CLASSIC MINERAL LOCALITIES

A SYMPOSIUM

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FRIENDS OF MINERALOGY

COLORADO CHAPTER

SEPTEMBER 18, 1983

Held in Conjunction with
Denver Council of Gem and Mineral Societies
17th Annual Gem and Mineral Show
Denver Merchandise Mart
Denver, Colorado

CLASSIC MINERAL LOCALITIES

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PROGRAM

12:00 pm - 12:10 pm	*INTRODUCTION*	Pete Modreski
12:10 pm - 12:40 pm	*AMETHYST DEPOSITS OF ONTARIO PROVINCE, CANADA*	Dan Kile
12:40 pm - 1:10 pm	*CHRYSOBERYL: A U. S. REVIEW*	Mark Jacobsen
1:10 pm - 1:40 pm	*MINERAL DEPOSITS OF THE THOMAS RANGE, UTAH*	Steve Brighton
1:40 pm - 2:10 pm	*MINERALS OF THE VULCAN DISTRICT, GUNNISON COUNTY, COLORADO*	Jack Murphy
2:10 pm - 2:30 pm	*BREAK*	
2:30 pm - 3:00 pm	*AMETHYST OF THE AMETHYST QUEEN MINE, MESA COUNTY, COLORADO*	Mike Madsen
3:00 pm - 3:30 pm	*CLASSIC MINERAL LOCALITIES OF NEW MEXICO*	Joe Taggart
3:30 pm - 4:00 pm	*PERUVIAN MINERAL LOCALITIES*	Dennis Belsher
4:00 pm - 4:30 pm	*CAMP BIRD MINE MINERAL DEPOSITS*	Barbara Muntyan

AMETHYST DEPOSITS OF THE THUNDER BAY AREA, ONTARIO PROVINCE, CANADA

By

Daniel E. Kile
333 Salem St.
Aurora, Colorado 80011

The Thunder Bay region in Ontario, Canada, has long been noted as a source of fine amethyst. This area is part of a Precambrian granite batholith comprising the Algoman formation. Crystals occur in clay filled pockets which are part of interconnecting amethyst vein systems within fault zones of this formation.

The principle mines that allow collecting are the Thunder Bay Amethyst Mine and the Diamond Willow Mine. Numerous other small prospects in the area are not currently active or known to be open for collecting. Crystal forms typically consist of rhombohedrons, with the prism faces being poorly developed if present at all. Clusters tend to occur in rounded groups, often with included hematite which imparts a red to brown color to the crystals; these features distinguish the Ontario material from that found elsewhere.

The Thunder Bay Mine is noted for exceptionally large crystal clusters weighing hundreds of pounds, with single crystals being up to six inches across. This mine consists of a large open pit located along an amethyst fault zone that is 80 feet wide and 1¼ miles long. Crystal pockets here may be up to six feet long and three to four feet across. Collecting status at this mine is uncertain due to a recent change of

ownership. Associated minerals in this mine are calcite (scalenohedral habit) and pyrite (micro-crystals). Hematite and/or goethite are often present as inclusions.

The Diamond Willow Mine has produced smaller but often brilliant color crystals in lavender to red hues. Active mining is confined to a series of small trenches; collecting is limited to searching dump material.

Collecting in the Thunder Bay area is generally productive if one has sufficient time to locate and pursue promising amethyst veins, or patiently search dump material. Excellent amethyst clusters should continue to be available from this region for both the buyer and the field collector.

CHRYSOBERYL: A U.S. REVIEW

By

Mark I. Jacobson
1950 S. Pennsylvania St.
Denver, Colorado 80210

United States chrysoberyl localities appear to number a handful and have yielded only minute quantities of gem-quality material. Chrysoberyl is probably not as rare as believed, since its recognition may often be missed. ~~It is hoped that~~ possibly a review of its geologic associations, properties and known localities will aid in the discovery of additional occurrences.

Chrysoberyl is found in pegmatites, schists and gneisses. Chrysoberyl-bearing pegmatites seem to be mostly simple or unzoned pegmatites enclosed

in high-grade metamorphic sillimanite-mica schists. The usual explanation is that chrysoberyl is found in peraluminous (contaminated with aluminum compounds or desilicated) pegmatites, but the apparent bulk composition of many chrysoberyl pegmatites seems to be no different than beryl-bearing pegmatites which do not contain chrysoberyl. Nevertheless, many, if not most, chrysoberyl-bearing pegmatites tend to be small and thin; perhaps only three to ten feet in width and up to 100 feet in length.

Chrysoberyl is usually observed as thin, platy crystals of various shades of green. It is usually found in matrix with quartz, feldspar or muscovite as crystals less than one inch in length and one-fourth inch in thickness. The V-shaped contact twin is the most common form, but pseudohexagonal twins and untwinned crystals are not rare.

Chrysoberyl is found in the following districts or areas: Pend Oreille County, Washington; Virgin Mountains, Nevada-Arizona; San Miguel and Taos Counties, New Mexico; Crystal Mountain District and Clear Creek District, Colorado; Southern Black Hills District, South Dakota; Haddam, Connecticut; Saratoga Springs and Ossing, New York; Grafton District, New Hampshire; and Paris-Rumford District and Topsham District, Maine.

~~Possibly~~ The most outstanding chrysoberyl localities in the United States are possibly the large, well formed crystals from various places in Maine and the sharp but small crystals from Saratoga Springs (Greenfield), New York and Haddam, Connecticut. The best known western United States chrysoberyl localities are Drew Hill, Jefferson County, Colorado, and the Scott Rose Quartz Mine, Custer County, South Dakota.

MINERAL DEPOSITS OF THE THOMAS RANGE, UTAH

By

Steve Brighton
8256 Teller Court
Arvada, Colorado 80003

The Thomas Range in Western Utah is well known for Topaz Mountain and the very fine crystals of topaz which occur there. Other areas in this range are not as well known but are sources or rare and beautiful minerals, as well as topaz. The Maynard Bixby area on the east side of the range provides the largest deep colored topaz and bixbyite with garnet. To the north are found large single bixbyite crystals up to 1.3 inches. On the west side localities for red prismatic beryl, pseudobrookite and hematite are found. The southwest part of the range is the garnet locality known as Garnet Basin. All the areas mentioned above, except Topaz Mountain and Garnet Basin, are on private mining claims. Most of the Thomas Range, however, is open to prospecting.

In 1981 while working a pseudobrookite claim, a nearby vein of hematite was located. In May of 1982, Larry Lehto, Lee and Tag McKinney, Lee Burnett and myself, using a portable gas drill and explosives, opened the hematite vein. After three days of effort to move a ton of rock, many fine hematite specimens were recovered in addition to more flats of pseudobrookite, ending a successful trip to the Thomas Range.

MINERALS OF THE VULCAN DISTRICT, GUNNISON COUNTY, COLORADO

By

Jack Murphy
Department of Geology
Denver Museum of Natural History

The Vulcan District, located 12 miles south of Gunnison, is in a belt of metavolcanics known as the Gunnison Gold Belt. This area has long been of interest to mineralogists since the discovery in 1903 of a new copper telluride species, rickardite (Cu_7Te_5, orthorhombic, pseudotetragonal). It is characterized by its beautiful deep blue to purple color and occurs as small lenticular masses or thin encrustations in the rich pyritic gold telluride ore associated with streaks and lenses of iron stained schist cut by small quartz veins.

This mineral is named for the well known mining engineer T.A. Rickard who visited the Good Hope and Vulcan mines in 1902 and identified petzite, berthierite, roscoelite (?), and noted the presence of the unknown telluride mineral that would later bear his name.

Rickardite is intimately associated with another new copper telluride species, weissite (Cu_5Te_3, pseudo-cubic). It is a dark blue to black mineral with a metallic luster that was named for Dr. Louis Weiss, owner of the Good Hope mine. Both of these species are commonly associated with rich concentrations of crystalline native tellurium.

A third copper telluride species, vulcanite (CuTe, orthorhombic) has also been recognized in Good Hope mine specimens that were saved during

mining operations in the early 1900's. It is a metallic mineral with a yellow-bronze color that is intimately intergrown with rickardite and associated with native tellurium.

Recent investigations in the region show that the Vulcan and adjacent deposits are Precambrian strata-bound massive sulfide deposits with a volcanogenic origin. The Vulcan district appears to be unique in experiencing a second Tertiary age episode that included the tellurium mineralization.

AMETHYST OF THE AMETHYST QUEEN MINE, MESA COUNTY, COLORADO

By

M.E. Madson and Allen B. Smith
3201 Snowberry Court
Grand Junction, Colorado 81501

The Amethyst Queen Mine is about 25 miles southwest of Grand Junction along East Creek in Unaweep Canyon. The mine has begun to yield some of the finest Siberian-grade gem quality amethyst ever recovered in Colorado. This occurrence has been known for several decades. Small amounts of copper, lead, silver, gold and fluorite have been produced from the Amethyst Queen and contiguous claims since 1900. Most of this production occured from 1900 to 1920. New lease arrangements by Allen B. Smith and Charles Fedler in late 1982 and subsequent selective extraction of amethyst-bearing ores have provided low to medium quality mineral specimens, tumbling stock, and finely colored gemstones.

The amethyst occurs in a thin (0.5 to 1.5 meters) vein that strikes approximately N50^{o}W and is nearly vertical. Wall rocks are of a Precambrian age and are dark grey gneisses of the Black Canyon schist. These gneisses are cut by thin (0.25 to 0.5 meter) quartz-microcline pegmatites. Vein mineralogy includes major amounts of calcite and amethystine quartz with minor amounts of malachite, barite, hematite, limonite, and chalcocite. Vein paragenesis includes several mineralization episodes concurrent with uplift and deformation of the ancestral Uncompaghre Range in late Jurassic to early Tertiary time. Indicated stages of mineralization are: primary calcite vein filling, primary smoky and amethystine quartz formation, secondary calcite mineralization, contemporaneous vein brecciation, secondary amethyst mineralization, secondary vein brecciation, copper sulfide mineralization, fluorite mineralization, and final calcite cementation.

Crystalline amethyst is recovered by HCl-leaching of the ore blocks. The nature and quality of the ore blocks are unknown until acid digestion is completed and the contained amethysts are sorted.

CLASSIC MINERAL LOCALITIES OF NEW MEXICO

By

J.E. Taggart
U.S. Geological Survey
Denver, Colorado 80225

Unlike in high population areas of the country, most of the classic mineral collecting sites of New Mexico are still accessible and productive.

Carlsbad, in the southeast portion of the state, is not only noteworthy for its caverns but also for the bedded evaporite deposits located

a short distance from town. These deposits are significant in that they contain zones rich in potash mineralization. In addition to large, relatively pure specimens of polyhalite, carnallite, langneinite, leonite, and anhydrite, they also contain some large, fairly well crystallized specimens of sylvite and halite. Occasionally the halite recrystallizes, forming crystals that are a light lavender to a dark inky blue. This coloration has been attributed to minute inclusions of elemental sodium.

In the southwest portion of the state are copper and silver mining districts including: the famous Chino open-pit copper mine in the Central District, which has been worked since the times of the Spanish occupation of the southwest until present day; the Bridal Chamber in the Lake Valley District which yielded over 2½ million ounces of silver; and the Stevenson-Bennett mine in the Organ Mountains, producer of the best wulfenite, cerussite and caledonite found in the state. This area of New Mexico is still producing unique specimens, most recently superb wulfenites and azurites. In the central portion of the state is the White Oaks gold district where small huebnerite crystals can still be collected. In recent years Lincoln County has become famous for the smoky quartz Japan law twin crystals that it produces. Just west of this area in Socorro County are located the Blanchard Claims of the Hansonburg District, producer of superb secondary lead, copper, and zinc mineral, including world class specimens of linarite.

In the western portion of the state is the ghost town of Kelly, where the famous Kelly Mine produced outstanding museum size specimens

of lustrous bluegreen smithsonite and unusual mammillary aurichalcite. West of Albuquerque, near Golden, the area was once worked by the Indians for turquoise, the Spaniards for gold and in recent history for gold and copper. Various locations in the area still yield specimens and cutting grade turquoise, Japan law twins of quartz, gold nuggets, and garnet crystals.

Further north near the towns of Dixon and Taos are located the Rio Hondo area where staurolite crosses can be found weathered from matrix, and the Harding pegmatite where beryl and microlite were mined as strategic minerals during World War II. Specimens of rose muscovite, spodumene, manganapatite and lepidolite can all be easily found. More pegmatites are located west of Taos near Ojo Caliente. Finally, in the northern part of the state are located the molybdenum mine at Questa, and the old gold mining ghost towns of Red River and Elizabethtown, now more famous as tourist spots. Although collectors are rapidly abusing their privileges and closing land to collecting, New Mexico is still an excellent collecting spot for those people who respect the land owners rights.

MINERAL LOCALITIES OF PERU

By

Dr. Dennis O. Belsher
1145 Grandview
Boulder, Colorado 80302

Peru is a fairly large country which contains dozens of specific areas which are, in and or themselves, classic mineral localities.

Virtually all of the Peruvian specimens available on todays market are from ore producing mines. Thus, a fairly large quantity of a wide variety of sulfide minerals are typically available. Most of the areas have produced pyrite specimens in abundance.

The following is a list of major mineral specimen producing areas in Peru, with a very brief description of the noteworthy specimens produced. Please refer to the map for the location of each area.

Quiruvilca - La Libertad Dept.

Pyrite - Octahedra to 13 cm on an edge

Orpiment - Cherry red crystals to 6 cm

Enargite - Shiny, sharp crystals to 8 cm

Pyrite after enargite - Casts to 3x3x8 cm

Hutchinsonite - Rare thallium sulfosalt; crystals to 3x3x25 mm

Orpiment after orpiment - colorful pseudomorphys; crystals to 1x1x8 cm

Tetrahedrite after enargite, barite, tetrahedrite

Pasto Bueno - Ancash Dept.

Rhodochrosite - Cherry red crystals to 8 cm

Huebnerite - Crystals to 1x5x30 cm

Fluorite - Mint green octahedra to 20 cm

Arsenic, native - Spheroids to 8 mm on huebnerite

Huanzala - Huanuco Dept.

Fluorite - Pink octahedra to 5 cm

- Pale green cubes to 4 cm, on white dolomite

- Purple dodecahedra to 3 cm

- Mint green octahedra to 10 cm

Dolomite - Transparent, saddle-like crystals to 7 cm

Galena - Pseudo-hexagonal crystals to 3 cm

Barite, arsenopyrite, calcite

Mundo Nuevo - La Libertad Dept.

Huebnerite - Blood red, tabular plates to 5 cm

Quartz - Japanese twins to 8 cm

Pyrite, tetrahedrite

San Genaro - Huancavelica Dept.

Pyrargyrite - Gemmy red crystals to 8 cm

Miargyrite, barite

Casapalca - Lima Dept.

Tetrahedrite - Shiny crystals to 8 cm

Sphalerite, quartz, manganocalcite

Morococha - Lima Dept.

Vivianite - Gemmy crystals to 3 cm

Cerro de Pasco - Pasco Dept.

Various vanadate minerals

Santa Rita Alta - Lima Dept.

Rhodochrosite - Pink crystalline rosettes w/needle quartz and pyrite, tetrahedrite

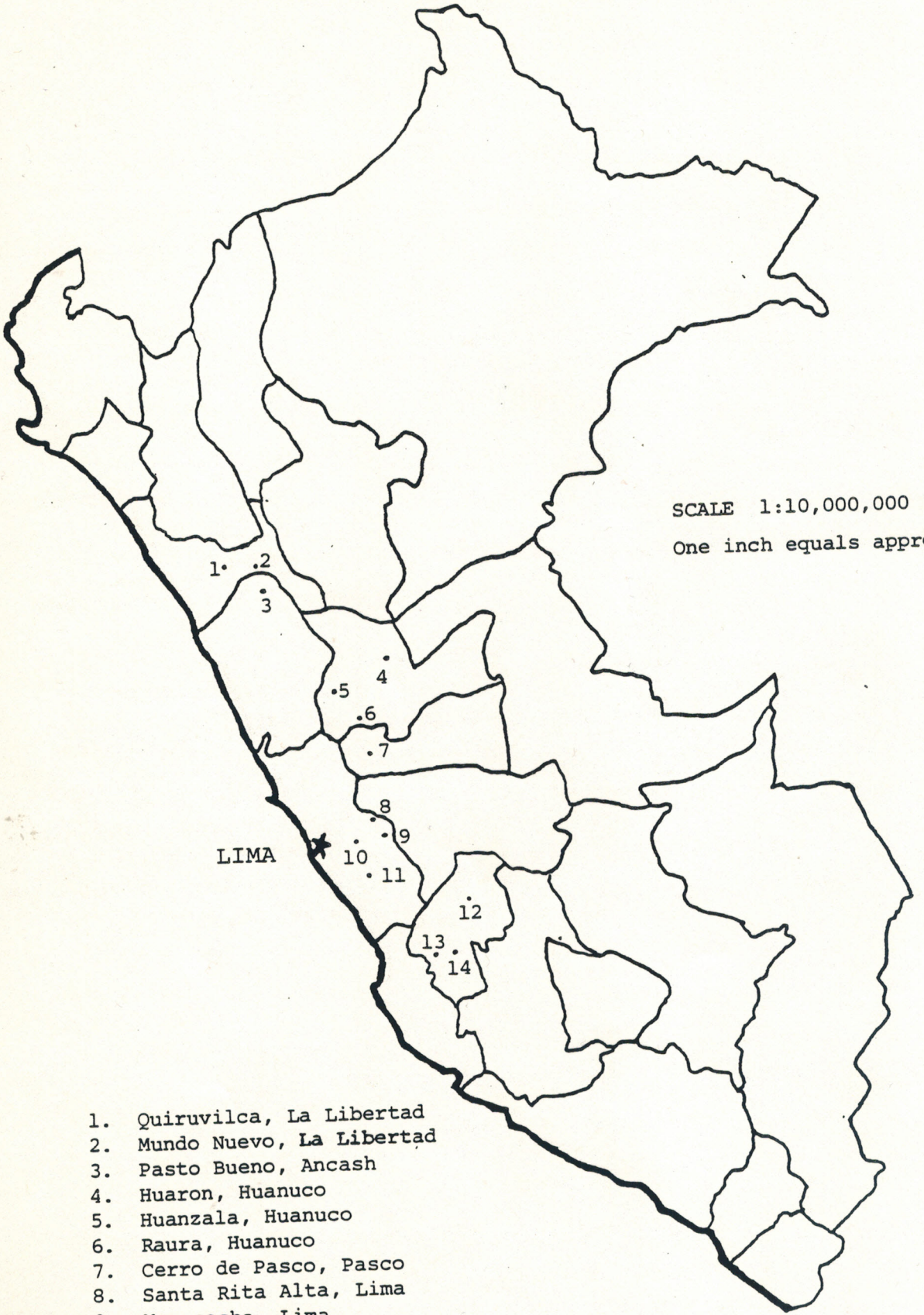
Quartz - Sceptered crystals

Huaron - Huanuco Dept.

Quartz - Clear needle-like crystals with pyritohedra nestled within

Sphalerite, rhodochrosite

PRINCIPAL MINES OF PERU



SCALE 1:10,000,000

One inch equals approx 160 miles

1. Quiruvilca, La Libertad
2. Mundo Nuevo, La Libertad
3. Pasto Bueno, Ancash
4. Huaron, Huanuco
5. Huanzala, Huanuco
6. Raura, Huanuco
7. Cerro de Pasco, Pasco
8. Santa Rita Alta, Lima
9. Morococha, Lima
10. Casapalca, Lima
11. San Cristobal, Lima
12. Julcani, Huancavelica
13. Pacococha, Huancavelica
14. San Genaro, Huancavelica

Raura - Huanuco Dept.

Rhodochrosite - Pink crystals to 1 cm

Galena

Pacocoha - Huancavelica Dept.

Galena - Shiny cubes to 5 cm

Sphalerite - Transparent orange crystals to 3 cm

Chalcopyrite - Crystals to 5 cm

Manganosiderite, quartz

San Cristobal - Lima Dept.

Wolframite - Crystals to 4 cm, commonly twinned

Quartz

Julcani - Huancavelica Dept.

Bournonite - Crystals to 7x7x10 mm

Barite

MINERALS OF THE CAMP BIRD MINE

By

Barbara L. Muntyan
6978 Wapiti
Boulder, Colorado 80301

The Camp Bird mine, located near the town of Ouray, Colorado is one of the state's richest and most famous mines. It was originally a series of small prospects which were purchased and consolidated in the 1890's by Thomas J. Walsh. Although the prospects were not considered to be important producers, Walsh had recognized the rich but tricky nature of the ore because of his background in Colorado's early milling industry.

He was right; during its heyday, the Camp Bird produced at the rate of a million dollars per day for Walsh and his family. It was enough income to move them to the social whirl of Washington, D.C., and buy the Hope Diamond for his daughter, Evalyn Walsh McLean.

During the early years, the Camp Bird produced rich ore, but it was not known for mineral specimens. The only reported specimens at that time were large quartz crystals, similar to those found more recently at the Idarado mine.

All that changed in 1970, however, when the mine began working the so called "Replacement Ore Body". This deposit was mined for almost a decade and produced a vast array of mineral specimens. Many people consider them to be among the finest to come out of the San Juans at any time. These include gem green sphalerites, manganocalcite sprays, large pyrites, galena, fluorite (lilac, pale green and colorless), and showy chalcopyrites in association with black sphalerite and white calcite.

With the decline in the productivity of the Replacement Ore Body in the late 1970's and the fall in silver and gold prices, the Camp Bird mine ceased operation. Although it has recently been purchased, it is unlikely that the Camp Bird will reopen in the near future, and even if it does, it is probable that the era of fine mineral specimen production is past history.

SPEAKERS

DENNIS O. BELSHER. Dr. Belsher received a B.A. degree in chemistry from the University of Colorado and a Doctorate in Law degree from the University of Puget Sound in 1977. After graduating he started and presently owns Worldwide Resources, a wholesale mineral specimen dealership specializing in minerals from Peru. He has imported mineral specimens from South America for over six years, during which he has visited Peru eleven times. He has lived in Peru for almost one year, and was the first dealer to export pink octahedral fluorite from the Huanzala Mine. Dr. Belsher authored an article on this occurence in the Mineralogical Record (vol. 13, no.1).

STEPHEN D. BRIGHTON. Mr. Brighton has been collecting minerals for thirty years; after moving to Colorado in 1968 he started specializing in thumbnail size specimens, as well as fluorescent minerals. He is also an active field collector and spends many of his weekends collecting in Colorado and Utah. He recently won the AFMS National Trophy in Spokane, Washington, for thumbnail minerals. Mr. Brighton is a member of the Littleton Gem and Mineral Society and the Colorado Chapter of the Friends of Mineralogy.

MARK I. JACOBSON. Mr. Jacobson is a senior Geophysicist with Chevron, USA. He received his B.S. degree in geology from Pennsylvania State University and his M.S. in geology from the University of California at Berkeley in 1976. Mr. Jacobson has been studying pegmatites and their minerals since 1966. He has visited and collected samples at most U.S. pegmatite districts. Mr. Jacobson has written several articles on pegmatite minerals for the Mineralogical Record and Rocks and Minerals. He is also a member of the Colorado Chapter of Friends of Mineralogy.

DANIEL E. KILE. Mr. Kile received his degree in chemistry from the University of Minnesota and is currently employed as an environmental chemist. He has been an active mineral collector for twelve years, with other interests in micromount minerals and lapidary, and has been teaching lapidary in Aurora for the past several years. Mr. Kile is a member of the Littleton Gem and Mineral Society, and is currently Vice President of the Colorado Chapter of the Friends of Mineralogy.

MICHAEL E. MADSON. Mr. Madson is a geologist specializing in geochemical exploration techniques. Currently Mr. Madson is employed by Bendis Field Engineering Corporation, Grand Junction, Colorado. As chief officer of Mike Madson Minerals, he has presented field collecting oriented slide shows at several shows in the intermountain region including the Tucson Gem and Mineral Show. Mike Madson Minerals has been a wholesale dealer in the Tucson Show since 1979.

PETER J. MODRESKI. Dr. Modreski is a geochemist for the U.S. Geological Survey - Branch of Central Mineral Resources. He received his B.A. in chemistry from Rutgers College and his PhD in geochemistry from Pennsylvania State University. Dr. Modreski worked for Sandia Laboratories in New Mexico before joining the U.S.G.S. His current work involves high-pressure, high-temperature experiments and geologic mapping and study of cobalt deposits near Salmon, Idaho. Dr. Modreski is a member of the Mineralogical Society of America, Geological Society of America, Littleton Gem and Mineral Club, and is currently Treasurer of Friends of Mineralogy, Colorado Chapter.

BARBARA J. MUNTYAN. Mrs. Muntyan is Director of Personnel for Affiliated Bank Shares of Colorado. She has been collecting minerals for over 20 years and has taught introductory courses in mineralogy at Parkman Junior College in Illinois. Mrs. Muntyan has personally visited most of the "classic" mineral collecting localities in Colorado. She has recently become involved in the cleaning and preparation of fine mineral specimens. Mineral photography is also one of Mrs. Muntyan's recent interests and she is quickly becoming one of the best mineral photographers in Colorado. She is currently on the Board of Directors of Friends of Mineralogy, Colorado Chapter.

JACK A. MURPHY. Mr. Murphy received his degree in earth sciences from the University of Colorado and has been the Geology Curator at the Denver Museum of Natural History for the past 12 years. Since then he has concentrated his interests on the minerals of Colorado and has been active in producing new exhibits and lectures. He is currently developing a manuscript on the minerals of Colorado. Mr. Murphy is past President of the national Friends of Mineralogy, and was one of the founders of the Colorado Chapter of the Friends of Mineralogy, as well as past president of that organization.

ALLEN B. SMITH. Mr. Smith is a gemologist (G.G.) involved in the identification and appraisal of gemstones. Mr. Smith is involved in faceting as well as custom gold jewelry design and manufacture. His particular interests lie with native Colorado gemstones. He also provides gemstones from unique occurences worldwide.

JOSEPH E. TAGGART, JR. Mr. Taggart is a geochemist and X-ray Project Chief for the U.S. Geological Survey - Branch of Analytical Laboratories. He received his B.A. in geology from Syracuse University and a M.S. in geochemistry from Miami University. Mr. Taggart worked as a mineralogist for the New Mexico Bureau of Mines before coming to work for the U.S.G.S. He is a member of the Mineralogical Society of America and is currently President of the Colorado Chapter of Friends of Mineralogy.

COLORADO CHAPTER

FRIENDS OF MINERALOGY

Friends of Mineralogy is an organization devoted to the advancement of interest in minerals and related activities. Its members include professional mineralogists, curators of public and private collections, and mineral collectors. The Colorado Chapter has established the following goals:

1.) protect and preserve mineral specimens and localities

2.) advance mineralogical education and research

3.) support and disseminate mineralogical knowledge with seminars, publications, and educational projects

4.) promote high ethical standards for collecting, exhibiting, and dealing with mineral specimens

5.) build a spirit of cooperation and participation in the region for collecting, sharing, and using mineral specimens

The Colorado Chapter, in furthering these goals, is co-sponsoring with the Denver Museum of Natural History, an update to Ed Eckel's "100 Year Record". This publication, titled Minerals of Colorado, is in the final draft stages and expected to be published next year. This book will contain almost 750 total mineral species found in Colorado, of which approximately 300 are species new to the state. Funding for this book has been provided by the Denver Museum of Natural History, the Friends of Mineralogy, Colorado Chapter, and private individuals.

1984 SYMPOSIA
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COLORADO CHAPTER OF THE
FRIENDS OF MINERALOGY

CALL FOR PAPERS

September, 1984
at the

Denver Merchandise Mart
58th Avenue at I-25

in conjunction with the annual
Denver Council of Gem and Mineral Societies
Gem and Mineral Show

Individuals interested in presenting a 20 - 30 minute talk on mineralogy, mineral occurances or related topics should contact Dan Kile (333 Salem St., Aurora, Colorado, 80011; phone 303/341-0135) not later than May 1st, 1984.