



Arizona Geological Society Newsletter

MARCH 2015

March 3, 2015 DINNER MEETING

Who: Harrison H. Schmitt will speak about “A Geological Visit to a Valley on the Moon”.

Where: Sheraton Tucson Hotel and Suites, 5151 East Grant Road, (at the intersection of Grant and Rosemont on the North side of Grant in the *PIMA BALLROOM* (enter at northwest corner of the building) and go upstairs to the meeting room.

When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.

Cost: Members \$27, Guests \$30, Students Members free with online reservation (\$10 without).

RESERVATIONS ARE REQUIRED: Reserve on the AGS website (www.arizonageologicalsoc.org) by 11 a.m. by Friday, February 27th. Please indicate regular (Grilled Chicken Breast), vegetarian, or Cobb salad meal preference. Please cancel by Friday, February 27th at 11 a.m. if you are unable to attend—no shows and late cancellations will be invoiced.

The March dinner meeting is sponsored by Clear Creek Associates



AGS is grateful for Clear Creek Associates' sponsorship, which helps us to offset dinner meeting costs

Abstract

A Geological Visit to a Valley on the Moon

by Harrison H. Schmitt

In December 1972, the Apollo 17 Mission became the most recent field trip to the Moon by human explorers. This 13-day adventure in space took geologist Harrison Schmitt to the Valley of Taurus-Littrow in the southeastern rim of the 740 km. diameter basin filled by Mare Serenitatis. After 72 hours on the lunar surface, including 22 hours outside the lunar module *Challenger*, the astronauts returned over 250 pounds of samples to Earth.

A number of new insights into the geology of the valley of Taurus-Littrow and surrounding regions of the Moon have resulted from recent synthesis and integration of transmitted field notes, field recollections, and

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photo-documentation with over forty years of data from sample analysis and geophysical measurements.

Proximity to the Earth, lack of atmosphere, gravity only one-sixth that of the Earth, planetary position as the smallest of the terrestrial planets, and potential life-sustaining resources almost certainly assure a role for the Moon in future lunar activities in support of human exploration, utilization, and settlement of space. The Moon can be considered as a stepping stone towards Mars and beyond and also as the low cost supply depot for deep space exploration and settlement. The first milestone in such an approach would be the development of helium-3 fusion power fueled by lunar helium-3.

About the October Dinner Speaker



Harrison Hagan Schmitt, a native of Silver City, NM, has the diverse experience of a geologist, pilot, astronaut, administrator, businessman, writer, and U. S. Senator. Schmitt received his B. S. from Caltech, studied as a Fulbright Scholar at Oslo, and attended graduate school at Harvard. Geological field studies in Norway formed the basis of his Ph.D. in 1964. As a civilian, Schmitt received Air Force jet pilot wings in 1965 and Navy helicopter wings in 1967, logging more than 2100 hours of flying time.

Selected for the Scientist-Astronaut program in 1965, Schmitt organized the lunar science training for the Apollo Astronauts, represented the crews during the development of hardware and procedures for lunar surface exploration, and oversaw the final preparation of the Apollo 11 Lunar Module Descent Stage. He served as Mission Scientist in support of the Apollo 11 mission. After training as back-up Lunar Module Pilot for Apollo 15, Schmitt flew in space as Lunar Module Pilot for Apollo 17 - the last Apollo mission to the moon. On December 11, 1972, he landed in the Valley of Taurus-Littrow as the only scientist and the last of 12 men to step on the Moon.

In 1975, after two years managing NASA's Energy Program Office, Schmitt fulfilled a long-standing personal commitment by entering politics. Elected in 1976, he served a six-year term in the U.S. Senate beginning in 1977. Harrison Schmitt became Chairman of the NASA Advisory Council in November 2005, and served until October 2008. He also consults, speaks, and writes on policy and constitutional issues of the future, the science of the Moon and Planets, history of space flight and geology, space exploration, space law, climate change, and the American Southwest. He presently is Honorary Associate Professor of Engineering, University of Wisconsin-Madison, teaching "Resources from Space." He is on the staff of the Institute for Human and Machine Cognition of Pensacola, Florida. Current board memberships include Orbital Sciences Corporation (lead director) and Edenspace Systems Corporation. In 1997, Schmitt co-founded and became Chairman of Interlune-Intermars Initiative, Inc., advancing the private sector's acquisition of lunar resources and Helium-3 fusion power and clinical use of medical isotopes produced by fusion-related processes. He is the author of, "Return to the Moon" (2006 Springer-Praxis) that describes a private enterprise approach to providing lunar helium-3 fusion energy resources for use on Earth. Schmitt's essays on the Constitution are collected on the "Americas Uncommon Sense" web site <http://americasuncommonsense.com>.

NOTE: A limited number of copies of Harrison Schmitt's book, "Return to the Moon" with a forward by Neil Armstrong will be available for sale at this dinner meeting for \$25. Senator Schmitt will autograph any books purchased.

In Memoriam Charles P. Miller (1929-2015)

Charles P. Miller passed away on February 10, 2015. He was born in Johnstown, Pennsylvania and graduated from Lehigh University with a Degree in Mining Engineering. He received his Masters Degree and Ph.D, from Stanford University in Geology.

Charles began his professional career with Phelps Dodge in 1957. By the mid-1960s, he was working for American Metal Climax, Inc. Following his retirement from American Metal Climax's successor, Amax in 1985, Charles formed Miller Resources, Inc.

Charles was a member and officer of several mining associations in Tucson, Arizona, where he has lived for the past 47 years. He was recently honored as lifetime member of the Arizona Geological Society for his 50 years of membership and service. Charlie's service to the Arizona Geological Society included Vice President, Field Trips (1975), President (1976) and Past President (1977), as well as serving as a councilor (1988-1990 and 2009). He also served on various committees for AGS symposiums spanning several decades and most recently served as a member of the AGS Finance Committee (2008-2013).

Charles was also a member of the Society of Mining, Metallurgy and Exploration Geology, and a long-time member of the Mining Foundation of the Southwest, where he served on the Board of Governors (2002-2007 and 2010-2013) and on the Hall of Fame Committee from 2001 through 2007.

The AGS conveys its condolences to Charles' wife, Mary, his family and friends. AGS also feels the loss of this fine geologist, who gave so much to our Society.



2015 Doug Shakel Memorial Student Poster Event

Arizona Geological Society's Annual Doug Shakel Memorial Student Poster Event will be held tentatively at the Arizona State University Science Center on Saturday, April 18, 2015. There will be a morning poster event, including display, oral presentations and the award of prizes. This will be followed by a catered lunch and a tour of the ASU's new Science Center. At this time, the venue is not finalized, but the date is firm. More details about this event will be announced in April's newsletter.

There will be no regular monthly AGS Meeting in April

AGS NEWS

Shining a Light on the Lindgren Collection – Part II

Last month's AGS newsletter recounted some of the history of the Lindgren Collection. In January 2002, AGS and the Tucson Gem and Mineral Society (TGMS) joined forces to deliver the collection to the University of Arizona (UA) Geosciences Dept, from Harvard, where it faced an uncertain future.

AGS is taking the lead in collaborating with UA Geosciences and TGMS to revisit the collection and deliberate on its future. On Thursday, 19 Feb, AGS Executive Committee and AGS members met in executive committee to hear Mark Barton (UA Professor of Geosciences) discuss the university's position on the Lindgren Collection. In the following discussion, AGS members weighted in with their opinions and concerns regarding the collection.

Subsequently, AGS Treasurer Alison Jones made a motion to form an advisory committee, to explore options for the future of the Lindgren Collection and make recommendations to the Executive Committee by May 2015. Members of the Lindgren Advisory Committee will include AGS, GMS and UA personnel.



Four of the 840 boxes comprising the Lindgren Collection.

Offered For Sale (\$9,000)

Olympus Innov-X Alpha 6000 X-Ray Spectrometer, with case, stationary stand, and 3 batteries. S/N 9708. Manufactured March, 2008. The X-Ray gun has had 220 hours of use. We paid over \$30,000 for it new in 2008. We will bring it to you to test it before you pay. We will include an Iridium Sat Phone (needs battery and subscription), and an S. E. International radiation detector meter.

Contact Rex Loesby
 E-mail - RexLoesby@aol.com
 Tel/Cell: (303) 771-9610



AGS Spring Field Trip | Oak Creek – Mormon Lake Graben

Date/Time: Saturday, 2 May / 7:30 a.m. – 5:00 p.m.

Starting Location: Flagstaff, AZ

Trip Leader: Paul Lindberg

Level of Difficulty: low; there is one short rock scramble along Oak Creek.

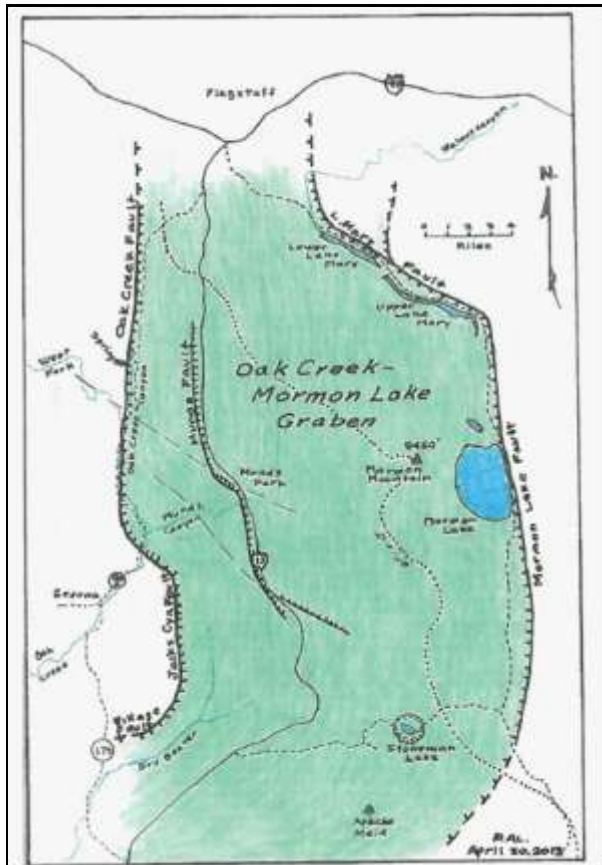
Logistics: To be announced.



Geologist Paul Lindberg has graciously agreed to lead an AGS field trip to the Oak Creek – Mormon Lake area south of Flagstaff, Arizona. Participants from outside the Flagstaff area, would probably need to arrive in Flagstaff on the evening of 1 May. We are working with the Flagstaff Tourism Office to identify accommodations.

From an earlier tour by Paul Lindberg; “The tour will circumnavigate the northern portion of what appears to be one of the youngest basin and range grabens to cut the Mogollon Rim area of north-central Arizona. Fault zones and scarps on both sides of the graben will be visited. Flagstaff lies at the shallower northern end of the graben with projected faults to the west near Exit 190 on Interstate 17 and to the east near a north-trending fault that passes through the Walnut Canyon and Mt Elden area. The graben appears to have dropped by a small amount, perhaps in concert with some of the eruptive activity of the San Francisco Peaks. Interstate 17 follows the central axis of the new graben and is built upon Miocene basalt lava beds (“Ramp volcanics”) that extend from the Colorado Plateau near Flagstaff to the Verde Lake bed in-fill within the core of the Verde graben in the Camp Verde area. The Mogollon Rim erosional escarpment has been dropped out of sight beneath the 1-17 route.”

There may be an opportunity for an informal tour of the San Francisco volcanic field on Sunday, 3 May. We’ll circulate information as it becomes available.



Arizona Geological Society Position Statement

The AGS membership voted on drafting statements to clarify the society's positions on various topics related to geology, education, and resources. This draft position statement on the importance of teaching geology at the K-12 levels is our first effort. If you have any suggestions for revisions, please email them to Alison Jones at ajones@clearcreekassociates.com. Thanks goes to Pam Wilkinson for her valuable insight as this statement was drafted.

The Importance of Teaching Geology

Position Statement: Basic knowledge of geology is essential to meeting the environmental challenges and natural resource limitations of the twenty-first century. It is critical that geology education, taught by highly qualified teachers, begin at the kindergarten level and continue with more advanced offerings in secondary school. AGS recommends that the study of geology be an integral component of science education in public and private schools at all levels, from kindergarten through twelfth grade.

Rationale: Geology is an integrated science, bringing together biology, chemistry, and physics, as they apply to the workings of the Earth. The applied, and often visual, nature of geology helps students see the connections and relevance of geology to their lives and their communities. Engaging students in learning about the Earth supports the development of problem solving and critical thinking skills and highlights the importance of science to society. Therefore, geology can serve as an introduction to the life and physical sciences or as a capstone course requiring students to apply their knowledge of these sciences. Geology can also serve as a framework for investigating life and physical sciences in museums and other informal education venues.

AGS encourages the following:

- Teaching geology at all levels of K-12 school systems;
- Teaching geology at the same academic level as physics, chemistry, and biology;
- Teaching geology as a high school laboratory capstone science course that contributes toward college admission credit;
- Inclusion of undergraduate and/or graduate geology courses in all teacher candidate preparation for those seeking elementary and middle childhood licensures, depending upon state and institutional requirements.

AGS encourages its members to:

- Dedicate one day per year, in a school classroom or in the field, teaching geologic concepts to students. Employers are encouraged to support their staff who are willing to donate their time in this effort.

AGS prepared this position statement, which is based on a Geological Society of America position statement on the same topic, because AGS members recognize the importance of geologic education to the future of society and our chosen profession.

Arizona Geological Society Membership Stats

Total Membership	Professional Members	Student Members	Organizational Members
526	377	142	7

Arizona Geological Survey News Brief



[Arizona Mining Review](#) (AMR) e-Video Magazine – 2/25/2015

AMR on the road at Mining Day at the Capitol. The Arizona Mining Alliance and Arizona Rock Products Association jointly hosted Mining Day at the Capitol on 11 Feb. 2015. Nyal Niemuth and the AMR video team talked with the organizers and members of the Arizona Legislature about the role of mining in Arizona, its challenges and successes.

- Legislators Sylvia Allen, Frank Pratt, TJ Slope, and Senate President discuss the impacts of mining in their districts,
- Kelly Norton (AMA) and Steve Trussell (ARPA) provide an overview of mining, growth and the Arizona economy.

Catch AMR on YouTube ([AZGS YouTube Channel](#)) following our livestream broadcast at 10:00 am MST on 25 February.

New Publications – Online at the AZGS Document Repository (repository.azgs.az.gov)

Richard, S.M. (compiler), 2015, Geologic map of the southwestern part of the Tonto National Forest, Gila, Maricopa, Pinal and Yavapai Counties, Arizona. Arizona Geological Survey Digital Geologic Map, DGM-76, map scale 1:130,000. http://repository.azgs.az.gov/uri_gin/azgs/dlio/1615

Spencer, J., and Richard, S., 2015, Map index for geologic maps available from the Arizona Geological Survey. Arizona Geological Survey Open-File Report, OFR-15-01, 32 p. and 15 illustrations. http://repository.azgs.az.gov/uri_gin/azgs/dlio/1616

Museum Bill Advances in State Senate (from the Arizona Blog of Lee Allison)

Senate Bill 1200, which would transfer the former Mining & Mineral Museum from the Arizona Historical Society (AHS) to the Arizona Geological Survey (AZGS), passed 5-0 in the Arizona Senate Rural Affairs and Environment Committee yesterday.

The bill directs AZGS to re-open the museum as the Mining, Mineral, and Natural Resources Education Museum, to include the elements planned for the proposed Centennial Museum that was never developed - agriculture, livestock, specialty crops, tourism, and education. The bill's sponsor, Sen. Gail Griffen, told the committee that her intent is that the museum would encompass forestry, range management, and wildfire impacts as well. The bill would also transfer \$428,300 from the Arizona Historical Society to AZGS to cover the rent on the building and the salary for one curator.

ANNOUNCEMENTS

Welcome New AGS Members

Valerie Bullock

Walter Kokola

Alexandra Macho

Nicole Sweetland

Jennifer Dabbs

Daniel Koning

Joseph Reiter

Raymond Irwin

James Lombard

Leonhard Schuh

Arizona Geological Society is grateful to Freeport-McMoRan, Inc for their generous support of our student members!



Freeport-McMoRan is sponsoring student dinners for the 2015 AGS monthly meetings.

2015 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

Please mail check with membership form to: Arizona Geological Society, PO Box 40952, Tucson, AZ 85717

Dues (check box) 1 year: \$20; 2 years, \$35; 3 years: \$50; full-time student (membership is free)

NEW MEMBER or RENEWAL? (circle one) Date of submittal _____

Name: _____ Position: _____

Company: _____

Mailing Address: _____

Street: _____ City: _____ State: _____ Zip Code: _____

Work Phone: _____ Home Phone: _____

Fax Number: _____ Cellular Phone: _____

E-mail: _____ Check this box if you do not have an email address

All newsletters will be sent by email. If you do not have an email address, we will mail a hard copy to you, but we cannot guarantee timeliness.

If registered geologist/engineer, indicate registration number and State: _____

Enclosed is a _____ tax-deductible contribution to the J. Harold Courtright or the Arizona Geological Society Scholarship Funds.