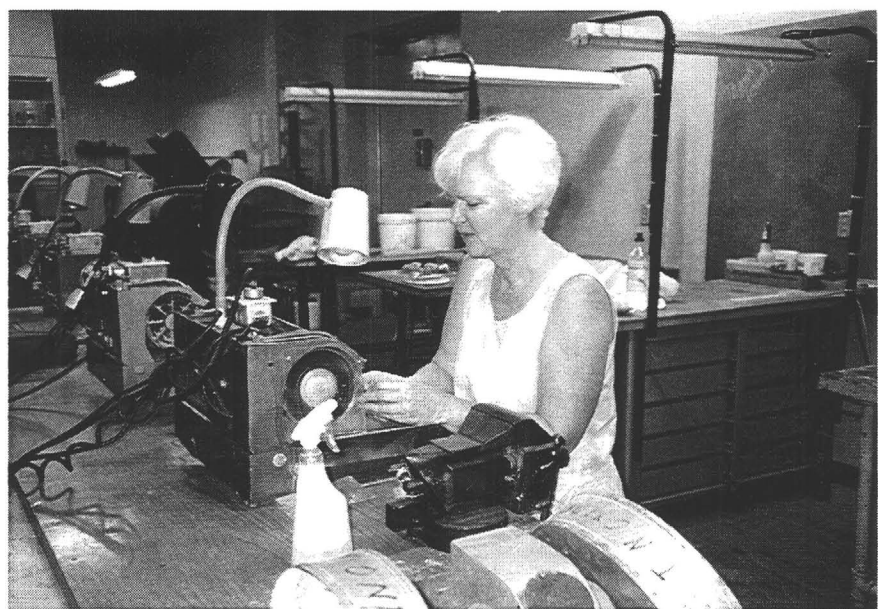
Over 600 Americans With Disabilities took advantage of the Museum's exhibits and self-guided tour.

Teacher-In-Service

Through its "Teacher-In-Service" program, the Museum provides training to elementary school, middle school, and high school teachers on a wide range of subjects relating to mining and mineral resources.

Through partnership with the Arizona Mining Association, the Museum Curator participated in the AMA Public Relations and Education Committee. The following programs were included:

Lapidary lessons are a popular feature at the Museum



- ◆ *Minerals in Society Academies*, Phoenix Academy was held June 9 -15, 1996 and the Tucson Academy will be held July 28 - August 2, 1996. Over 500 teachers from elementary schools, high schools and colleges, and universities throughout Arizona will participate in this program.
- ◆ *5th Annual National Minerals Education Conference* will be held in Scottsdale June 19 - 22, 1996.
- ◆ *Minerals in Society Partnership Field Trip Program* with trips to:
 - ◇ Bisbee
 - ◇ Kayenta Peabody Western Coal Company
 - ◇ Cyprus Sierrita Mine
 - ◇ Salt River Rock
 - ◇ Cal Mat's ready mixed concrete batch plant
 - ◇ United Metro's asphaltic concrete facility
 - ◇ Magma's Pinto Valley Mine
 - ◇ Cyprus' Bagdad Mine
 - ◇ Asarco's Mission Complex
 - ◇ Asarco's Ray Complex
 - ◇ Magma's San Manuel facility
- ◆ A tour of the Museum with 50 teachers as part of a *Minerals in Society* field trip.
- ◆ The Curator worked with Lee Groberg of Groberg Communications. Mr. Groberg is making a video for 4th to 8th graders about mining and minerals.
- ◆ *Enriching Opportunities for Arizona Educators 1995-1996*
- ◆ *5th Annual National Minerals Education Conference* in Scottsdale June 19 - 22 1996.
- ◆ Chapman University, Phoenix, Arizona, 30 teachers attended the 4-hour in-service activities.
- ◆ Pendergast School District - Staff Development, Glendale, Arizona

Teacher Kits

During FY 1995/ 1996, 750 Teachers Kits were provided to K-12 teachers. Each kit contains approximately 50 minerals and a varieties of information regarding the minerals contained and the mining industry of Arizona. Also available are "Teacher Pacs" with grade-specific activities for use in the classroom.

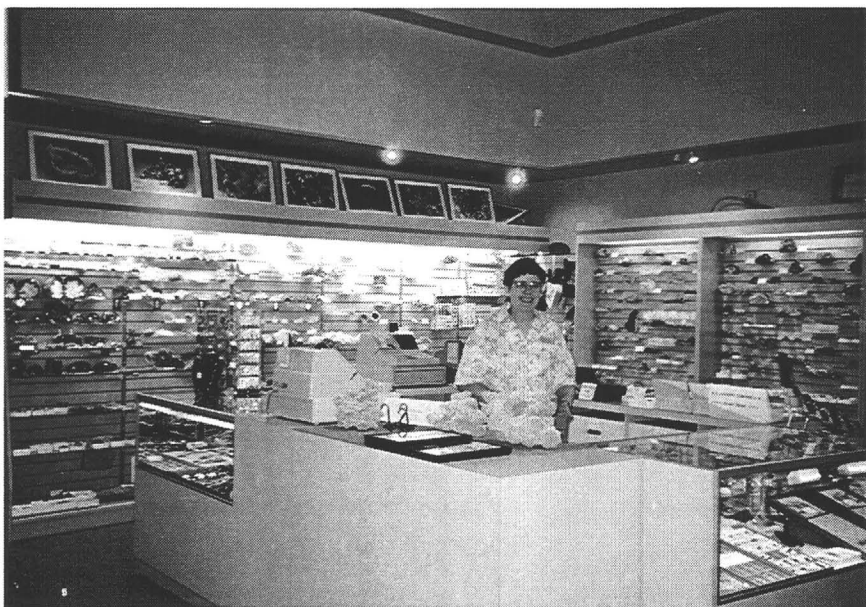
Production of the kits is volunteer-dependent. The minerals in the kits are donated and volunteers size the specimens, affix identification, and assemble the kits.

Student Education

Appendix G on page 21 is a listing of the school groups and organizations participating in formal tours at the Museum in the last fiscal year.

The student education program introduces students from pre-school through college to the world of mineral beauty and function. Students discover how minerals and mineral resources are a part of virtually every aspect of everyday life. The program is made up of the following components:

- ◆ An introductory film
- ◆ A show-and-tell-style talk on minerals and how they are used in everyday life
- ◆ A self-guided tour of the Museum
- ◆ A "Treasure Hunt" with questions
- ◆ Hands-on activities at various stations
- ◆ Demonstrations of lapidary, faceting, conductivity, crystal growing, wire wrapping, inlay and faceting
- ◆ Free specimens of Arizona rocks/minerals



The Museum gift shop.

Lapidary Shop

The lapidary shop provides instruction to interested people in the hobby of rockhounding and lapidary art and demonstrations on the Museum floor as part of the student education program. Shop monitors supervise the day-to-day operations of the shop and a shop supervisor oversees their work. During FY 1995 - 1996 the shop recorded 1248 of certified shop users volunteer time, and 50 items were produced for resale in the gift shop.

The shop supervisor offered 6 - 12 hour classes in cabochon-making and 26 people became certified in the lapidary arts.

Gift Shop

The Museum gift shop is an important extension of the Museum's education and exhibition program. It provides visitors the

opportunity to purchase mineral specimens from Arizona and around the world, items hand-crafted by Museum volunteers, books, and a wide variety of gift items.

Museum Gift Shop sales for 1995-1996 was \$52,095.77. Funds generated by gift sales are used to pay the part-time Museum staff and support other Museum programs. Additional shelving and counter space were added during the year.

Volunteer Program

Volunteers are the heart of the programs and services provided by the Museum. Since 1991, over 100 volunteers have given over 46,712 hours of their time to the Museum.

Museum volunteers are integral participants in all Museum activities and services. Some programs are staffed and managed entirely with volunteers. Volunteer activities include:

- ◆ Working in the lapidary shop
- ◆ Gift shop management and staffing
- ◆ Making jewelry to be sold in the gift shop
- ◆ Teachers' Kits numbering, assembly, mineral acquisition, and crushing
- ◆ Case cleaning, case maintenance, and lighting chores
- ◆ Exhibit interpretation
- ◆ Data entry for mineral computer catalog
- ◆ Reception

Arizona Public Service Partnership

The Department and the Museum have benefited greatly from the volunteers efforts of the Arizona Public Service Company. Through Charlie Connell and Sue Terrengino, employees of the Palo Verde Nuclear Power Plant, over 3,000 copies of the booklet *A Study collection of Rocks and Minerals* were printed.

APS also provided the hoists and transportation equipment to load and haul the stamp mill donations and the drills to construct the foundations for the Boras Headframe and the crane for the erection of the Boras Headframe.

Acquisitions and Donations

From July 1, 1995 through June 30, 1996 there were 117 Muesuem donations. Items not cataloged into the permanent collection were distributed to the gift shop, the educational collection, or the lapidary shop. Included in this year's donations were:

- ◆ a collection of 2,000 micro-mount specimens
- ◆ the workings for a ten stamp mill
- ◆ muckers and ore carts for the outdoor exhibit

Appendix A

Mining companies assisted by ADMMR in the FY

Airmetco
 Allied Stone
 American Girl Mining
 April Gold Inc.
 ASARCO
 ATL, Inc.
 AZCO Mining Inc.
 Badger Drilling
 BHP Copper Inc.
 Birch Development
 Black Canyon Resources
 Boulder Buster West
 Boush Mining Co.
 CACO Resources, inc.
 Calmat Companies
 Can Am Phoenix Minerals
 Canadian American
 Continental Energy Resources
 Corella Electric
 Corn & Ahern
 Cyprus
 D&M Mining Products
 D.J. exploration
 Del Tierra Engineering
 Desert Flower Mining LLC
 Desert Pacific Exploration
 Dunham's Minerals
 Eastern Driller's MFG.
 Energy Fuels
 Fayro Enterprises. Inc.
 Gibraltar Mines
 Gila Red Hills Mining
 Globe Miami Copper Zinc Corp.
 GPM Co.
 Grinnell Corp.
 GSA Resources, Inc.
 J&D Mining
 Kyna Tech, Inc.
 Kyrene de los Ninos PTO
 Industrial Minerals Division, Kerr-McGee Corp.
 Medhi Minerals Management
 Miller Resources
 Mineral Economics, Inc.
 Mineral Mountain Mining Co.
 Minpro, Inc.
 Motorola
 Nevada AGCO, Inc.
 New Mexico & Arizona Land Company
 North Mining Inc.

North Sea Mining
 Northland Research, Inc.
 Oglebay Norton
 Pacific Rainier, Inc.
 Peabody Western Coal Company
 Phelps Dodge Corporation
 Phelps Dodge, Morenci Division
 Provenance Resources
 Quadrangle Resources
 Red Bird Mining
 Revolver Mining Co.
 RJD Enterprises
 Robue River Resources
 Rothschild Fine Arts, inc.
 Summax Mines Ltd.
 Sunshine Mining Company
 Terracon Consultants Western Inc.
 Thatcher CO of AZ
 The Dial Corp.
 Treasure Chest
 United Desiccants
 US Machinery & Foundry
 Walsh Environmental
 Western Cultural Resource Management
 Wiley & Associates
 Wombat Mining & Exploration Co.
 Wordjina Res. Inst.
 Zenera

Appendix B

Advocacy Activity

- Joint display on Arizona's mining industry at the Arizona State Fair with the Arizona Mining Association
- Meeting with the Mineral Manager of the State Land Department
- American Institute of Mining Engineers Arizona Conference
- Weaver Mining District meetings in Yarnell and Congress
- People for the West meetings and demonstrations at Wes Boland Plaza
- Arizona Mine Locations with the Arizona Mine Inspectors Office.
- AMA Luncheon at Tucson. Also in attendance were former Directors Leroy Kissinger and John H. Jett
- GSPED Town Hall Meeting

- Bureau of Land Management briefing on agency's activity on Public Lands in Arizona.
- Mine Lands Hearing of the Senate Natural Resources Committee
- Arizona Council for the Arts Luncheon in the Museum
- Superior Companies "End of Summer" luncheon and company review.
- Formal Dedication of the Arizona Historical Society Museum in Tempe by Governor Symington
- Arizona Mining Association's Annual reception at the Phoenix Country Club
- Meeting with Dr. McBride from ASU to provide slides for his televised Arizona History Class from ASU
- Arizona State Senate's Committee on Natural Resources to discuss Mine Land reclamation
- Prospectors Day at the Museum
- Maricopa Lapidary Society's 47th Annual Treasurers of the Earth Show at N. Mtn. Preserve Park
- Conversation with Frank Brophy about the listing of the Tiger Salamander, the death of Jack Greenway and the publishing of his uncle's book on Isabella Greenway
- Phone conversation with Mrs. Dorre, Isabella Greenway's granddaughter. She has control of the manuscripts on Isabella Greenway.
- Maricopa Lapidary Society's 47th Annual Treasurers of the Earth Show
- Meeting with Director Rhodes of the AZ Dept. of Environmental Quality
- Arizona Senate Natural Resources Committee on H.B. 2473
- Discussions with Louis Galvao, CEO, United Universal Enterprises, Corp an import export broker about Arizona commodities that could be sold abroad
- Ken Phillips and Dan Eyde co-chaired the SME session on industrial minerals
- Ken Phillips and Susan Celestian have formed a new 4-H Geology, Minerals, and Arizona Mines Club that meets at the Museum
- Meeting with Gordon Rossiter, VP, Advanced Separation Technologies Inc. about a process to piggy back on SX/EW for copper that will recover gold and silver. This has the potential to recapture some of Arizona's lost gold and silver production
- Calypso at the Capital for State of Arizona employees
- Annual Flagg Mineral Show at Mesa Community College
- Arizona Historical Society Library Staff Reception
- Phoenix Corral of Westerners
- Arizona Commission on the Environment held several meetings of a balanced group of representatives from mining, ranching, and environmental groups to discuss changes to the Endangered Species Act. These meeting were discontinued when the Commission bill was vetoed by the governor
- MSA meeting, Les Presmyk on "Red Cloud Wulfenites"
- ESA Mining Team meeting at the Department
- Ken Phillips presented a program on the Industrial Minerals Industry of Arizona at the annual meeting of the Society of Mining Engineers in Phoenix
- The Director provided information to George Cole of Cominco, a major zinc producer, in San Francisco, CA about Magma Mine shutting down at the end of June and leaving about the 6 million tons of 4-6% zinc within 1000 feet of their present workings. Here is a mine staffed with 363 experienced employees, operating a 3300 TPD mill that can be converted to Zn. It is operating, permitted, and equipped
- Meeting with Arizona Mine Inspector and Guy Johnson, formerly of the U. S. Bureau of Mines, to discuss educational grants and work grants for several agencies
- AMIGOS meeting in Globe to honor the shakers and movers in People for the West
- Visited with Paul Johnson and others from Carlotá Copper at their Miami office
- Called on Ram Engineering in Miami. They provide services to the mining industry in the local area

- Called on Jay Spears and Tom Conto at Cyprus Miami
- Met with Florence Planning and Zoning agency and local officials to reviews plans for an areated concrete building block plant to be constructed north of the town

Appendix C

Events attended by the ADMMR staff during the fiscal year.

- ♦ Arizona Mine Emergency Association monthly board meetings in Phoenix, Tucson and Jerome, AZ
- ♦ Flagg Mineral Show at Mesa Community College
- ♦ Phoenix Gem and Mineral Show
- ♦ Arizona Historical Convention in Sierra Vista, AZ
- ♦ Fabulous 4th Celebration at the Department
- ♦ Arizona Geological Society in Tucson
- ♦ Executive Meeting of Maricopa American Institute of Mining Engineers
- ♦ Exhibits for State, Maricopa, and Pima Fairs
- ♦ Mineralogical Society of Arizona
- ♦ National Mining History Association
- ♦ American Institute of Mining Engineers Maricopa Section Monthly Meeting
- ♦ Arizona Humanities Council
- ♦ Mine Inspectors Meeting in Casa Grande
- ♦ Arizona Mining Hall of Fame in Tucson
- ♦ American Institute of Mining Engineers Arizona Conference in Tucson
- ♦ Arts Council Legislative Reception at the Museum
- ♦ Rockazona Gem and Mineral Show
- ♦ AZ Community Colleges Legislative Reception at the Museum
- ♦ Arizona Mining Association's Reception at the Phoenix Country Club
- ♦ Prospector's Day at the Museum
- ♦ "Car Made from Rocks" (Meeting with Polly Rosenbaum and a reporter from the Arizona Republic to discuss the project as a touring exhibit of the importance of minerals in society)
- ♦ Arizona Mineral Collectors in Tempe
- ♦ Arizona Mining Association's Spring Teachers Field Trip
- ♦ Boomtown Spree at Miami For mining competition
- ♦ Annual Society of Mining Engineers Meeting in Phoenix
- ♦ Mining and Mineral Museum Advisory Committee meetings
- ♦ ADMMR Museum, Arizona Mining Association and Arizona Rock Products Association Exhibit at Maricopa County Fair
- ♦ Arizona Mining Association Spring 1996 Teacher Field Trip to San Manuel underground, open pit, mill and smelter field trip
- ♦ Geological Survey Mineral Information Office (provided maps and data on mining operations and mineral resource potential)
- ♦ Opening of a new exhibit at the Gila Pueblo Museum.
- ♦ The Museum had a collection on display at the Tucson Gem and Mineral Show in Tucson
- ♦ The Museum provided a display for the Scottsdale Gem & Mineral Show
- ♦ The Director was introduced at the Bisbee 4th of July Mining Competition
- ♦ A public hearing to discuss the designation of the tiger salamander and an unusual lily as endangered species and their habitat along Sonoita Creek
- ♦ Yavapai Property Rights Coalition, "The Great Southwest Wise Land Use" conference in Prescott area
- ♦ Bisbee Gem and Mineral Show was loaned a special exhibit from the Museum
- ♦ First National Team Mining Competitions at the Arizona State Fair in conjunction with the Arizona Lottery,
- ♦ AMA, the Arizona Mine Inspector, AMIGOS and other organizations
- ♦ The Director spoke about mining history in Arizona to the Arizona Bat Conservation conference
- ♦ Department of Education's Poetry Judging was held at the Museum. The Director attended and participated in their awards ceremony
- ♦ Mining History Association (MHA) Annual Convention Rossland, B.C.
- ♦ Mining History Association Annual Convention Rossland, B.C.

Appendix D

Field Trips by ADMMR staff during the fiscal year

- Jerome to review the Little Daisy Headframe at Jerome State Park
- Field Trip to Bagdad for about 200 Arizona mineral collectors.
- Red Rover Mine, Maricopa County
- Shumway Mill and the Clay Throne mill near Payson in Gila County.
- Chocolate Rock Quarry north of Big Lake in Navajo County
- Robinson's Mining World in Yavapai County
- A basalt property near Wickenburg
- Weaver Mining District's at Congress Yavapai County
- Queen Ann property near the I-17 and Bumble Bee, Yavapai County.
- DeSoto Mine, Yavapai County
- Button Mine, Yavapai County
- Smith Brothers Mine on the Lower Minnehaha Creek Yavapai County.
- With Howard Thomas to the Sierra Stone Quarry, Navajo County
- With Lee Chartrand Arizona Picture Rock No. 2 and the Southwestern Stone Company at Taylor in Navajo County
- With Lee Chartrand Arizona Picture Rock No. 1 near Taylor in Navajo County
- Stone Container Biomass Water Reclamation Project Area at Big Lake
- Southwestern Stone's stone processing plant in Taylor
- Concho Creek Apache County diatomite prospect
- Superior Company's Camp Verde Plant, Yavapai County
- Hassayampa River placer mines from Oak Grove to the Box, Yavapai County.
- Golden Green Placer on the Tohono O'Odham Reservation
- New River Rock and Sand in Maricopa County
- Asarco's Silver Bell Mine in Pima County
- Bumble Bee Group of mining claims, Yavapai County
- United Verde slag at Cottonwood, Yavapai County
- Gold Tooth Mine and the Limestone quarry at Perkinsville, Yavapai County
- Phoenix Cement Company's plant in Clarkdale, Yavapai County
- Superior Companies Cherry Sand and Gravel Pit and Plant in Cottonwood
- Larson Gypsum Pit in the Verde Valley, Yavapai County
- Bimetals Mine, Yavapai County
- Coconino Cinder and Materials in Flagstaff, Coconino County
- Airemetco White Cliffs, Pinal County
- Union Rock and Sand's Pit and Plant on the Salt River, Maricopa County.
- Asarco's Ray Mine, Pinal County
- Harborlite Perlite plant at Superior, Pinal County
- Georgia Marble's Andrada and Davidison Quarries south of Tucson, Pima County
- Pantano Clay Mine, Pima County
- San Manuel, Pima County.
- 18 industrial mineral consumers in the El Paso and Southwestern New Mexico to find markets for Arizona industrial minerals.
- AMEA Board Meeting and mine tour at Gold Road Mine in Oatman Mohave County.
- Lodestar Steel's mini steel mill west of Kingman in Mohave County
- Combined Metals Reductions' gold and silver heap leach Mohave Project in Mohave County.
- Airemetco's Emerald Isle copper leach project in Mohave, County.

Appendix E

Speeches given by H. Mason Coggin and the Department staff during the fiscal year.

- ♦ Pinetop Lakeside Department of Parks and Reclamation, Mineral Resources in Society, Ken Phillips
- ♦ Maricopa County 4 H Camp at Mormon Lake, Mineral Resources in Society, Ken Phillips
- ♦ Governor's Open Space Committee, On the necessity of mineral deposit protection in the Open Space provision for the Lake Pleasant Area, H. Mason Coggin
- ♦ Fountain Hills Historical Society, Roots of the C&A, by H. Mason Coggin.
- ♦ Arizona Mine Safety Conference Casa Grande, Cutting the Rope, H. Mason Coggin
- ♦ Desert Palm Elementary, How Society Uses Minerals, H. Mason Coggin
- ♦ A reception for Howard Baker, President of the American Stock Exchange, Minerals in Society, Glenn Miller, H. Mason Coggin, and Ken Phillips
- ♦ Ms. McCutcheon's Science class at Connelly Middle School in Tempe, Minerals in Society, H. Mason Coggin
- ♦ Scottsdale Gem and Mineral Club, Roots of the C&A, H. Mason Coggin
- ♦ Arizona Mexico Commission, The Health of Arizona's Mining Industry, H. Mason Coggin
- ♦ Motorola Rockhounds, Miner's Houses, H. Mason Coggin
- ♦ Weaver Mining District, The Economic Impact of Mining on the State of Arizona. H. Mason Coggin
- ♦ Arizona Prospectors, Good Gold Bets in Arizona, H. Mason Coggin
- ♦ The Don's Club, Miner's Houses, H. Mason Coggin
- ♦ Cochise Gathering of Cowboy Poets, Cowboy Poetry, and Mining in the Coronado National Forest. H. Mason Coggin
- ♦ Rockhounds West, Gold Mining in Arizona, H. Mason Coggin
- ♦ First Families, Arizona Gold Mining Camps, H. Mason Coggin
- ♦ Mineralogical Society of Arizona, Miner's Houses, H. Mason Coggin

- ♦ Apache Junction Gem and Mineral Club, Mines Houses, H. Mason Coggin
- ♦ Oak Creek Gem and Mineral Society, The Arizona Mining and Mineral Museum, Glenn Miller
- ♦ Central Arizona College's Elderhostel at Kings Ranch, Arizona's Copper industry, From Boom to Bust and Resurgence, H. Mason Coggin
- ♦ History for lunch bunch at SHPO, Miner's Houses, H. Mason Coggin
- ♦ Kiwanas at Sun City West, "Miners Houses, H. Mason Coggin

Appendix F

Museum Traveling Exhibits

- American Federation of Mineralogical Societies, Oklahoma City, Oklahoma
- Apache Junction Rock and Gem Show, Phoenix, Arizona
- Arizona Senate Building, Phoenix, Arizona
- Arizona Mineralogical Society's, Gem and Mineral Show, Phoenix, AZ
- Bisbee Gem and Mineral Show, Bisbee, Arizona
- Maricopa County Fair, Phoenix, Arizona
- Mojave Middle School Library, Scottsdale, Arizona
- Painted Cliffs Welcome Center, Lupton, Arizona
- Phoenix Gem and Mineral Show, Phoenix, Arizona
- Phoenix Zoo - Photo Exhibit "Arizona's Minerals - Natures Art"
- Pima County Fair, Tucson, Arizona
- The Arizona State Fair in Partnership with AMA
- Tucson Gem and Mineral Show, Tucson, Arizona
- Turquoise on loan to California State University

Appendix G

School Groups and Organizations touring the Museum in FY 1995-96

4-H Mineral Club
ABC Alternative
Adobe West
Advantage Learning Center

American Child Care Center
 American Lutheran Preschool
 Amigo Preschool
 Andalusia Elementary
 Anderson Elementary
 Arizona Travel Industry
 Arizona Treasure Unlimited
 Arroyo Elementary
 Avondale
 Avondale Elem. Project Excellence
 AZ City Gem & Mineral Soc.
 AZ State Hospital
 Aztec Elementary
 Balsz School District
 Bellair Elementary
 Bennett Academy
 Bethune Elementary
 Bicentennial North Elementary
 Bicentennial South
 Brownie Troop 2085
 Burton Headstart
 C. Lincoln School
 Cartwright at Cordes Jct.
 Challenger Elementary
 Chandler YMCA
 Chaparral Elementary
 Chapman Univ. Teacher's Workshop
 Child Time
 Children's Campus
 Children's World Learning Center
 Childtime
 Christown YMCA
 Church group
 Cibola H.S.
 Citizen 2000 Elementary
 Clarendon Elementary
 Coe Elementary
 Cope Behavioral Services
 Creighton Elem.
 Crockett Elem.
 Cub Scouts Den 1
 Deer Valley H.S.
 Desert Cove Elem.
 Desert Springs Elementary
 Doorways
 Eagle Ridge Elementary
 St. Matthews Catholic School
 Edison Elementary
 Edu-Prize and Cherokee
 El Mirage Christian
 Elderhostel
 Emerson Elementary
 Emmanuel Lutheran School
 Estrella Jr. Hi

Evans Elementary
 First Baptist Church
 First Presbyterian
 Florence Elementary
 Garden Lakes Elementary
 Gila Bend Elementary
 Glen L. Downs Elementary
 Glendale Christian
 Glendale Community College
 Glendale High School
 Glendale Recreation Dept.
 Gold Dust Elem.
 Grace Christian
 Grand Canyon Elderhostel
 GS Troop 1367
 Guiding Light School
 Herera Schools
 Heritage Elementary
 Heritage Southwest High
 Hillcrest Middle School
 Home Schooling
 Humphrey Elementary
 Indian Bend Elementary
 Ironwood
 Isaac Jr. Hi
 Issac Junior High
 John Jacobs
 Kennedy House
 Khalsa Montessori School
 Kids Camp -- Campfire Council
 Kindercare
 Kingswood Elementary
 Knox Elementary
 Kyrene de los Ninos Elementary
 Kyrene Elementary
 La Petite Academy
 Lagos Elementary
 Laguna Elem.
 LaPetite Academy
 Lee Kornegay Middle School
 Light of Life Christian
 Littleton Elementary
 Loma Linda Elementary
 Longview Elementary
 Madison Meadows School
 Madison Park Elementary
 Madison Rose Lane School
 Marc Center
 Maricopa Elementary
 Maricopa Middle School
 Martin Luther School
 McClintock H.S.
 Mensendick Elementary
 Mercury Mine Elem.

Mercury Mine School
 Mineral Educators Conference.
 Mission Christian School
 Mitchell Elementary
 Montessori Schools
 Mt. Vista School
 Murphy Headstart
 Nevitt
 Northwest Community Christian School
 Oasis Elementary
 Our Lady of Mt. Carmel School
 Palomino Elementary
 Papago Elementary
 Paradise Mt. Christian Academy
 Paradise Valley UMC
 Peoria Elementary
 Peralta Elementary
 Phoenix Children's Hospital
 Phoenix Country Day School
 Phoenix Gymnastics Academy
 Phoenix Preparatory Academy
 Phoenix School for the Deaf
 Pilgrim Elementary
 Pioneer Elementary
 Porter
 Queen Creek Elementary
 Red Mt. Ranch Elementary
 Richard E. Miller Elementary
 Rosa Linda Elementary
 Sahuaro Elementary
 San Manuel
 Scottsdale- YMCA Webelos Pack 212
 Sequoya Elementary
 Sevilla Elementary
 Sierra Vista Elementary
 Sistine Elementary
 Smith Elementary
 Solomon Schechter
 Southwest Education Center
 Spitalny Elementary
 St Gregory's
 St. Agnes
 Sundance Elementary
 Sunflower Elementary
 Sunrise Preschool
 Sunset Elementary
 Surprise Elementary
 Sweetwater Elementary
 Taxon Elementary
 Tempe Christian School
 Tempe Montessori
 Tempe School District
 Tesseract Elementary
 Toltec School

Touchstone
 Touchstone Charter School
 Trevor Browne H.S.
 USI Teachers
 VA Medical Center
 Valley Cathedral School
 Valley View
 Villa de Paz
 Watering Hole Child Care Center
 Webelos
 Webelos Pack 192
 Webelos Pack 261
 Webelos Pack 262
 Webelos Pack 329
 Webelos Pack 461
 Webelos Pack 540
 Webelos Pack 545
 Webelos Pack 606
 Webelos Pack 756
 Webster Elementary
 Whispering Winds Elementary
 Wilson Elementary
 Wood School
 YMCA
 Zito Elementary
 Zuni Elementary



Mineral Resource

MINING

Hit it! Hit it!

The National Mining Team Competition to be held at the Arizona State Fair this year will be hosted by the Arizona Department of Mines and Mineral Resources, the Arizona State Lottery, the Arizona Mine Inspector, AMIGOS and the Arizona Mining Association. The events slated for the competition will include machine drilling, hand mucking, spike driving, and hand drilling for a purse of nearly \$20,000. The event will start Friday, October 27 at 1:00 pm in the main arena. Charles Marshall, operator of a mine safety training program in Colorado, will promote the mining industry during his announcing.

Mining Legislation News

The National Mining Association reports in the October 10 *Mining News* that the House of Representatives recently voted 277-147 to send the Interior Department Appropriations Bill (H.R. 1977) back to the conference committee, with instructions to continue the patent moratorium contained in the House version of H.R. 1977.

The Senate lifted the patent moratorium and included language in H.R. 1977 that would charge mining companies the fair market value of the surface. The conferees agreed to the Senate language.

Although House debate centered on the patent moratorium, other provisions in H.R. 1977 could be opened up for discussion in a new conference, including provisions to bar additional listings under the Endangered Species Act, merger of the National Biological Service into the U.S. Geological Survey, and the future of the Mojave National Preserve.

When the vote in the House was taken, 91 Republicans joined 185 Democrats and one independent to send H.R. 1977 back to conference. The vote echoes the House vote earlier this year to extend the patent moratorium.

Bagdad Proposes New Tailing and Waste Rock Storage

Cyprus Bagdad Copper Corporation has prepared a Draft Environmental Impact Statement on its proposed tailings and waste rock storage areas. These facilities will allow Bagdad to continue mining its ore deposit which is located on company-owned private property. This program will extend the mine life to 35 years and will have a positive impact to the Arizona economy. The impact is measured as follows:

IMPACT OF BAGDAD MINE ON ARIZONA ECONOMY		
	Per Year	Mine Life
Direct impact on Arizona economy	\$95.8 million	\$3.3 billion
Purchase of goods & services	56.7 million	198.0 billion
Personal income to Yavapai County	29.0 million	1.1 billion
State & local government revenues		
Severance tax	\$2,558,000	89,530,000
State property tax	281,000	9,835,000
County property tax	1,267,000	44,345,000
School property tax	2,931,000	102,585,000
Community college property tax	964,000	33,740,000
Other property tax	67,000	2,345,000
Sales taxes on purchases	1,800,000	63,000,000
State payroll tax	54,000	1,890,000
Motor vehicle license tax	10,000	350,000
Fuel tax	199,000	6,965,000
TOTAL	\$10,131,000	\$354,585,000

With the adoption of this proposal the projected production from the property will be increased to 3,660,000 tons of recoverable copper. Bagdad currently plans to continue present employment levels for the next 35 years.

New Fish and Wildlife Approach

About 100 people attended the Patagonia public hearing of the U.S. Fish and Wildlife Service on the proposed adding of one animal species, the Sonora tiger salamander, and two plant species, the Canelo Hills ladies-tresses and the Huachuca water umbel, to the list of endangered species. Under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544) these species may be

listed if they meet certain arbitrary criteria established by members of the U.S. Fish and Wildlife Service. The Fish and Wildlife Representatives at the meeting described each species, its habitat and the program that would preserve these species. This program will prohibit grazing, farming, mining, and surface and ground water diversion on lands now owned by local ranchers and farmers. No economic impact statement is required to explain how the land owners would be compensated for their loss through the taking of their property by federal agencies.

The Fish and Wildlife representatives warned the local residents that unless they treated the species as endangered now they would have to add the species to the endangered species list. The Nature Conservancy, with representatives at the meeting, has an interest in the area as they plan to greatly expand the San Pedro River Riparian Habitat.

Addwest Sells to Cornucopia

Cornucopia Resources plans to purchase Addwest Minerals for \$22.3 million. Addwest is the wholly owned subsidiary of Addington Resources and their biggest asset is the Gold Road Mine near Oatman, Arizona. Cornucopia Resources expects Gold Road to produce gold at a rate of 50,000 ounces per year by the end of 1995. A consulting firm calculated reserves of 518,000 tons averaging 0.3 opt in gold. Cornucopia expects to increase this reserve from identified resources. Addwest has constructed a 500 tpd mill on the property and is confident that they can produce at the 500 tpd rate. Cornucopia will pay \$7 million in cash and issue 6 million shares.

Magma Spends \$22 Million to Develop New Copper Reserves

According to a news release by Burgess Winter, Magma plans to develop a feasibility study for the Florence insitu mining operation, Miami's insitu leaching project, the Tintaya oxide leach, the Tintaya sulfide expansion and advanced stage exploration at Tintaya and Superior. They are planning work in Mexico, the US, Chile, Peru, and northeast Asia.

Yarnell Mining Submits Plan of Operations

Yarnell Mining Company, a wholly owned subsidiary of Bema Mining, has submitted a plan of operations to the Bureau of Land Management. This is the first in a series of permits required before the mine can be brought into operation. The proposed mine will be an open pit, heap-leach gold mine. The mine will bring a much needed source of income to the area and will provide jobs for about 100 people over its 7 to 10 years of life.

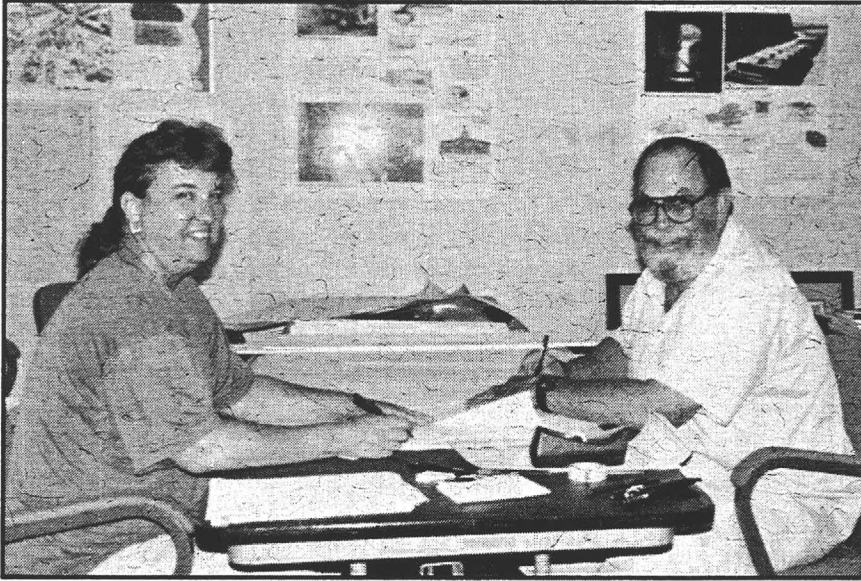
Holistic Reclamation

For years mining companies have been trying unsuccessfully to promote plant growth on their tailings ponds. Now in a cooperative effort with several ranchers and farmers they are succeeding. After ore is crushed, ground and the valuable minerals recovered through flotation or other methods what's left is barren crushed and ground rock. In the past large ponds of these tailing would grow nothing but dust. In spite of industry's best efforts to fertilize, water, and seed, this material would support life for only a short time and required constant attention. This all changed in 1989 when Gary Jones of Cyprus Miami's Environmental Department started his Holistic Resource Management Plan. In a unique opportunity to show the effect of cattle grazing against no treatment or other treatments, parts of the old Inspiration tailings were fenced and cattle allowed to feed over the steep slopes of the tailings ponds. Within a short period the cattle grazing areas were covered with a lush green grass.

In this operation hay is placed at the top of the tailings pile, water and salt are placed at the other end. The several varieties of hay contain large amounts of seeds that are eaten and passed through the rumen stomachs. These are successfully reseeded on the tailings surface by the cows in their natural foraging patterns. The cattle hooves are constantly working both seed and manure into the surface of the soil over these trails. The trail breaking also slows down rainfall runoff and checks erosion. Cycling the cattle to alternate areas allows the grass to recover in a greatly improved environment. Grazing the area in a regular pattern will strengthen the grass bonding and soil development. Cyprus is currently extending their Holistic Resource Management program to Sierrita and other areas.



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



Jean and Bill Manning, volunteers at the Department, are shown at their monumental task of cataloging and archiving the Department's map collection.

Babbitt Chooses "Rhetoric Over Reason"

Recent criticism of the mining industry by Interior Secretary Bruce Babbitt show "he continues to rely on rhetoric over reason and places politics over policy in his quest to drive the natural resources industries away from the United States," NMA President Richard L. Lawson said last week.

"Somehow, Secretary Babbitt has decided that the natural resources industries are working against the best interests of the American public. In his frenzy to tear down the industries that have built America, Bruce Babbitt chooses to ignore the facts, especially when he campaigns against the domestic mining industry," Lawson said.

Starting with a press conference on budget cuts last week in Washington, followed by a series of appearances in New York, Florida, Georgia, Michigan, Wisconsin and Missouri, Babbitt articulated a number of criticisms of the natural resources industry and bipartisan efforts in Congress to reform the U.S. mining law.

When Babbitt speaks of "giveaways" and "corporate welfare," Lawson says, "he ignores the hundreds of millions of tax dollars paid to local, state and federal governments by mining companies, he ignores the salaries paid to tens of thousands of miners, many working in rural communities where jobs are scarce; and he ignores the hundreds of millions of dollars invested to explore, permit and develop a mine and the hundreds of millions of dollars spent by mining companies to restore,

protect and improve the environment of the communities in which they operate.

From: Mining Week, Vol 1, Issue 33

BOOK REVIEW

MINERALOGY OF ARIZONA, Third Edition
John W. Anthony, Sidney A. Williams, Richard A. Bideaux, and Raymond W. Grant
ISBN 0-8165-1555-7
1995, 508 pages

At last! The eagerly-awaited *Mineralogy of Arizona*, completely revised and greatly expanded, is available. This handsome edition, like its predecessors published in 1977 and 1983, is the definitive source of information on Arizona minerals. The size of this exceptional work is more than double that of the first and second editions. Features include: • 61 stunning new color plates • 16 maps of Arizona mineral districts • expanded sections on porphyry-copper related deposits, Arizona meteorites, and uranium and vanadium deposits • new chapters on the history of Arizona mining and mineralogy, breccia pipes, and pegmatites. The new text includes 232 minerals that have been discovered in Arizona since release of the first edition, bringing the total number of minerals found in Arizona to 809.

Mineralogy of Arizona is essential for anyone interested in Arizona's minerals, from the novice to the professional geologist. It is available from bookstores or at the Museum.

Arizona Sand and Gravel Ranked Third

For 1994 and the first quarter of 1995, Arizona's sand and gravel production ranked third in the United States. For the same period Arizona's position in total construction aggregate (sand and gravel combined with crushed stone) production was eleventh in the United States. Salt River Sand and Rock, located in Maricopa County, is the nation's second largest producer of sand and gravel.

Arizona is fortunate to have large quantities of sand and gravel near consuming centers. Slightly over ninety percent of Arizona construction aggregate is produced from sand and gravel deposits. The remaining ten percent is produced from quarries where it must be drilled, loaded with explosives, blasted, and crushed and screened. The average value of Arizona's sand and gravel is \$4.10 per ton compared to \$5.80 per ton for crushed rock.

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

Mineral Resource

Mined Land Rules

The Arizona Mine Inspector has completed Draft 1 of the Proposed Arizona Mined Land Reclamation Rules to implement provisions of the Arizona Mined Land Reclamation Act. The rules were distributed at a meeting of the Legislature's Natural Resources Committee on September 19, 1995. At a December meeting it was determined that the Arizona Mine Inspectors Office was the agency to receive this assignment. No decision was made on how the program would be funded.

Uranium in the Arizona Strip

The Arizona Strip Bureau of Land Management District RMP/EIS has designated approximately 1,409,500 acres as open to mineral entry in the Vermillion Resource and Clear Water Point areas. These areas have potential for breccia pipe mineral deposits including uranium, copper, silver, gallium, and germanium. The most recent activity in the area was by Energy Fuels Nuclear, Inc. and Pathfinder Mines Corporation in the area west of Ryan Road and east of Kanab Creek. Most of the activity was centered around Pigeon Point, Gunsight Point, and Clear Water Point. Due largely to economic conditions, work in this area has been curtailed and large portions of the area are now open for staking. According to the BLM Environmental Assessment the release of desert bighorn sheep will not preclude energy and mining interests' exploration and development in the area.

Equipment Leasing Available Alternatives for Mines

The PFC group, a 16-year-old leasing and financial company offers several programs for mines and mills for qualifying companies. The company's local representatives are George Corfield, P.E. and mining consultant, and Lyn Caringer, PFC's Vice President of the Mining Division. PFC Group can be reached by phone at 602-371-3437 or fax at 602-371-3102.

Royal Oak Drilling at Copperstone

According to Dan Patch, owner of the Copperstone Mine, Royal Oak Resources has an agreement and is drilling on the property. Copperstone, in La Paz County, is Arizona's most recent gold producer. Reverse circulation drilling was done originally, followed by diamond drilling. Results have been favorable. Patch also owns the Goodman and the Jackpot mines in La Paz County.

Asarco Wants Feed

Asarco is looking for sources of gold-loaded carbon, precious metal scrap, precious metal-bearing slags, precious metal-bearing silica, CIP carbon, lead drosses, skims, etc. and all form of lead scrap except battery plates and paste, as well as crushed glass. For more information write Asarco's Ore Department at 180 Maiden Lane, New York, NY 10038, or call 212-510-2215.

Copper Exploration at Bisbee

Phelps Dodge has begun drilling in and around the Lavender Pit in Bisbee to determine how much copper ore remains around the operation that was suspended in 1973. The company plans to drill 25 holes in the immediate area. Company spokesman John Zamar explained that drilling a few holes does not necessarily mean that mining will be resumed.

There is still time to sign up for the *Prospecting for Profit in the 90's* seminar sponsored by the Department and the Superstition Mountain Treasure Hunters Association. It will be held on Saturday, January 20 and includes technical sessions, equipment demonstrations, and breakfast, lunch and steak dinner. Ron Feldman, historian and lecturer, will present his slide show on the Superstition Mountains during dinner. For more information call the Department or Elaine Schrader at 983-3481.

William C. Epler, 1922-1995

In October ~~mining~~ lost one of its great friends and reporters. Bill Epler, publisher and entrepreneur, has been the driving force of *Pay Dirt* and other publications of Copper Queen Publishing. Bill was the owner of this company since 1960. Epler studied journalism in Nevada, New Mexico, and California before settling in Arizona. He is survived by his wife Betty and a daughter, Nancy Sullivan of Tucson.

The Department is making a memorial to Bill by selling bricks for the Boras Headframe with Bill Epler's name on them. Interested parties should contact Mason Coggin at the Department.

Boras Headframe Foundations Poured

A team of volunteers, including the Arizona Public Service Company's Drill and Drillers, drilled the foundations and poured concrete for the Boras Headframe on December 20. Concrete for the project was paid for by donations, paving brick purchases, and a matching grant from the State Preservation Office. Foundations for the hoist are expected to be completed by the end of January. Department Director Mason Coggin hopes the headframe, one of the few surviving constructed entirely of wood, will be erected by the end of 1996. The Boras is a gift from the Phelps Dodge Corporation.

Atlas Corporation Options Arizona Property

Atlas Corporation of Denver has acquired an option on the Commonwealth project in Cochise County from the Harvest Gold Corporation, a privately held Denver mining company. An independent 1991 engineering report describes the property as a low waste to ore project amenable to open pit mining and heap leaching. The property includes a 1,280 acre land position that has been explored by 126 holes. The mineralization has not been fully defined. Terms include an initial payment of \$125,000 and a minimum exploration and development expenditure of \$425,000. In addition, Atlas will pay Harvest \$25/oz of contained gold based upon a revised reserve study. *From: Mining Record*

Kalahari Pushes Mexican Hat

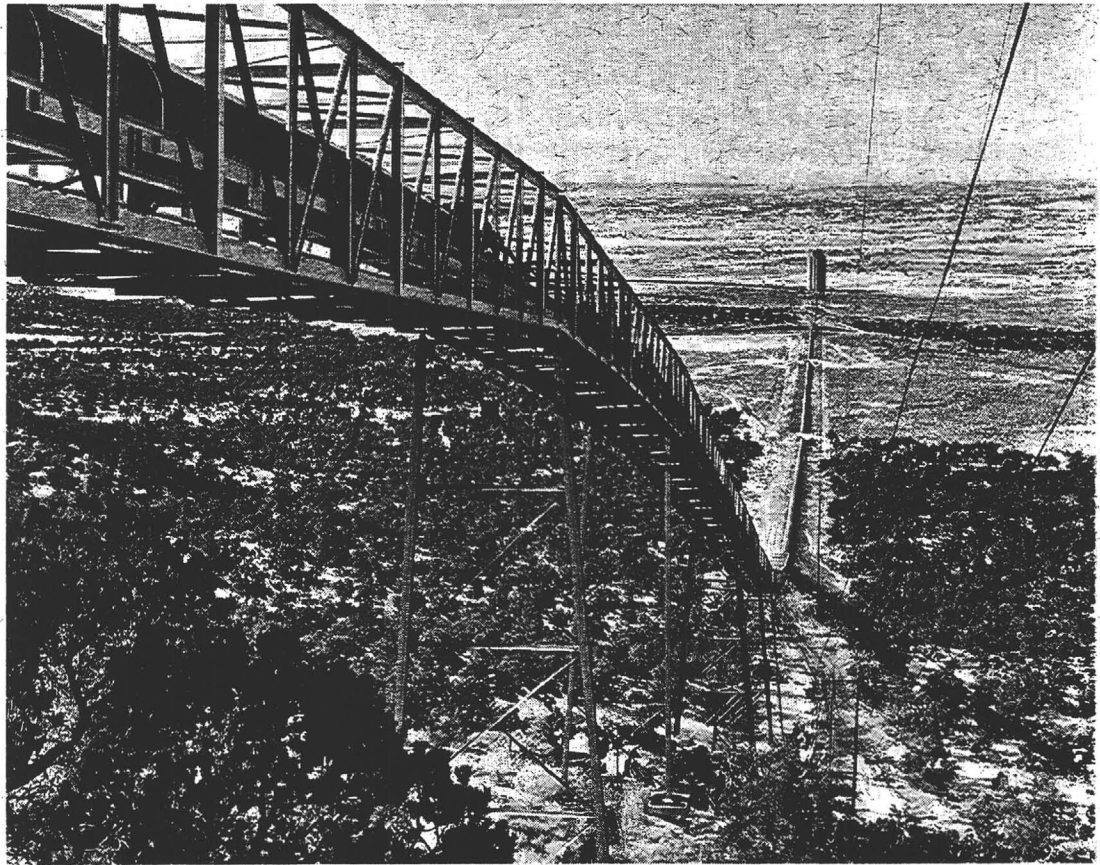
Recent activity on the Mexican Hat project in Cochise County is the outcome of a joint venture between Kalahari Resources and Oneida Resources both of Vancouver. Under the terms of Kalahari's agreement they can earn up to a 60 percent interest in the property by spending \$2.25 million and producing a feasibility study. Oneida last worked the property in a 1990 venture with Placer Dome. Dome blocked out 5.8 million tons grading 0.027 ounces per ton in gold. A 40,000 ft. reverse circulation drilling program is planned.

From: Northern Miner, Dec. 18, 1995



Director Mason Coggin and Dolan Ellis at the Department holiday gathering. Ellis, the Arizona State Balladeer, entertained about 150 appreciative guests.

*Coal conveyor at
Black Mesa.*



COAL PRODUCTION IN ARIZONA

Coal is second only to copper in economic importance of mineral commodities produced in the State. In 1994 Arizona's coal production was 12,901,000 short tons, having an estimated value of \$300 million. The high-quality coal is strip mined from the Kayenta and Black Mesa mines in central Navajo County. The coal is sub-bituminous with an average quality of 11,000 Btu, 0.5 percent sulfur, and 10 percent ash. All production is from land leased from the Navajo and Hopi Tribes by Peabody Western Coal Company. Indian royalties from coal production run about \$30 million annually. Peabody is the nation's largest coal producer and Kayenta is their largest operation.

Kayenta Mine's production capacity is 8 million tons annually. The coal from the mine is carried by a conveyor system 17 miles to storage silos. From there it is transported by the automated electric-powered trains of the Black Mesa & Lake Powell Railroad to the Salt River Project Navajo Generating Plant 78 miles away.

Black Mesa Mine's annual capacity is 4.5 million

tons. Here, the coal is powdered and mixed with water prior to transport by the world's longest coal-slurry pipeline. The 273-mile journey to the Mohave Generating Station at Laughlin, Nevada takes three days. Both mines are now using 300-ton capacity tractor trailer bottom-dump trucks to transport coal from the mine to the conveyors and pipeline feed plants.

The Peabody operations at Black Mesa are model reclamation programs. Mining and reclamation proceed at the same rate of approximately 500 acres annually. As an area is mined, the topsoil is removed and stored. After mining is completed, the topsoil is returned and the surface is contoured. The resultant reclaimed land, used for grazing, is more productive than the original land.



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

Minerals of Arizona Symposium

The fourth annual *Minerals of Arizona* symposium will be held on Saturday, March 23 from 8 am to 5 pm at the Museum. The highly popular symposium is sponsored by the Museum and the Arizona Mineral and Mining Museum Foundation. The \$30 registration fee includes admission to the talks, program abstracts, refreshments, and lunch. The authors of *Mineralogy of Arizona*, Third Edition, Sid Williams, Richard Bideaux, and Ray Grant, are among the featured speakers this year. Call the Museum for more information.

NOTE! Much of Arizona's gemshow season remains: February 2-11, Tyson Wells & Quartzsite Pow Wow; February 8-11, Tucson, Gem & Mineral Show; February 24, Prospectors Day (at the Museum); February 1-March 3, Phoenix Gem & Mineral Show; March 8-10, Scottsdale Gem & Mineral Show. Call for more information or for Circular 61, *Arizona Gem Shows*.

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Mineral Resource

MINING

Silver Bell to Construct SX-EW

Asarco has announced that construction of a new mining and solvent extraction-electrowinning (SX/EW) facility at Silver Bell will soon commence. When the eighteen-month-project is completed the plant will produce approximately 18,000 tons of copper cathode per year at an estimated cost of \$0.50 per pound. Initial construction costs are estimated at \$70 million.

The facility, to be owned jointly by Asarco Incorporated and Mitsui & Co. Limited, will be called Silver Bell Mining L.L.C. Asarco will have a 75 percent interest in the project while Mitsui will have a 25 percent interest that it purchased for \$15 million and a proportionate share of funding for the construction. The new plant will operate under a unique and innovative BADCT from the Arizona Department of Environmental Quality.

Silver Bell produced copper concentrates from 1954 until 1984 when mining and milling operations were suspended. The facility will produce copper from leaching and precipitation until the new plant is in service.

Black Marble Success Story

Occasionally a gold miner and prospector finds a deposit, other than gold, that has potential economic value. Such was the case of Pete Incardona when he started developing the black marble deposit that he found on his patented mining claims. The original mines on the claims produced gold, silver, and a little copper. The fine black and cream marble on the property marked the limits of the deposits. When Incardona and his wife started reworking the property for gold they found this marble to be beautiful and workable as a carving stone with unusual color. Their first success was to sell it as lapidary material since it cuts well and takes a high polish. The dense black marble can be carved with a file. The Incardonas now face the next problem - finding carvers who will sculpt the material into salable shapes. Then the process of distribution and marketing can begin. Presently, the \$1.00 per pound asked by the Incardonas will allow a great deal of room

MINERAL PRODUCTION IN ARIZONA - 1995

COMMODITY	QUANTITY	VALUE
Clay (tons)	110,000	\$463,000
Copper (tons)	1,317,000	3,600,000,000
Gemstones		3,761,000
Gold (tr. ounces)	62,400	23,297,000
Sand & gravel (tons)	40,800,000	179,500,000
Silver (tr. ounces)	6,327,000	33,116,000
Stone-crushed (tons)	5,950,000	27,500,000
Pigments (tons)	85	62,000
Coal ¹	13,000,000	310,000,000
Other ²		309,178,000
TOTAL		\$4,486,877,000

Non-fuel figures from U.S. Geological Survey (preliminary)

¹ Estimate based on first 6 months of year.

² Cement, clays (bentonite), gypsum, lime, molybdenum, perlite, pumice, salt, sand and gravel (industrial) and dimension stone.

for sculpting or distribution and selling of multi-thousand dollar art pieces. The Incardonas have a saw with a 36-inch capacity. If you are interested in rock sculpture, distribution, or selling this material, please call them at (520) 684-0517 or contact the Department.

Silver Eagle Acquires 3 R Property

Silver Eagle Resources Ltd., of Vancouver, BC has acquired three advanced stage mineral properties, a staff of executives, and a laboratory from Liximin of Tucson. The acquisition includes the Three R property consisting of 21 patented mining claims and 52 unpatented claims near Patagonia, 70 miles southeast of Tucson. The Three R has produced approximately 50,000 tons of copper ore averaging about 10 percent copper during the period 1909 to 1920. The six levels of the mine are estimated to contain a remaining 7.4 million pounds of copper that can be leached and electrowon.

U.S. Bureau of Mines Data to ADMMR

Over the past few months, as the U.S. Bureau of Mines has gone through the process of closing their offices, they have been sending the Department reference material that pertains to Arizona. We have received originals and unpublished reports as well as copies of the Forest Service Mineral Land Assessment Open File Reports of Coronado and Prescott National Forests.

Ray Grant Sabbatical

Dr. Raymond Grant has recently completed a 4-month sabbatical with the Arizona Department of Mines and Mineral Resources. The sabbatical provided the Department with an opportunity to further develop our Metallogenic Map series and produce an overlay for the Phoenix 1 x 2 degree map. While here he offered a course in physical mineralogy for the staff and volunteers. We will all miss Grant's geologic knowledge and mineral identification skills, as well as his enthusiasm and amiable personality.

\$100 Million Goes to Mexico Wollastonite

According to an article in the Arizona Republic on Jan. 9, 1996, Fording Coal Holdings, Inc. of Canada plans to start up the world's largest wollastonite deposit in Sonora, Mexico. The mine, mill and processing plants will be constructed near Hermosillo. Wollastonite, a fibrous mineral, is used to strengthen plastic castings to prevent them from deforming when heated by sunlight. It is used extensively in automobile dash boards, grills and other plastic items subjected to heat, and in many ceramics and coatings applications. Fording Coal's Mexican subsidiary, Minera NYCO S.A. de C.V., will produce about 240,000 tons of the wollastonite yearly once the mine and plant are completed. The mine and plant will employ about 300 locals initially. NYCO purchased the property three years ago and has had the property on a fast track ever since. The company has considered wollastonite projects in Canada, US, China, and Spain.

Arizona has several identified wollastonite occurrences. Notable among these are the ones in Cochise, Gila, Pima, and La Paz Counties. None of these are producing at the present time.



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

Mining Association Elects New President

Charles W. "Chuck" Shipley has been named President of the Arizona Mining Association replacing David C. Ridinger who retired in January. Ridinger has been AMA's president since 1987.

Shipley, who has served as Vice President of Public Affairs for the Arizona Chamber of Commerce since 1987, holds a bachelor of science degree in geography and planning from Northern Arizona University. Shipley is active in a variety of community organizations in the State including the United Way, Arizona Coalition for Tomorrow, and Arizona business Leadership for Education.

Discovery Park to Have Mining Pavilion

Discovery Park in Safford is being developed as a regional attraction for the Safford Area. Among other things, the park will feature a mining pavilion with exhibits on the mining history of Arizona and the Safford Area. Steve Eady from Phelps Dodge will head the Mining Pavilion Planning Committee.

Arizona Facts

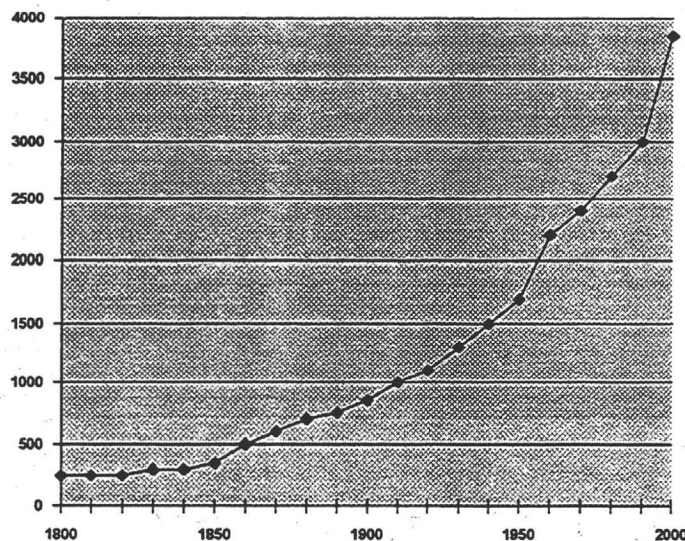
According to the Arizona Department of Commerce, the State of Arizona had a total population of 4,071,650 people in 1994. This is a growth of 34.3% in the last decade. The population of Maricopa County was 2,355,900. Phoenix alone had a population of 1,051,515 people. The average personal income for Arizona was \$19,119. Mining employed 0.69% directly, and paid an average of \$798 per week. The next highest paying employer was manufacturing at \$653 per week. The rest of the people in Arizona lived in, drove, bought, sold, insured, taxed, regulated, talked about, or otherwise used the things that were mined.

Arizona Strategic Minerals Publication Available

The Department is now offering *Principal Deposits of Strategic and Critical Minerals in Arizona*, a special publication of the U. S. Bureau of Mines. This publication provides location, geological and operational data for about 200 mineral deposits representing 16 commodities that are important to the economy of the United States. Each of these commodities is discussed in terms of its history, physical and chemical properties, uses, and occurrence in Arizona. The 334-page publication is available from ADMMR for \$15.00.

Historic Gold Production

Mil. oz.



The amount of gold produced in the world throughout the ages (projected to 2000) stands at about 3.8 billion ounces. Eighty-six percent of that total was mined since the turn of the century.

Estimated Disposition

- 1,309,000,000 oz - Jewelry, decorative, and religious items
- 424,000,000 oz - Industrial use, undetermined, or lost
- 905,000,000 oz - Central banks
- 898,000,000 oz - Private stocks
- 59,000,000 oz - C.I.S.

Source: Adapted from CPM Group data in *Northern Miner*

MUSEUM NOTES

International Museum Day

During May the Museum will be participating in the celebration of the 50th anniversary of International Museum Day. The Central Arizona Museum Association is offering a free brochure that features discounts to many museums in central Arizona. Call (602) 644-2468 for a discount brochure and a free CAMA brochure listing museums and their locations.

AMA Teaching Teachers

The Arizona Mining Association is sponsoring the national Minerals Education Conference, 1996, *Mining Minds - Minding Mines* to be held on June 19-22, 1996. The conference will be held at the Red Lion LaPosada Resort in Scottsdale. A registration fee of \$95.00 includes conference materials, continental breakfast and lunch daily and an evening reception and dinner.

Also in June, the Mining Association is sponsoring a *Minerals in Society* program from June 9-15. The free program will include hands-on activities, field trips, and more. Academic credit is available for both of these events. For information on either program, contact Larry McBiles, Minerals Ed 96 Conference Chairman at (602) 266-4416.

Museum and Department Productivity

Museum attendance increased significantly the last calendar year, from 32,339 to 38,241. This figure included included 16,973 students.

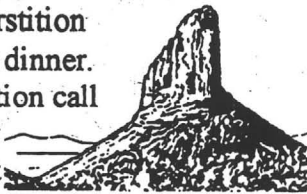
For the first two quarters of fiscal year 95/96 the Department has handled over 25,383 incoming telephone calls and made over 8431 outgoing calls. During that same period of time we have shipped out over 1171 publications or copies of file information and had over 876 visitors. In those six months we have accessed 3,588 files and made corrections, added information, or made changes to the MILS indexes.

Thomas Cleator, 1924-1996

The end of an era in Arizona pioneer history is marked with the passing of Tommy Cleator. He was mayor of the town on the Bradshaw Mountain Railroad where his father, James P. Cleator, had been assigned as Postmaster in 1918. Originally called Turkey, it later became known as Cleator. He was well known as a small miner and worked many of the mines in the Cleator area. Although the sign on Cleator's bar usually said 'Closed,' this was an attempt to discourage flatland customers. Everyone who knew Tommy knew that if the door was open the bar was open.

MINING SEMINAR

There is still time to sign up for the *Prospecting for Profit in the 90's* seminar sponsored by the Department and the Superstition Mountain Treasure Hunters Association. It will be held on Saturday, April 20 and includes technical sessions by the Department staff, equipment demonstrations, and breakfast, lunch and steak dinner. Ron Feldman, historian and lecturer, will present his slide show on the Superstition Mountains during dinner. For more information call the Department or Elaine Schrader at 983-3481.



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Mineral Resource

MINING

Mined Land Reclamation Bill Update

Senate Bill 1380, which places the Mined Land Reclamation Program under the administration of the State Mine Inspector, was signed by the Governor on May 1, 1996. SB1380 requires the Mine Inspector's office to establish rules for the reclamation of surface disturbances by October 1, 1996 and extends the date for the submission of reclamation plans from July 1, 1996 to April 1, 1997 to provide adequate time for the mines to develop their reclamation plans after the final rules are adopted.

Audrey Akhavan or Paul Catanzariti of the newly established Division of Mined Land Reclamation in the Office of the State Mine Inspector can be reached at 602-542-5971 for more information.

USBM Information Available

With the U.S. Bureau of Mines closed, much of the information formerly available there has been transferred to the U.S. Geological Survey in Reston, Virginia. The following phone numbers can access this information:

- Mines FaxBack: 703-648-4999
- Mines Data (bulletin board): 703-648-7799
- Metals: 703-648-4968, Fax: 703-648-7737
- Special Projects: 703-648-4911, Fax: 703-648-7792
- Data Collection : 703-648-7940, Fax: 703-648-7792
- Publication Services: 703-648-4750, Fax: 703-648-7792
- Minerals Information Systems: 703-648-4920, Fax: 703-648-7792
- Minerals Availability (Denver): 303-236-5200, Fax: 303-236-4028



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

Scams and Scoundrels

From the *The Northern Miner* 6-24-96

When markets are hot, scoundrels come out of the woodwork. That is the only way to explain the recent Timbuktu Gold fiasco, a salting scam that lured in unsuspecting investors by conjuring up the romance of Africa's legendary gold mines.

According to street gossip, the salting was so crudely done that shavings of the South African Kruggerand could be found in the worthless samples. Another theory is that placer gold was added. Whatever the case, the salting was deliberate and meant to deceive.

The incident cast a pall over the Alberta Stock Exchange, where Timbuktu was listed, and a black cloud over the brokerage firms involved in selling and/or recommending the stock. And rightfully so. These firms are sufficiently sophisticated to know that if it sounds too good to be true, it usually is. Where was the due diligence?

Salting scams pop up once every 10 or 20 years. Most remain unsolved, usually because the salting is done in a foreign jurisdiction, which hinders the investigative process. Getting to the bottom of the Timbuktu case, for example, would require the cooperation of law enforcement.

continued

Mining History Association

The Mining History Association, a forum for miners, museum curators, engineers, geologists and history scholars, meets in a historic mining community each year to hear papers on mining history and tour the host community. This year's meeting was held in Rossland, BC from June 6-9. The association has a quarterly newsletter that is distributed to association members. Membership is open to all interested in the history of mining. Dues are \$25.00 per year. The Association address is P.O. Box 150300, Denver, CO 80215.

Scams and Scoundrels cont.

ment authorities from Canada, the U.S. and Mali. We hope it happens, but we won't hold our breath. Fortunately, salting is rare. A more common headache for regulators is the modern-day alchemists who, each year, bilk millions of dollars from unsuspecting investors, particularly doctors, dentists and retired couples with substantial savings.

A few years ago, the Northwest Mining Association mentioned that, in 1987 alone, an estimated US \$250 million had been lost to gold scams in North America. The most elaborate of these involve projects where millions of ounces of gold are in the ground but can't be measured by conventional assaying because of "interfering elements" or because of "wicking" (whatever that means), or because the temperature is not "high enough" or the right "pretreatment" was not used.

Sometimes these promoters will have their own laboratories, where all sorts of exotic steps are taken to produce the "right" assay results. Or, they go to labs that specialize in the people pleasing business. Granted, the going rate may be 10 to 20 times higher than normal, but business is business, and someone has to pay for the gold they find.

Investors are kept hanging by a string while the promoters work furiously to solve the "complex chemistry" through never-ending, costly research. Or they try to build some sort of pilot plant . . . a blackbox that allows them to recover the mysterious gold that reputable, certified labs are not able to find. When the jig is up, they close up their tents without ever producing an ounce of gold and move on to the next "big discovery." Sometimes they do produce a few ounces, but at a cash cost per ounce that would be incalculable.

Years ago, the mining industry urged regulators to take a tough stand against these types of scams. The Vancouver Stock Exchange was probably the first of all Canadian exchanges to address the issue, through its disclosure policy on assaying. Companies can still use the exotic labs but, at the same time, must report results from a certified Canadian lab using accepted techniques. When the results do not compare, both parties cannot be right. Investors should keep in mind that when faced with this situation, regulators will side with the tried and the true. After all, conventional technology has had no trouble finding all the deposits in production today.

Phil Eckman

Louise Philip Eckman, Canadian mining engineer, died on December 14, 1995. Although Eckman confined most of his mining career to Canadian companies, all of North America benefited from his contributions to the mining industry. His exploration and mine evaluation work took him from the Yukon to Costa Rica, Newfoundland to the Queen Charlottes, and North Carolina to California. He contributed to the acquisition of Inspiration Consolidated Copper Company in Arizona by Hudson Bay.

In the 1980's Eckman suggested to the Mining Club of the Southwest that it establish an American Mining Hall of Fame. It was due to his vision that this institution has become a reality.

Phil Eckman will be greatly missed by his wife Majorie, daughter Heather, son Cameron, and his many friends in the mining community.

The following quote was found in a summary of a 1909 Forest Service Examination Report on an Arizona claim called the Blind Tiger, located near Crown King.

"No mining machinery of any kind on claim. The mouth of the discovery is boarded up. Cut used as a stable. Another cut is used for a beer cellar. There are no other excavations on this claim. No water conduits on claim. The claimants operate a saloon and disreputable resort upon this claim. I think this claim is invalid."

PROPERTY NEWS

New Westwin Acquires the Gladiator

New Westwin Ventures, Inc. has acquired an option on the Gladiator Mine from Nor-Quest Arizona Inc. The property, located near Crown King, was first worked in the 1870's. Between 1890 and 1906, 20,000 tons of ore averaging 1.02 was mined from the Gladiator-War Eagle vein. An additional 22,000 tons averaging 0.44 ounces were mined during the period 1937 to 1942. Nor-Quest worked the property from 1985 to 1988 but could not sustain operations because of the market conditions of 1987.

New Westwin is doing some further drilling and sampling before trying to reopen the property. They are

raising about \$1,000,000 through a private placement to support this work.

Tin Cup Leased to Nevada Pacific

Sante Fe Pacific Mining has given an option to Nevada Pacific Mining Company on their Tin Cup property in the Secret Pass district of Mohave County. The Tin Cup is considered by Santa Fe to contain about 100,000 ounces of gold in a deposit similar to those of the San Francisco district. There has been no announcement of Nevada Pacific's plans for the property.

Oracle Ridge Shuts Down

The Oracle Ridge Mining Partners have closed their Oracle Ridge copper mine north of Tucson pending successful negotiations for the sale of the mine. Santa Catalina Mining Corporation will sell their 70 percent interest in the mine. The project has had difficulties with the milling and crushing operations.

Santa Fe Pacific Offers Arizona Properties

Santa Fe Pacific Corporation is offering four Arizona mining properties for joint venture or lease. The Courtland-Gleenson in Cochise County has a defined resource of 650,000 tons grading 3.1 percent copper and 0.12 opt gold. Lone Copper Peak, Mohave County, is a chloritic, silicified and hematitically altered area of Paleozoic carbonates and Mesozoic volcanics overlying an extensive detachment surface. The target is a leachable copper oxide deposit. Black Ranch in Mohave County is a copper/zinc -rich time horizon at the contact of fragmental rhyolite with sedimentary Precambrian rocks. Gold Basin in Mohave County is a known gold occurrence. Tertiary-aged mineralization has been emplaced into the Muddy Creek fanglomerates along the west side of the Gold Basin district.

The properties are being handled by Fred Jenkins or Nick Kohlmann in Reno at 702-858-8000.

Crane operator Art Hamrick Sr. of APS lifts the Boras Headframe and gently places it on the prepared foundation. Helping ease it into place are Director Mason Coggin, Chief Engineer Ken Phillips, and Department volunteer Keith Halsey.

Cyclopic Permitting

The Arizona Department of Environmental Quality has announced their preliminary decision to issue an individual aquifer protection permit for the Cyclopic Mine in Mohave County. Nevada Pacific Mining Company is planning a facility that will include crushing and agglomeration as well as leaching. The initial heap leach pad has been designed to accommodate 4.7 million tons. Nevada Pacific Mining plans to produce about 750,000 tons of gold ore per year for a period of 4 to 6 years.

Silver Consumption

Mine supply of silver increased in 1995, but fell significantly short of meeting fabrication demand by 154.8 million ounces. Photography, still a major consumer, used 222.1 million ounces, jewelry and silverware consumed 228.2 million ounces, while coins fell off to 22.9 million ounces. Arizona produced 194 metric tons, or 6.327 million ounces, in 1995.



ARIZONA'S ACTIVE MINES

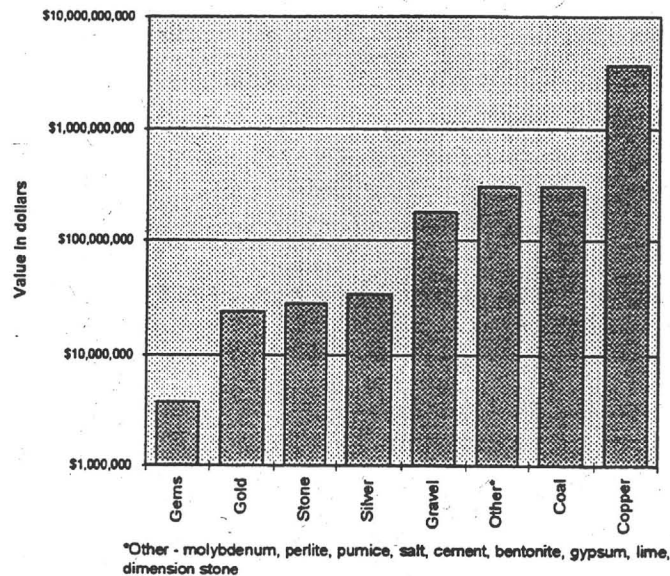
The *Directory of Active Mines in Arizona - 1996*, now available at the Department, reflects the strength and diversity of Arizona's mining industry. Fifty-seven companies, operating 108 mines are listed this year. Seventy sand and gravel operations are also listed.

Arizona again ranks first in nonfuel mineral production in the U.S. as it has for 7 of the past 8 years. The value of all mineral output was \$4.2 billion, an increase of 27 percent over 1994. Arizona also remains the leader in U.S. copper production, supplying 63 percent of the U.S. total. Arizona copper production was 2.6 billion pounds valued at \$3.6 billion.

In addition to being first in copper production, Arizona also leads in molybdenum production; is second in gemstones, silver and perlite; and fifth in pumice and iron oxide pigments.

Coal is a distant second to copper in economic importance of mineral commodities produced in the State. In 1995 Arizona's coal production was valued at \$310,000,000.

1995 Arizona Mineral Production



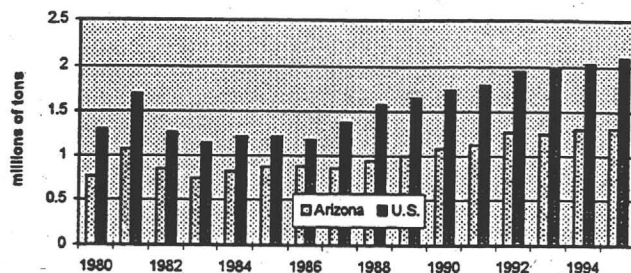
While Arizona remained 11th in gold production, the State climbed from 7th to 6th in the production of construction sand and gravel. Arizona also produces bentonite clay, cements, dimension stone, lime, gypsum, diatomite, salt cinders, smelter slag, pumice, zeolites, crushed stone, decomposed granite, flagstone, silica flux, and hydrofrac sand.

The *Directory of Active Mines* lists company name, corporate address and key personnel,

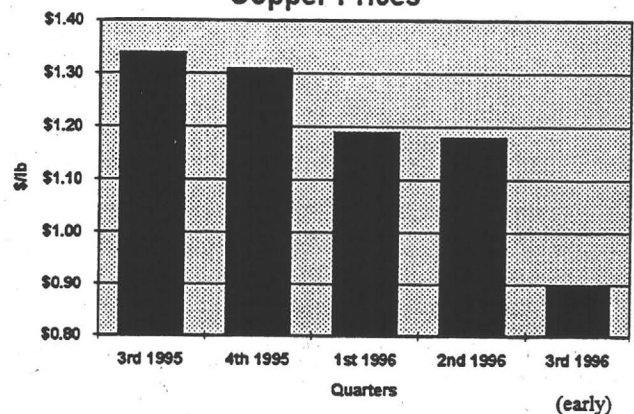
mine, mill or smelter location, and a description of the operation. Metal mines, non-metal mines (excluding sand and gravel), smelters, and company offices or plants are plotted on a 1:1,000,000 scale map that accompanies the publication. The directory is cross referenced to 29 commodities.

The directory is available at the Department offices, the Museum gift shop, by mail, and is also available in several local bookstores. The directory, including map, is \$5.00, or \$6.50 if mailed.

Copper Production in the U.S. and Arizona



Copper Prices



MUSEUM NOTES

Help Wanted

Volunteers are an invaluable part of the effective outreach of the Arizona Mining and Mineral Museum's programs. The efforts of volunteers has enabled the Museum to become a valuable community asset.

Currently we are hoping to initiate two new programs. We would like to offer *daily* demonstrations of lapidary arts, crystal growing, and mineral testing. Staffing has been so short we have had very few demonstrations during the past year.

We would also like to offer a half day, once-a-month program for junior high students.

If you would like to contribute to these innovations - even one day or morning per month - contact Glenn Miller or Susan Celestian. Of course, there are other continuing needs as well that you might be able to address. Among others, we need a computer programmer, carpenters, front contact personnel, and jewelry makers.

Your Museum needs your help!

Harold Hill

On June 10, 1996 a beloved volunteer for the Museum lapidary shop died. Harold Hill succumbed to emphysema and pneumonia at age 82. A retired carpenter, he was a lapidary craftsman with a penchant for perfection. His specialty - shield bola ties - were always popular items in the Museum gift shop.

Harold and his late wife, Marie, were charter members of the Arizona Leaverite Gem & Mineral Society. He was also a member of the Maricopa Lapidary Society, an instructor at the Glendale Community Center, and shop monitor for the Museum. Forays into the the field to collect gave him great joy.

Harold Hill was a sweet, talented, generous man who will be very much missed by all who knew him.

Educators Educated

So far this summer approximately 125 teachers have participated in formal programs at the Museum. Activities have included Minerals in Society, the Mineral Educators Conference, Urban Systemic Initiative, and a Chapman University summer course.

BOOK REVIEW

Photographing Minerals, Fossils, & Lapidary

Materials by Jeff Scovil

ISBN 0-945005-21-0

1996, 224 pages, \$40.00

Forty-four color plates, 74 black and white photographs, and 42 line drawings stylishly illustrate this useful and informative work. A former Department staff member, Scovil is a regular contributor to all of the major mineral-related publications including *Rock & Gem*, *Lapidary Journal*, *Mineralogical Record*, *Rocks and Minerals*, and the German periodical *Lapis*.

Arizona Mining Heavy Equipment and Fleet Maintenance: Pollution Prevention Practices and Opportunities

by Charles G. Burke and Peggy S. Dierking,

Department of Environmental Quality

Open File Report 96-11 provides an overview of pollution prevention and examples of applications in the reduction of wastes and pollutants in wastewater, spent solvents, greases, oils, vehicle fluids, solid wastes, paints, and strippers.

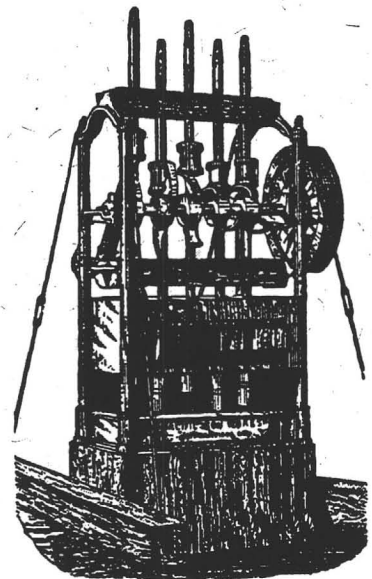
Supplying the Mining World, The Mining Equipment Manufacturers of San Francisco, 1850 -1900

by Lynn R. Bailly

ISBN 0-87026-096-0

1996, 133 pages, \$36.95

Includes a fine collection of line drawings taken from company catalogs, mining publications, and patent applications. Available at the Museum store.





John C. Lacy, partner in the law firm of DeConcini McDonald Brammer Yetwin & Lacy, P.C. has been elected president of the Mining Foundation of the Southwest.

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