



# Arizona Geological Society Newsletter

ARIZONA GEOLOGICAL SOCIETY, INC., TUCSON, AZ

NOVEMBER 2010

## November 2, 2010 DINNER MEETING

**Peter K. M. Megaw** 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 pm, Dinner at 7 pm, Talk at 8 pm.

**Cost:** With reservation, members \$24, guests \$27, Students \$10.

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 October 29, 2010.** Indicate low-salt, vegetarian, or vegan meal preferences. A coffee/salad/roll/dessert option is also available for \$18. Please cancel if unable to attend. The hotel cannot guarantee that meals will be available without a timely reservation.

## ABSTRACT

### Discovery of the Silver-Rich Juanicipio-Valdecañas Vein Zone, Western Fresnillo District, Zacatecas, Mexico.

Peter K.M. Megaw, IMDEX Inc., and MAG Silver Corp.

The 2003-2005 discovery of the important Juanicipio-Valdecañas vein zone in the western part of the famous Fresnillo silver district was the result of ten years of research and geological fieldwork predicated on the idea that the Fresnillo district was much larger than conventionally believed. High levels of vein exposure, extensive cover, and weak surface geochemical signatures historically hampered exploration in the district and arguably resulted in a limited perception of the overall system. Nevertheless, new exploration success was the consequence of a continuation of discovery history in the district, just with a wider application of established concepts and broader scope of vision.

Information from published studies and reconnaissance field observations from the district were combined with improved academic understanding of the importance of variations in boiling levels in low sulfidation epithermal vein systems to generate the concept that the extensive alteration zone, five kilometers west of the Fresnillo mine, concealed additional veins. However, detailed geologic mapping, geochemical sampling, and geophysical surveys were required to convince investors that the concept was worth pursuing. The spectacular successes validate the work and demonstrate that several mineralization centers, with different boiling depths, were active in different places at various times in the district. This creates new exploration possibilities for the Fresnillo district and suggests that seeking vertically and laterally shifting mineralization centers in any large epithermal vein camp may be fruitful, particularly where mining and exploration have been confined to relatively limited areas or within vertically restricted zones.

---

**Dr. Peter K.M. Megaw**, Consulting Geologist, is President of IMDEX/Cascabel and co-founder of Minera Cascabel and MAG Silver. Dr. Megaw has 30 years involvement in Mexican geology and has become well known in the Mexican mining industry and is a frequent speaker at international academic and technical symposia. His Ph.D. work at the University of Arizona was an exploration-focused geological/geochemical study of the Santa Eulalia Ag-Pb-Zn District, Chihuahua and Carbonate Replacement Deposits (CRDs) in general. He has published extensively on CRDs and his primary exploration foci are CRDs, Epithermal Vein Deposits and Porphyry Copper Deposits. He and his team are credited with the significant discoveries at Juanicipio-Fresnillo, Zacatecas; Platosa, Durango; and Cinco de Mayo, Chihuahua. Dr. Megaw has served on the Board of MAG Silver since 2005, and Candente Resources since 2003. He is also a dedicated mineral collector and has published extensively on the mineralogy of Mexico and the application of mineralogical interpretation to exploration. Dr. Megaw was awarded the Carnegie Mineralogical Medal for 2009.

## November Member Spotlight—Jon E. Spencer

**Jon Spencer** was born in Palo Alto, California. He received a Bachelor's degree in geology from University of California-Santa Cruz in 1977 and a Ph.D. in Geology from M.I.T. in 1981. Jon has been a very active AGS member for many years, having served on the Executive Committee from 1992 to 2008. He was President of AGS in 2001, and he served as co-editor of AGS Digest 22 in 2008 with Spencer R. Titley. Jon and his wife, Margaret Kurzius-Spencer, raised "two wonderful children", both now in their 20s. Jon is employed as Senior Geologist at the Arizona Geological Survey.

**How did you first become interested in geology?** It started when I learned that the San Andreas fault was located pretty much at the foot of the driveway where I lived on the San Francisco peninsula. That interest was fueled enormously when my mother Jackie started dating then Stanford geology professor Bill Dickinson (they got married when I was 17). The plate tectonics revolution was in full swing, and Bill was great at explaining to my brother and me what all the excitement was about.

**What was your first job?** I was a housing construction worker during the summer of 1972 near Sacramento in northern California. It was an innovative housing construction project employing student labor at the University of California, Davis. The houses were fiberglass domes. I cut out rectangles in the fiberglass with a pneumatic saw and installed windows and doors. It was hot and pretty miserable work, and provided plenty of incentive to stay in college.

**What was your first job as a geologist?** When I was an undergraduate I began working for Bill Normark in the Marine Geology Branch of the USGS (1977), and worked intermittently there for four years, mostly reducing marine geophysical data. The highlight of that job was working as a navigator for two weeks at sea on a USGS ship (the "S.P. Lee"), doing seismic-reflection profiling of the Monterey deep-sea fan. With a crew of about 20 and a scientific party of about 20, we exited the San Francisco Bay under the Golden Gate Bridge and headed southwest for about 18 hours of seismic profiling, with unusually big swells from the Gulf of Alaska hitting the ship broadside all the way. Many of the greenhorns, including me, got sea sick, and the swells lasted for six days. We almost had to return to port because one geologist remained sick and unable to hold down water for the entire six days. Although we had smooth seas for the rest of the voyage, the experience did not inspire me to pursue a career in marine geophysics.

**What is your most memorable field experience?** John Welty and I were working in the Buckskin Mountains in the 1980s when we drove to an old mine site which, to our surprise, was occupied by the claim holder who was collecting rattlesnakes to sell to a researcher at UC San Diego. He had dozens of them in wire bins. His hand was bandaged because he had very recently lost his finger due to a rattlesnake bite. "Do you want to see my snakes?" he said. Well, OK, we saw his snakes. Then John asked about the charcoal we had seen there the previous year, spread out in rectangles on the ground. He told us how he had two partners, that they had gotten into a fight and one had killed the other, that they spent all of their money trying unsuccessfully to keep the survivor out of prison, and that the widow came out and burned down all the buildings. That was a memorable story from a memorable guy (John and I referred to him as "Lefty").



**Jon Spencer and his friend, Quito.**

## Member Spotlight—Jon E. Spencer (continued)

**What do you consider your greatest professional achievement?** In 1984 I read an article in *Scientific American* titled “The continuous processing of metals in the U.S.S.R.” that explained the metallurgical process of continuous casting. It occurred to me some time later that the long grooves on core complexes could have been produced by an analogous process that occurred at tectonic rates (tectonic continuous casting). I wrote an article on this, published in *Geology* in 1999. The process is probably most applicable to deep-sea core complexes, which were barely known in 1999.

**How about your greatest achievement EVER?** Having a long and rewarding career as a geologist at the Arizona Geological Survey. It is really difficult to land a research-oriented job, especially one with many diverse avenues of inquiry. I feel very fortunate to be here, to be in a State with such interesting geology, and to have worked with some really great people over the past 28 years.

**What are your hobbies?** Geology is my biggest hobby. When I am not at work I am free to study any aspect of it, not just Arizona geology. This year I had a paper published that made use of Space Shuttle radar data to identify and analyze core complexes in Indonesia and New Guinea. That was great fun.

Thanks, Jon!

## Fall Field Trip Report—Ajo District and the New Cornelia Mine

AGS members were treated to a visit of the inactive New Cornelia open pit copper-gold mine at Ajo and the surrounding district on October 16, 2010. Great weather, presentations, and outcrop geology were enjoyed by 28 participants. AGS members Ralph Stegen and Will Wilkinson (Freeport-McMoRan), William Brack (formerly of Phelps Dodge Ajo Operations), and Dennis Cox (USGS retired) co-led the trip. We had excellent overview presentations by Ralph, Will, and Bill and then made three stops in the pit to look at the geology and mineralization. We also had good discussions led by Dennis on stops in the immediate Ajo region. Thanks go to Freeport-McMoRan for their hospitality and permission to visit the site, and to Dennis for traveling from California to participate. If you have possibilities for an upcoming trip, or would like to lead or coordinate a trip, please contact VP Field Trips Doug Shakel at [Dshakel@dakotacom.net](mailto:Dshakel@dakotacom.net).



Group photo from Concentrator Hill overlooking the New Cornelia open pit and the town of Ajo. Front and center are Jeff Gerwe, Doug Shakel, and Claudia Stone.



Dennis Cox reviews the geology of the Ajo district. Claudia Stone, Thomas Parkhill, and Jan Rasmussen in the foreground.

More photos—page 4

## Ajo District and the New Cornelia Mine—continued



L to R— Ann Pattison, Kevin Horstman, Dick Jones, and Coleen Brown at a stop on the edge of Ajo.

More photos of this fabulous field trip will be published in the December newsletter! Stay tuned!



Will Wilkinson of Freeport-McMoRan was one of the field trip leaders. The New Cornelia Pit is visible on the left side of the photo.

## Announcements

The **SME Arizona Conference** will be held December 5-6 at the Hilton El Conquistador Hotel in Oro Valley. A number of AGS members will be presenting talks and chairing sessions. The program includes technical talks presented on Dec. 6<sup>th</sup> in the fields of Geology, Environmental, Mining, New Institute for Mineral Research, Mineral Processing/Metallurgy/Smelting, Mexico, and New Projects. Early registration deadline is November 5. For the technical program and registration details, see the Meetings link at [www.smenet.org](http://www.smenet.org) or call 1-800-763-3132.

The **Mining Foundation of the Southwest** announces the **28<sup>th</sup> Annual American Mining Hall of Fame Banquet and Fundraiser** to be held at the Tucson Marriott University Park on Saturday, December 4. Among the honorees are Stanford geology professor Dr. Charles F. Park, Jr. (Inductees from Mining's Past) and AGS member **Nyal Niemuth**, Chief Engineer, Arizona Department of Mines & Mineral Resources (Medal of Merit). The MFSW is a non-profit organization founded to promote public understanding of mineral resources and the mining industry. Registration and sponsorship information is found at [www.miningfoundationsw.org](http://www.miningfoundationsw.org).

By now you should have received your **AGS 2010 Member Directory**. Kudos go to those who contributed photos and to Cori Hoag, VP Marketing, for coordinating the effort. Remember your directory is for personal use only; you can purchase additional copies for \$5 at a dinner meeting. Thanks to the **advertising sponsors** who offset the design and publication costs: **ARCHAEOLOGICAL CONSULTING SERVICES, LTD., BAROID INDUSTRIAL DRILLING PRODUCTS, BOART LONGYEAR COMPANY, BRONCO CREEK EXPLORATION, CLEAR CREEK ASSOCIATES, GOLDER ASSOCIATES, INDEPENDENT MINING CONSULTANTS, INC., MINTEC, INC., MONTGOMERY & ASSOCIATES, ROSEMONT COPPER, SRK CONSULTING, and STEWART BROTHERS DRILLING CO.**



## CalPortland Cement Plant — Field Trip Report

Cori Hoag reports that there were 14 enthusiastic participants on the joint AGS-Mining Foundation of the Southwest tour of the cement plant at I-10 and Rillito held on October 1, 2010 . After a brief introduction on the uses and manufacturing of cement, CalPortland Quality Manager Bill Phillips and Safety Manager Frank Obregon led the group on a fascinating tour of the plant, preheater tower, kiln, control room, ball mill, cement storage facility, and laboratory. We learned a lot and thank CalPortland for allowing us to tour the facility. Next time, we may get the chance to see the quarry operations. See [www.calportland.com](http://www.calportland.com) and [www.cement.org](http://www.cement.org) for more information on cement.



Group photo from 7<sup>th</sup> floor of the Kiln 4 Preheater Tower. L to R front: Jim Hays, Louis Pill, Rex Dustin, Larry Dykers, Jasper Begay. L to R back: Jan Rasmussen, Jeff Cornoyer, Bill Phillips, Bob Metz, Cori Hoag, Mike Block, and Danny Russin.



Cement Plant facilities and the 7-story high Kiln 4 Preheater where the crushed limestone is preheated before going into the kiln.



### NOVEMBER FIELD TRIP—King Canyon Loop Hike, Tucson Mountains – Saturday, November 13th

Join AGS member and hydrogeologist **Dawn Garcia** on a half-day geologic hike in the heart of the Tucson Mountains. The moderately difficult climb to the top of Mt. Wasson (4,687 ft elev.) is rewarded with spectacular views of the Tucson Basin and a panorama of the surrounding mountains that circle the basin. The Tucson Mountains are the site of a former volcanic caldera. This hike allows you to walk over the three types of rock that form the Tucson Mountains (pre-caldera, rocks within the caldera, and post-caldera igneous rocks). The trail takes you through the “Tucson Megachaos”, where you’ll see the lava flows from the ancient volcano. Trip bonuses: Sonoran desert vegetation, a mine adit, and Hohokam-era petroglyphs (950 AD to 1450 AD).

Difficulty: moderately difficult, 8-mile loop with one steep section of switchbacks.

Trail conditions: rough in sections of volcanic rock, smooth walking in areas where the igneous rocks have eroded into sandy gravel

Meeting Location: King’s Canyon Trailhead parking lot at 9 a.m. From Speedway Blvd, drive west over Gate’s Pass to N. Kinney Rd. Turn N (right) onto Kinney Rd and continue past entrance to Arizona-Sonora Desert Museum. Entrance to King’s Canyon Trail parking lot is a dirt road on north (right) side of Kinney about ¼ mile past the Desert Museum. Hike is expected to take 4-4.5 hours including a snack break at the top Mt. Wasson. Bring water, snacks, sturdy shoes or hiking boots, hat, and sunscreen. Hiking sticks are recommended.

RSVP: Dawn Garcia at [dgarcia@srk.com](mailto:dgarcia@srk.com) or (520) 471-9387 by November 12th. Group size limited to 15.

Fee: \$5 expected per person; Golden Age, Senior, and other park passes are applicable so fees may vary.



ARIZONA GEOLOGICAL SOCIETY

P.O. Box 40952
Tucson, AZ 85717-0952
Phone: 520.663.5295
www.arizonageologicalsoc.org

NON-PROFIT ORG.
U.S. POSTAGE PAID
TUCSON, ARIZONA
PERMIT NO. 1346

RETURN SERVICE REQUESTED

www.arizonageologicalsoc.org
AGS books and maps are sold at the
monthly dinner meeting and by the
Arizona Geological Survey. Visit the
AZGS website
www.azgs.state.az.us
and click on
Non-AZGS Publications

2010 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)

Name: \_\_\_\_\_ Position: \_\_\_\_\_

Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Street: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Work Phone: \_\_\_\_\_

Home Phone: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Cellular Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

I wish to receive newsletter by E-mail [ ] Regular mail only [ ] E-mail AND Regular mail [ ]

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

Enclosed is a \_\_\_\_\_ tax-deductible contribution to the J. Harold Courtright Scholarship Fund.