



Arizona Geological Society Newsletter

ARIZONA GEOLOGICAL SOCIETY, INC., TUCSON, AZ

AUGUST 2011

August 2, 2011 DINNER MEETING

Dr. Spencer Titley will be our featured speaker. See abstract below.

Where: Sheraton Four Points Hotel, Wild Cat Room, 1900 E. Speedway Blvd. in Tucson
When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.
Cost: With reservation, members \$24, guests \$27, Students \$10 (students free with online reservation).
Without a reservation, a \$3 surcharge will be added (if the hotel is able to accommodate you).

RESERVATIONS: CALL 520.663.5295 by 5 p.m. on July 29, 2011.

Please indicate low-salt, vegetarian, or vegan meal preferences. A coffee/salad/roll/dessert option is also available for \$18.
Please cancel if you are unable to attend. The hotel cannot guarantee that meals will be available without a timely reservation.

ABSTRACT

Evolution of the Practice of Economic Geology During the Twentieth Century

Spencer R. Titley, University of Arizona

A century of activity by economic geologists resulted in an extraordinary epoch of discovery of mineral resources. Many components of the practice contributed to this record that was both field and laboratory driven. The efforts and emphasis on the search for ores may be temporally separated into three periods.

In the earliest, research and exploration followed independent paths. We were learning new things with the advent of analytical and mathematical advances. Prospecting continued to expand from successes of the 19th century when those early discoveries were based mostly on outcrop studies. Important engineering advances were starting to contribute to mining efficiencies. By the middle of the twentieth century, in great part driven by post-WWII expansions, *discoveries were driving research* that resulted in a broadened understanding of occurrences of minerals and rocks, as well as an understanding of the evolution of planetary architecture. By the late twentieth century, exploration and increasing and broadened material requirements resulted in *research driving discovery*.

This presentation will review high points of advances during these three periods of the century and summarize and discuss a point of view that proposes the most fundamental advances and contributions to discovery knowledge during the century—the ore deposit classification and the knowledge of crustal history and architecture.

Spencer R. Titley is Professor of Geosciences Emeritus at the University of Arizona where he has taught Economic Geology, Geochemistry, and Regional Geology for more than 50 Years. He graduated from the Colorado School of Mines with the Degree of Geological Engineer in 1951 and received his Ph.D. from the University of Arizona in 1958. During studies at Mines, he worked partial summers as a contract miner in Colorado. He has worked full time in industry as a mining and exploration geologist with stints at Gilman, Colorado and Hanover New Mexico, as well as in exploration geology in the southwest. He has traveled widely and written extensively about both ores in regions of the Pacific Rim where he has worked during release time as a teaching consultant with many corporate exploration groups and as an exploration consultant in deposits of island arcs. His professional focus has been on the geology, exploration and engineering parameters of ore deposits in the Pacific Rim with emphasis on porphyry copper deposits. He continues to teach, write and carry out research at the University of Arizona.

Announcements

Good news for students! The AGS Executive Committee has agreed to provide a limited number of free meals at our dinner meetings to students who make *advance online* reservations. The dinners are made possible through industry sponsorship of the monthly meetings. Students also are encouraged to sign up for free membership. AGS is a great way to make contact with prospective employers!

If your company is interested in a sponsoring a dinner meeting, contact Ann Pattison, AGS VP of Marketing.

Conference Announcement: Opportunities for Alternative Energy Development in Arizona and the Southwest—Geologic/Hydrologic Considerations

Tempe, Arizona, October 27-28, 2011

Sponsored by AEG and the Arizona Land Subsidence Group

More information about the presenters/topics, sponsorship, exhibits, and registration can be found at this link:

<http://www.aegweb.org/i4a/pages/index.cfm?pageID=5464>

The **Arizona Hydrological Society** is convening their annual symposium on “Watersheds Near and Far” in Flagstaff on September 18-20, 2011. For more information, and to sign up, go to:

http://www.azhydrosoc.org/2011_symposium.html

Thank you to new AGS member **Carmon Dexter Bonanno** of Kansas City, MO for his contribution to the Courtright Scholarship Fund. Mr. Bonanno is President of Arizona Oil and Gas, Inc.

Save the date – October 1, 2011

AGS Field Trip to Subsidence Cracks and Fissures in Cochise County!

At our monthly dinner meeting several months ago, Brian Conway of the Arizona Department of Water Resources (ADWR) gave a fascinating presentation about satellite-derived detailed measurements of land subsidence in Arizona, accompanied by photos of land fissures and cracks that have developed as a result of this subsidence.

The Arizona Geological Survey (AzGS) operates the “Earth Fissure Center” (EFC) that studies these features. The EFC has been monitoring a relatively new set of fissures that has developed south-southeast of the Willcox Playa, in Cochise County. Geologist Joe Cook, Program Manager for the EFC, has offered to lead an AGS field trip to these fissures on Saturday, October 1, 2011.

Details of the trip are yet to be set, but we will assemble our group at the DeConcini Building of the University of Arizona before 8:30 a.m., and head over and down to Cochise Co. in AGS-provided vans. (For participants coming from east or southeast of Tucson we can arrange some kind of rendezvous point.) Cost per person will be on the order of \$40-45, and walking will be on generally level ground, but with lots of low, leg-scratching shrubbery (i.e. DON'T wear shorts!) Total walking distance will likely be about 1½ miles.

Watch for additional details in future issues of the AGS Newsletter.



A Cochise County earth fissure that is being monitored by the EFC. Photo courtesy of Arizona Geological Survey Earth Fissure Center

<http://www.azgs.az.gov/EFC.shtml>

August Member Spotlight—Claudia Stone

Claudia Stone was born in Washington D.C. and grew up in D.C. and northern Virginia. After receiving a B.S. in Journalism from Marquette University, she became interested in geology and received an M.S. in Geology and Geophysics from the University of Hawaii. She is a Senior Consultant at SRK Consulting, where she has been employed since 2006. Claudia has given much of her time to AGS. She first served on the Executive Committee in 1982 as V.P. of Field Trips. She served as AGS President in 1983. For several years she served as Secretary, and she is currently a Councilor. Claudia lives in Tucson with her husband, Ken Hollett, who is also an AGS member, and their dog, Sally, who is not.



How did you first become interested in geology? I was living in Hawaii, on Oahu, and could not figure out why the windward and leeward sides of the island were so different. I bought Harold T. Stearn's booklet, *Road Guide to Points of Geologic Interest in the Hawaiian Islands*.

It told me the caldera of the Koolau Range on Oahu was three miles out to sea and where to find augite crystals. I didn't know what a caldera was and I didn't know what an augite crystal was or why they were worth finding. So I bought Stearn's hardback book, *Geology of the State of Hawaii*. After that I took a course in geology at the University of Hawaii and never looked back. (While in graduate school I was able to work with Dr. Stearns for a day on the Hawaii geothermal well that had been drilled on the Big Island ...and I have a small vial of augite crystals from Hawaii that I value greatly.)



What was your first job? My first job was working in the cheap ladies' dresses department and cheap linen department of Hecht's Department Store in Arlington, Virginia during my senior year of high school. (The cheap merchandise was in the basement.) I think I was good at my job because I was not turned loose after the Christmas rush!

What was your first job as a geologist? The first geology money I earned was in graduate school when Lone Star needed to know the hardness of some sand-blasting material. Dr. Macdonald told me never to charge for less than half a day, and at my level of experience I should charge \$100 per day. I bought a sapphire ring with my first \$50. Later on, my first real job in geology was as a Geologist with the Geothermal Program, Arizona Bureau of Geology and Mineral Technology in Tucson (forerunner of the Arizona Geological Survey).

Continued on page 4

What is your most memorable field experience? My most memorable field experience happened the first time I was REALLY in the field. I came to Tucson in a doctoral program at UA and was given a RA position in the Geothermal Program at the Bureau of Geology and Mineral Technology. Shortly after starting, I went on a field trip to the White Mountains with Wes Peirce and Dick Hahman. Standing on the outcrop, Wes held out his hand to me and said, “I have something for you, Claudia.” I knew in a split second that I was being set up and had less than a split second to think, “If he can hold it, I can hold it,” and stuck out my hand. He dropped a baby horned toad into my palm and was disappointed, I think, that I didn’t throw it into the air and run off screaming into the brush.

I also identified some flows with a diktytaxitic texture and impressed the pants off everyone. It took Dick Hahman about 18 years to learn to pronounce diktytaxitic.

What do you consider your greatest professional achievement? Determining the absence of a geothermal resource in the Springerville area, long before the Department of Energy was conned into paying for a 3,000+ foot geothermal test hole that definitely was not hot.

How about your greatest achievement EVER? Raising three capable children who are accomplished and successful adults.

What are your hobbies? Working, gardening, rafting the Grand Canyon (this is a new one!), camping, traveling, reading.

Water, Whiskey or Wine? Right now? ...water.

Thanks, Claudia!

Do you know someone who would be an interesting subject for a “Member Spotlight” column? Email his/her name and contact information to ajones@clearcreekassociates.com.

Grand Canyon Trip a Success!

Six AGS members and their family members were part of a larger group that rafted through the Grand Canyon on July 10-17. We were fortunate to have great weather and big water (27,000 cfs)! This photo shows Stan Beus (yellow shirt at the right of the photo) discussing the basal conglomerate of the Esplanade Formation in the Supai Group at North Canyon. He also told stories about his experiences with Eddie McKee in the Grand Canyon. AGS member Susan Miller is shown photographing the basal conglomerate. Will we hear about this in your next murder mystery, Susan???



Veterans' Day Weekend AGS Field Trip 2011

(November 10-13, 2011)

3½-day / 3-night trip out of Yuma

Origin of the Salton Sea

Get yourself, your family, and your friends to Yuma by bedtime on Thursday, November 10, and be ready to begin a 2½-day field trip the next morning to learn about the Origin of the Salton Sea, the largest lake in California, and the **largest accidental man-made lake in the world!** Bring your valid passport or border crossing card, because we'll make a couple of hours traverse of the Colorado River Delta on the Mexican side of the US/Mexico border.

After several decades of “what if...” speculations and proposals to divert some of the Colorado River into the below-sea-level lands of the Salton Sink, a couple of ambitious entrepreneurs formed the California Land Company, built a head-gate to divert some of the Colorado into a pre-existing but usually dry distributary known as the Alamo River, and began to promote settlement and irrigated farming in their newly invented “Imperial Valley” in 1900. The first settlers arrived in 1903, and for a couple of years their scheme was wildly successful.

But in 1905, during a temporary repair project, disaster struck—a series of unexpected floods came ripping down the Gila and Colorado Rivers, quickly over-topping the temporary intake works and within days the entire flow of the Colorado River was coursing westward and then north into the Salton Sink, filling it with what would soon be known as the Salton Sea. Productive farmlands were flooded, elaborate irrigation canal networks were washed out on both sides of the border, a financially successful salt works near the lowest part of the valley was inundated, the increasingly important mainline of the Southern Pacific Railroad repeatedly had to be relocated, and 15-foot head-cut waterfall migrated upstream through the nascent border towns of Calexico and Mexicali, which together had become the largest commercial center in the region.

The highly resented Southern Pacific Railroad eventually became the hero of the effort to staunch the flow of the river and get it headed back to the Gulf of California, notwithstanding a many-months appropriation of every spare hopper car and rock quarry in the western U.S., and the actual one-time loss of a whole train into the breach. Epes Randolph of Tucson was the man in charge of directing SP efforts to stop the flow into the Salton Sea. (He later became the head of the Arizona Board of Regents, and after his death Tucson's Randolph Park was created and named in his honor.)

The recriminations and aftermath of this disaster ultimately resulted in the involvement of the federal government and the construction of an “All-American Canal” and the Boulder Canyon Project. Did you know that Hoover Dam is pretty much a direct result of the events that created the Salton Sea?

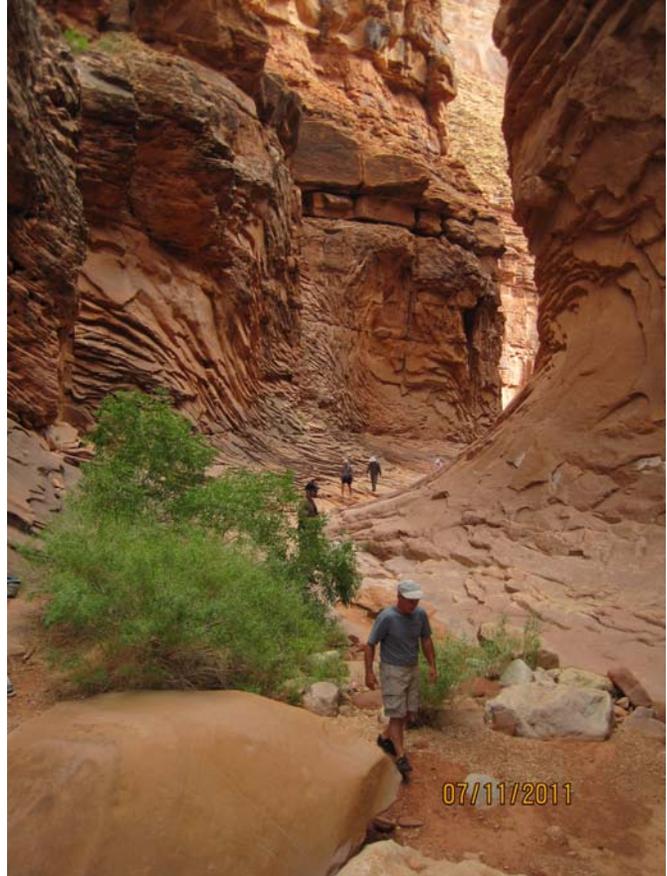
Additional water manipulations in the Colorado River Delta region have caused considerable consternation on both sides of the border, including the construction and subsequent modifications of the Wellton-Mohawk Project along the lower reaches of the Gila River in Yuma County. The long-standing issue of water salinity associated with that project resulted in the construction of a nuclear powered desalination plant west of Yuma. That facility was completed more than 30 years ago, but has never really been put into use. A one-year extensive test of the system was finally achieved and ended just last year. Our Veterans' Day weekend trip will include a guided visit to the plant for our AGS group on Friday, November 11.

Watch for further information about this trip in coming AGS newsletter issues, and be prepared for an early registration once the final details of this trip are determined. Estimated trip cost of \$300-350 per person will include three nights accommodation in Yuma (based on double occupancy), including full buffet breakfasts, van transport in and out of Yuma for day excursions in California and Mexico, and visits to and along the Salton Sea.

This trip will involve a minimum of walking, and is suitable for young people down to age 14 who might have either a historical or geographic/geological bent. November weather in the Yuma area and southeastern California is usually pretty mild, and precipitation is extremely unlikely. (Wind, is, however another matter...)

North Canyon was the first campsite of our Grand Canyon raft trip on July 10-17. Only one of dozens of fabulous stops during the trip, it allows for closeup views of the Supai Group.

We will post a more detailed article about this trip in a future edition of this newsletter.



2011 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

Starting in 2011, 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 Scholarship Fund.