



Los Alamos Geological Society
P.O. Box 762, Los Alamos, NM 87544-0762

September Meeting

Time: Tuesday, September 21, 2010, 7:30 pm

Place: Christian Church

92 East Road

Los Alamos, NM 87544

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Geothermal Energy – The Real Thing or a Passing Fad?

Shari Kelley, Ph.D., New Mexico Bureau of Geology and Mineral Resources

New Mexico has much potential for low to moderate temperature geothermal resource development that will provide direct heating for buildings, greenhouses, and aquaculture. New Mexico and the southwestern United States were evaluated for geothermal potential during the 1970s to 1980s, and most of the significant, easy-to-find, resources were developed during that timeframe. Over the course of the last two years, the geothermal industry has been revived nationwide. Is the revival simply driven by an infusion of stimulus dollars into green technologies by the Obama administration or have there been important advances in technology during the last 20 to 30

years? The answer is “yes” to both questions. The technological advances in the geothermal industry in recent years and the current direction of geothermal evaluation across our country will be presented. Two New Mexico-based projects, the assessment of the geothermal resource on the Pueblo of Jemez and the construction of a geothermal database for New Mexico that will be incorporated into the National Geothermal Database System, will keep New Mexico on the leading edge of this green technology. A version of this talk was given for the Frontiers in Science colloquium series in the spring of 2010.



Shari Kelley works for the New Mexico Bureau of Geology and Mineral Resources and is adjunct faculty in the Earth and Environmental Science Department at New Mexico Tech. Shari is a field geologist who has investigated a variety of volcanic centers

around New Mexico, including the Jemez Mountains, Mt. Taylor, and Sierra Blanca volcanic fields. Recently, Shari was hired as the Senior Geophysicist at the Bureau and is working to evaluate, with a team of many people, the geothermal possibilities in our state.

Upcoming Meetings

October 19, 2010—to be announced.

November 16, 2010—speaker will be Richard Stead.

December 2010—annual Wrap a Rock party.

January 2011—Annual Banquet.

Water in Earth's Mantle Key to Survival of Oldest Continents *Science Daily, Sept. 2, 2010*

Earth today is one of the most active planets in the Solar System, and was probably even more so during the early stages of its life. Thanks to the plate tectonics that continue to shape our planet's surface, remnants of crust from Earth's formative years are rare, but not impossible to find. A paper published in *Nature* Sept. 2 examines how some ancient rocks have resisted being recycled into Earth's convecting interior.

Throughout the world there exist regions of ancient crust, referred to as cratons, which have resisted being recycled into the interior of our tectonically dynamic planet. These geologic anomalies appear to have withstood major deformation thanks to the presence of mantle roots. A mantle root is a portion of Earth's mantle that lies beneath the craton, extending like the root of a tooth into the rest of the underlying mantle.

Just like a tooth, the mantle root of a craton is compositionally different from the normal mantle into which it protrudes. It is also colder, causing it to be more rigid. These roots were formed in ancient melting events and are intrinsically more buoyant than the surrounding mantle. The melting removed much of the calcium, aluminum, and iron that would normally form dense minerals. Thus, these roots act as rafts bobbing on a vigorously

convecting mantle, on which old fragments of continental crust may bask in comparative safety.

However, geophysical calculations have suggested that this buoyancy is not enough to stop destruction of the mantle roots. According to these calculations, the hotter temperatures that are widely thought to have existed in Earth's mantle about 2.5 to 3 billion years ago should have warmed and softened up the base of these roots sufficiently to allow them to be gradually eroded from below, leading to their eventual destruction as they were entrained, piece by piece, into the convecting mantle. A stronger viscosity contrast between the root and the underlying mantle is required to ensure preservation.

In the Sept. 2 issue of *Nature*, Anne Peslier, an ESCG-Jacobs Technology scientist working at NASA-Johnson Space Center and her colleagues David Bell from Arizona State University and Alan Woodland and Marina Lazarov from the University of Frankfurt, published measurements of the trace water content of rocks from the deepest part of a mantle root that offer an explanation for this mystery.

"It has long been suspected, but not proven, that cratonic mantle roots are dryer than convecting upper mantle," explains Bell, an associate research scientist in the School of Earth and Space Exploration and the department of chemistry and biochemistry in ASU's College of Liberal Arts and Sciences. "The presence of very small quantities of water is known to weaken rocks and minerals.

During partial melting, such as that experienced by the mantle roots, water -- like calcium, aluminum and iron -- is also removed."

The researchers used samples found in diamond mines of Southern Africa, where the ancient crust of the Kaapvaal craton was pierced about 100 million years ago by gas-charged magmas called kimberlites. These magmas were generated at depths of about 125 miles (200 kilometers) beneath the mantle root and ascended rapidly (in a matter of hours) through the Earth via deep fractures, bringing with them pieces of the rocks traversed, including diamonds. After erupting explosively at the surface, the magmas solidified into the pipe-like bodies of kimberlite rock that were subsequently mined for their diamonds.

The mantle rocks analyzed by the team were transported from a range of depths down to 125 miles (200 km) below the surface, where they had resided since their formation around 3 billion years ago. The samples of rock called peridotite are composed mainly of the mineral olivine, with minor quantities of pyroxenes and garnet. Olivine is, because of its abundance, the mineral believed to control the rheological properties of peridotite.

What Peslier and colleagues found is that beyond a depth of about 112 miles (180 km), the water content of olivines begins to decline with depth, so that the olivine in peridotite samples from the very base of the cratonic

mantle root contained hardly any water. That makes these olivines very hard to deform or break up, and may generate the strong viscosity contrast with that geophysical models of craton root stability require.

Why the bottom of the mantle root has dry olivines is still a matter of speculation. One possibility, suggested by Woodland, is that reducing conditions thought to prevail at these depths would ensure that fluids would be rich in methane instead of water. Bell suggests that melts generated in the asthenosphere, such as those eventually giving rise to kimberlite eruptions, may scavenge any water present while passing through the base of the cratonic root and transport it into the overlying shallower mantle.

These results reiterate the belief shared by many scientists that knowing how much water is present deep in terrestrial planets and moons, like Earth, Mars or the Moon, is important to understanding their dynamics and evolutionary history.



This is an image of a sample of cratonic mantle root from Kimberley, South Africa. The rock consists of dark green olivine, whitish-green enstatite, emerald green diopside and purple garnet. (Credit: David R. Bell / ASU)

Journal Reference:

Anne H. Peslier, Alan B. Woodland, David R. Bell, Marina Lazarov. Olivine water contents in the continental lithosphere and the longevity of cratons. *Nature*, 2010; 467 (7311): 78 DOI: 10.1038/nature09317

LAGS Regular Meeting Tuesday, 17th August, 2010

By Paul Bradley

The August 2010 meeting of LAGS was on the 17th and we had a good crowd – about 30 people – for Joyce’s “far out” topic of helioseismology, which describes studying the interior structure of the Sun using the sound waves visible on its disc. The meeting started with announcements, mostly concerning the fact the Earth Treasure show planning is about to begin. The show will be on December 4 and 5, with setup on Friday the 3rd. Paul and Rick described the August field trip to the Harding mine, including a last-minute gathering location change due to the Triathlon. The club will meet at the Christian Church parking lot. Rick and Paul solicited ideas and interest for field trip possibilities in October. The trip to Cooke’s Peak on Columbus Day weekend had three people interested and there was only one person interested in the Cerrillos state park. The board will discuss the interest and possibilities on August 25. Emily then described upcoming talks and announced that Giday Wolde-Gabriel has tentatively agreed to be the Janu-

ary banquet speaker. Emily then introduced Joyce Guzik as the speaker of the evening.

Joyce started out with a movie showing large prominences on the Sun that were larger than Jupiter. She then described some of the basic facts about the Sun’s size, mass, and temperature. The Sun is on average 150 million kilometers from the Earth. The Sun is 1.4 million kilometers in diameter. The Sun has a luminosity of 3.8×10^{26} watts, which requires converting 100 million tons of hydrogen into helium every second. Put in terms people in Los Alamos can relate to, this energy is equivalent to setting off 100 billion hydrogen bombs every second. At the outside of the Earth’s atmosphere, the solar radiation is 0.137 joules/cm²/sec. The visible surface of the Sun has a temperature of 5800 K, which is hot enough to vaporize any element. Finally, the mass of the Sun is 1.99×10^{27} kg, which is 333,400 times that of the Earth or over 1000 times the mass of Jupiter. Compared to the Earth, the Sun is amazingly hot, large, and massive. Yet the Sun is an ordinary star.

Joyce then motivated why people would care to study the Sun. One example is “space weather”, which describes what happens to the Earth’s magnetic field. The Sun has a strong magnetic field, and it manifests itself visibly in the form of sunspots, among other things. Sunspots come and go in a cycle that lasts about 11 years on average. However, since the discovery of the telescope, there have been times with few to no sunspots.

The most dramatic episode was from 1650 to 1715, which coincided with cooler than normal weather on Earth, especially in Europe. The effect was dramatic enough that this was called "the little Ice Age" by people. Sunspots form as the result of magnetic field lines getting wrapped around the Sun as it rotates. At some points, the field lines are close enough together and twisted enough that they can poke through the surface. In extreme cases, the field lines can break and reconnect, causing large solar flares, which pour out enormous amounts of energy and charged particles. When the charged particles slam into the Earth's magnetic field, bad things can happen to satellites and the electric power grids of countries. In addition to magnetic storms, sunspots also cause the Sun to be about 1 part in 1000 brighter than at sunspot minimum. The dark sunspots are more than offset by bright regions that surround the sunspots. This connection between sunspots and the Sun's brightness is what caused astronomers to realize that the absence of sunspots in the late 1600's was related to the earth being cooler during that time period. Joyce noted that although people have looked, there are no changes in Earth's temperature that follow the normal 11 year sunspot cycle.

One of the historic mysteries about the Sun was how old it was. In the 1800's people realized that the Sun could only shine at its present luminosity for 100,000 years from chemical reactions. Then people suggested

gravitational contraction, which could power the Sun for 2×10^7 years. Although this was impressively long, there were signs from rocks and fossils that the Earth must be at least hundreds of millions of years old. It was not until the 1930's that astronomers discovered that fusion of hydrogen into helium must be powering the Sun. This provides a lifetime of about 10¹⁰ years, which is comfortably above the Earth's age of about 4.5×10^9 years. The dominant nuclear reaction in the Sun is called the proton-proton chain (pp chain for short) and consists of three major steps that convert hydrogen into helium. The steps are very slow, with the first step of combining two hydrogen nuclei into a deuterium nucleus taking 10⁹ years! It is only because the Sun is so massive that it is able to fuse 100 million tons per second. At this point, the Sun has converted about 100 Earth masses of hydrogen into energy. We have direct proof that nuclear fusion happens; some of the reactions produce nearly massless particles called neutrinos. Most of these particles travel out of the Sun without reacting and we can detect them on Earth. Because neutrinos do have some mass, the Sun is able to change the neutrino's type as it travels through the Sun. Although fusion creates electron neutrinos, about 1/3 are converted to muon neutrinos and 1/3 are converted to tau neutrinos.

Although have direct evidence of nuclear reactions in the Sun, we do not have direct measurements of the interior structure. Or do we? Astronomers model the Sun's structure with computer programs that use basic laws of

physics, such as conservation of mass, conservation of momentum, and conservation of energy. For a long time, all we had to tell us which model was correct was the surface temperature, the luminosity, diameter, mass, and age. Astronomers realized that if the Sun was a variable star, the modes (think of ringing a bell or playing a horn) would provide clues to the interior structure. This is the solar analogue to Terrestrial seismology, where geologists use earthquakes to determine the Earth's interior structure in great detail. In 1970, astronomers recognized that the Sun did indeed pulsate. Satellites and ground-based networks eventually discovered over 100,000 modes. Most of the modes have periods in the 5 to 10 minute range. These pulsations are all sound waves, and the waves are 40,000 times longer than those our ear can hear. The modes are identified by the spherical surface pattern combined with the number of zero crossings (nodes) that occur between the center and the surface. It turns out that mathematical functions called spherical harmonics describe the surface pattern of pulsation on the surface. Wikipeda has some pictures of spherical harmonics. Joyce described her work in this field and how she has used the observed pulsation modes to help infer the internal composition of the Sun with depth, the depth of the convection zone, and how heavier elements have settled towards the interior of the Sun over time.

Joyce concluded by talking about the Kepler satellite. Its main purpose is to find planets that

pass in front of (transit) their parent star and cause the apparent brightness of the star to change. Kepler is sensitive enough that it can in principle detect a planet the size of Earth passing in front of the Sun out to some distance. One byproduct of the Kepler observations are the discovery of pulsating stars, in particular two classes of pulsating stars with masses ranging from 1.5 to 3 times that of the Sun. The sound wave (pressure mode) pulsators are called δ Scuti stars, while the buoyancy wave (gravity mode) pulsators are called γ Doradus stars. Joyce concluded by describing efforts that she and her collaborators are using to sift through the large number (hundreds) of new variable stars. With that, Emily thanked Joyce and people stuck around for a while to talk to her as they enjoyed refreshments.

LAGS Board Meeting Wednesday, 25th August, 2010

by Paul Bradley

The August 2010 board meeting was held at 7:30 AM on August 25 at Ruby K's. Rick Kelley, Emily Schultz-Fellenz, and Paul Bradley were present. Eric Nelson showed up a bit later. We discussed field trips and settled on the idea of cleaning out and releveling the shed on September 25. Although this conflicts with the Fall Field Conference, it sounds like not too many LAGS members will be away. We discussed several options for October. One is to use Columbus Day week-

end (October 9-11) to travel to Cooke's Peak. Shari Kelley is keen on examining the geology of the place.

Three other alternatives were discussed. These would be on the normal field trip date, October 23. The first was to visit a ridge north of Guaje Canyon where Rick and Shari found hyalite and interesting volcanic rocks. The second alternative is to do the Quebradas road trip that was rained out in April. This would involve a fairly easy 5 mile hike with interesting geology. Finally, the idea of visiting the New Mexico Travertine operation in Belen was mentioned. This will be more likely as a Spring trip next year.

After discussing field trips, Emily mentioned that the only vacancy is October. Shari Kelley will speak in September about New Mexico geothermal resources and Richard Stead will talk in November about Death Valley. Emily confirmed that Giday will be the banquet speaker, but Giday won't know his travel schedule to Ethiopia for several weeks. Once his schedule is fixed, then we can settle on the banquet date, most likely either January 22 or 29. Emily also has the letter to the Masons nearly finished and should mail it Thursday or Friday.

Eric shared the results of the silent auction in July. LAGS made \$570.75 and a donor gave a \$100 check, all for scholarships. Thanks to all of you for helping out!

With that, the board adjourned. See you on September 21.

September and October 2010 Field Trips by Paul Bradley and Rick Kelley

We have decided on a somewhat different and very local field trip for Saturday, September 25. The LAGS shed is in desperate need of re-leveling and cleaning out. We will meet at the Masonic Temple at 15th and Canyon at 9 AM to work on the shed. The Masons will be having their breakfast from 7 AM to 10 AM. Consider showing up early to have a good breakfast and then walk over to the shed to help us out. We figure we will be done by Noon if we get enough help.

Please contact Paul Bradley (Ppbradpp@aol.com) or Rick Kelley (rekelley@ix.netcom.com) no later than September 22 if you can help. We won't need vehicles, but we will need people. The lifting is everything from light stuff to the saw and display case, which will require several people to help lift.

For October, the field trip will be local (possibly as far as the Eureka Mine near Cuba). It will be Saturday, October 23 and we will meet at 8 AM at the Aquatic Center. If you have suggestions on a local place you've wanted to see, please contact Rick or Paul. The aspens should be pretty, so a place that involves seeing them would be a nice bonus.

August 2010 Field Trip by Paul Bradley and Rick Kelley

Our August 21st field trip took us to the Harding Pegmatite Mine, near Dixon, NM. This mine is one of the most famous geological features in northern New Mexico (<http://epswww.unm.edu/harding/harding.htm>), and it had been a number of years since the club paid this site a visit. The weather was great and we had a good turnout of 15 people on the trip.

The annual Los Alamos Triathlon, which is based at the Aquatic Center, complicated our field trip arrangements and forced a last-minute relocation of the gathering place to the Christian Church. After assuring ourselves that everyone had made it to the revised departure point, we made the drive to the Harding mine without incident, thanks to detailed directions from previous trips. Sure enough, just past mile marker 8 on NM-75 was the turnoff and the dirt road to the mine site was just fine for all the vehicles. The caretaker, Gilbert Griego, showed up shortly after we arrived and Paul handed him the completed release forms required by UNM. Gilbert described the history of the mine and led us around to the stops in the "Walking Tour" brochures that several of us had.

During the walking tour, we collected nice specimens of spodumene, lepidolite, pink muscovite, blue apatite, cleavandite, and columbite.

Gilbert even took us just inside some of the old tunnels to see some minerals in situ. Fascinating!

After the tour, we did a little more collecting for specimens and tried to determine what beryl looked like from Harding. Paul picked up one rock and asked Gilbert to confirm it as beryl. Gilbert immediately said "that's a nice one!" That piece was about the size of a grapefruit. The beryl is generally a pale pink color and the distinguishing characteristic is the greasy luster, in contrast to the shine of quartz and albite feldspar. We broke for lunch and discussed the morning while eating. Then people headed back to the dumps for more collecting. We found more beryl, lepidolite, columbite, and microlite (a rare tantalum ore). Then some people walked over to the "iceberg pit", where a large block of optical quality calcite had been before someone had the bright idea to blast it with dynamite. That instantly created lots of little calcite crystals. The place has been heavily picked over, so there were only small amounts of tiny optical calcite pieces around. People were happy with that and everyone headed back to their cars with some new prizes.



Fig. 1: LAGS members listening to the mine caretaker, Gilbert Griego, describe the history of the Harding Mine.



Fig. 2: Large (about 5 feet long) spodumene crystals exposed in the wall of the Harding Mine.



Fig. 3: Rick Kelley looks for specimens, while Gilbert Griego answers questions from Cynthia and Shari.



Fig. 4: Lepidolite in the wall of one of the entrances to the underground workings at the Harding Mine.



Fig. 5: LAGS members study minerals in an underground wall while Gilbert Griego explains what can be seen.

ANNOUNCEMENTS

Help! Rocks Need A Home

Paul Bradley and Louise Men- dius have overflowing storage spaces due to LAGS rocks and they both need to move them to a more permanent home. If you have room in a garage or stor- age space, please contact Paul or Louise to help out. We would really appreciate it!!

LAGS Needs A Secretary

Do you like writing stories about meetings? Then we have the job for you. LAGS is looking for someone to take the minutes at the regular and board meetings. If you have some time to volun- teer, please consider becoming the LAGS secretary. Contact one of the officers for more informa- tion.

Albuquerque Geological Society

October 6, 2010 – Mike Darr, Eohydrologic Investigation of the Southern Chupadera Mountains Area: Availability and Sustainabil- ity of Water Supplies for Domestic Use

2010 GSA Annual Meet- ing, 31 October - 3 No- vember, Denver, Colorado USA

Reaching New Peaks in Geo- science. This year, GSA is offer- ing 156 Topical Sessions for you to choose from, each designed to promote the exchange of

interdisciplinary, state-of-the-art information. You can filter the topical session list by category or sponsor to help find the one you're after. In addition, GSA will have a multitude of Discipline Sessions. Discipline sessions are equally vital to completing our technical program. Finally, there are the prestigious Pardee Keynote Symposia with invited speakers.

For more information see [http:// www.geosociety.org/meet- ings/2010/](http://www.geosociety.org/meet- ings/2010/)

2010 AGU Fall Meeting 13–17 December Moscone Convention Center Howard Street, Between Third & Fifth Sts. San Francisco, California, USA

The Fall Meeting is expected to draw a crowd of over 16,000 geophysicists from around the world. The Fall Meeting provides an opportunity for researchers, teachers, students, and consul- tants to present and review the latest issues affecting the Earth, the planets, and their environ- ments in space. This meeting will cover topics in all areas of Earth and space sciences.

Registration

Registration for the Fall Meeting is now open. Full conference reg- istration fees prior to 10 Novem- ber are listed under Registration Rates. Late fees will apply after 10 November. The last day to register online is 19 November.

Meeting Discounted Registration Deadline: 10 November 2010, 2359 UT (Universal Time)

Register online at [http://www. agu.org/meetings/fm10/registra- tion/index.php](http://www.agu.org/meetings/fm10/registra- tion/index.php).

Tectonic Crossroads: Evolving Orogens of Eurasia-Africa-Arabia Ankara, Turkey, 4-8 Octo- ber 2010

Situated at the intersection of the Eurasian, African and Arabian plates, Turkey and the eastern Mediterranean region form one of the most seismically and volcanically active convergent zones in the Alpine-Himalayan orogenic system. This broad zone of convergence is domi- nated by crustal extension and shortening, as well as strike-slip faulting as part of collision-in- duced escape tectonics.

The Geological Society of America, in collaboration with the Chamber of Geological Engi- neers of Turkey, the Directorate of the Mineral Research and Exploration Institute, and the Turkish Association of Petroleum Geologists are convening a them- atic, global geoscience meet- ing, hosted by the Middle East Technical University from 3 to 8 October 2010 in Ankara, Tur- key. This international meeting is designed as a forum to bring geoscientists from around the world to compare and contrast regional geology and processes with the local experts working in this extraordinary region—so active that it is one of the world's great natural geological labora-

tories. Conference participants and guests will also examine the geology and regional culture via an array of field trips. Comparative presentations at the meeting will also help improve our understanding of the region's natural hazards and mineral resource potential.

Utah Geological Association

UGA Annual Fall Field Trip, October 1-3, 2010

Mark your calendars! The UGA Fall field trip to south-central Utah will be held October 1-3. Dr. Ben Everitt is coordinating this year's trip, which will likely start near Cedar City and move eastward to Hanksville, with overnights in Kanab, and Escalante or Torrey. Logistics of the trip are still being sorted out, so stay tuned. If you are interested in leading a stop near your field area, please contact Ben at: rockdoc@xmission.com.

October 2010 – China Field Trip – Contact Bill Stone – See his contact info below.

Bill and Mary Stone are conducting a field trip to SW China Karst in October, 2010. As with travel anywhere, and especially in China, be prepared for minor adjustments. They have added two days in Chongqing at the end of the trip. Bill and Mary and spent time there in October 2009 and found a wonderful small hotel, fascinating attractions, and a city worthy of traveler's attentions.

Chongqing is much more than the "big industrial city" that some guidebooks declare. If this makes your stay in China longer than you would like, they can easily arrange for you to return directly to the USA and skip Chongqing and the associated costs, though they are nominal.

Estimated cost of the entire trip with 15 nights/16 days in China is \$4850 per person. Single supplement is estimated at \$525. That includes most costs. See the details in the itinerary. We will provide more background information, trip advice, and planning information for those that sign up, including a guidebook that we have written just for this tour. The last trip guidebook was almost 40 pages thick.

William J, Stone, Ph.D. Hydrogeologist & Writer 1024 Francis Rd. El Prado, NM 87529 (303) 532-9322 (cell) wstone04@gmail.com

Show Calendar

Sept. 15-19--DENVER, COLORADO: Fall show, "Colorado Mineral & Fossil Show"; Martin Zinn Expositions LLC; Holiday Inn - Denver Central, 4849 Bannock St.; free admission; 200 wholesale and retail dealers from all over the world, free shuttle to shows at the Merchandise Mart; Wed. 10-6, Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-5; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax (303) 223-3478; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

Sept. 15-19--DENVER, COLORADO: Show and sale, "Denver

Coliseum Mineral Show"; Eons Expositions; Denver Coliseum, 1900 44th St.; Wed. 10-6, Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-4; free admission; 130 dealers, minerals, fossils, crystals, meteorites, gems, artisan jewelry, gold, services, equipment, displays; contact Lowell Carhart, 7514 Antelope Meadows Circle, Peyton, CO 80831, (719) 886-7046; e-mail: lowellcarhart@yahoo.com; Web site: www.ColiseumShow.com

Sept. 15-19--DENVER COLORADO: Wholesale/retail show, "Denver Expo 2010"; T.E.P. Gem Show; National Western Complex, 4655 Humboldt Street Wed. 10-7, Thu. 10-7, Fri. 10-7, Sat. 10-7, Sun. 10-4; free admission; open to the public, free shuttles to other shows; contact Al Sargent, T.E.P. Gem Show, P.O. Box 2902, Tucson, AZ 85702, (520) 883-6447; e-mail: TEPGemShow@cs.com; Web site: www.tucsonelectricparkgemshow.com

Sept. 17-19--DENVER, COLORADO: Show, "Colorado Fossil Expo"; Martin Zinn Expositions LLC; Denver Merchandise Mart Plaza Annex, 451 E. 58th Ave.; Fri. 9-6, Sat. 10-6, Sun. 10-5; adults \$6, seniors and teens \$4; 50 dealers, fossils, meteorites, petrified wood, amber, paleontological exhibits, part of the Denver Gem & Mineral Show; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax (303) 223-3478; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

Sept. 17-19--DENVER, COLORADO: 43rd annual show, "Denver Gem and Mineral Show";

Greater Denver Area Gem & Mineral Council; Denver Merchandise Mart, 451 E. 58th Ave. (I-25, Exit 215); Fri. 9-6, Sat. 10-6, Sun. 10-5; adults \$6, seniors and students \$4, children free with adult; runs concurrent with the Colorado Fossil Expo, exhibits, dealer displays, minerals, fossils, meteorites, gems, jewelry, demonstrations, speakers, "Minerals of Creede/Mineral County"; contact Emily Epstein, (303) 233-2516; e-mail: emilye@sprynet.com; Web site: www.denvermineralshow.com

Sept. 18-19--PASO ROBLES, CALIFORNIA: 19th annual show, "Rockhound Roundup"; Santa Lucia Rockhounds, Pioneer Park, 2010 Riverside Dr.; Sat. 10-5, Sun. 10-5; free admission; exhibits, raffle prizes, silent auction, demonstrations, youth activities, rocks, gems, minerals, fossils, meteorites, crystals, beads, carvings, lapidary equipment; contact Kim Patrick Noyes, 7343 El Camino Real #301, Atascadero, CA 93422, (805) 610-0603; e-mail: kimnoyes@gmail.com

Sept. 18-19--REDWOOD CITY, CALIFORNIA: 44th annual show, "Harvest of Gems"; Sequoia Gem & Mineral Society; Community Activity Bldg., 1400 Roosevelt Ave.; Sat/ 10-5, Sun. 10-5; free admission; kids' activities, dealers, member displays, silent auction, earth science room; contact Carol Corden, P.O. Box 1245, Redwood City, CA 94064, (650) 248-7155; e-mail: ccorden@earthlink.net; Web site: <http://sgms.driftmine.com>

Sept. 18-19--STAFFORD, TEXAS: Wholesale and retail show; Bead Jamboree; Stafford Con-

vention Center, 10505 Cash Rd.; Sat. 10-5, Sun. 10-4; free admission; contact Robert Khork, 914 164th St. #449, Mill Creek, WA 98012, (206) 769-3987; e-mail: info@beadjamboree.com; Web site: www.beadjamboree.com

Sept. 24-26--SALT LAKE CITY, UTAH: Show, "Gem Faire"; Gem Faire Inc.; South Towne Exposition Center/Exhibit Hall 3, 9575 S. State St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

Sept. 24-26--SAN BERNARDINO, CALIFORNIA: Show, "OBMS Tail Gate Gem & Mineral Show"; Orange Belt Mineralogical Society; Western Regional Little League Ball Park, 6707 Little League Dr.; Fri. 9-dusk, Sat. 9-dusk, Sun. 9-dusk; free admission; rocks, jewelry, tools, lapidary display, education, kids' event, kids' club, silent auction, raffle, workshop; contact Shane Ripley, 205 W. Benedict #8, San Bernardino, CA 92408, (909) 557-3605; e-mail: OBMS_PR@yahoo.com; Web site: <http://obms-rocks.yolasite.com>

Sept. 25-26--MONTEREY, CALIFORNIA: 51st show; Carmel Valley Gem & Mineral Club; Monterey Fairgrounds, 2004 Fairgrounds Rd.; Sat. 10-6, Sun. 10-5; adults \$3.50, senior \$2.50, children free with adult; exhibits, kids' stuff, grab bags, door prizes, wheel of fortune, demonstrations (fossil impressions, sphere making, silver jewelry making, grinding and polishing gemstones); contact Janis Rovetti, 1047

Roosevelt St., Monterey, CA 93940, (831) 657-1933; e-mail: janis12@sbcglobal.net; Web site: www.cvgms.org

Sept. 25-26--SOUTH SIOUX CITY, NEBRASKA: 45th annual show; Siouland Gem & Mineral Society; South Sioux City Senior Center, 1501 W. 29th St.; Sat. 9-6, Sun. 10-4; adults \$1.50, students (12 and older) 50 cents, children under 12 free; exhibits, four dealers, agates, rough and polished specimens, gems, beads, geodes, minerals, superb faceted jewelry, fossils, door prizes, spin the wheel, silent auction, displays, Siouland dinosaur hunters' exhibits; contact Bob Powell, (712) 378-2775

Oct. 2-3--GREELEY, COLORADO: Show; Rock & Mineral Society of Weld County; Greeley Senior Center, 1010 6th St.; Sat. 10-6, Sun. 10-3; free admission; jewelry, door prizes, gems, minerals, fossils, raffle, demonstrations, rough and polished rocks; contact Melanie DeHart, (970) 352-8149; e-mail: hamlethouse@yahoo.com

Oct. 2-3--OMAHA, NEBRASKA: 55th annual show; Nebraska Mineral & Gem Club; Westside Community Center, 108th and Grover St.; Sat. 9-6, Sun. 10-5; contact Tim Kutsch, (402) 397-9606; Web site: www.nerockgem.us

Oct. 2-3--OROVILLE, CALIFORNIA: 3rd annual show; Feather River Lapidary & Mineral Society; Oroville Rock Club, Municipal Auditorium, 1200 Myers St.; Sat. 10-5, Sun. 10-4; adults \$2, children under 12 free; rocks, gems, minerals, fossils, vendors,

rough material, cabochons, handmade cabinets, tools, books, tumblers, wire wrappers, Wheel of Fortune, grab bags, polished rocks, raffles, door prizes, 2nd Annual World Rock Tumbling Championship; contact Connie Rossetto, P.O. Box 5772, Oroville, CA 95966, (530) 589-1840; e-mail: Crossetto@aol.com; Web site: www.orovalerocks.com

Oct. 2-3--WALNUT CREEK, CALIFORNIA: Show, "Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, P.O. Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

Oct. 3--FALLBROOK, CALIFORNIA: Show, "Fall Festival of Gems"; Fallbrook Gem & Mineral Society; 123 W. Alvarado St.; Sun. 10-4; free admission; silent auction, geode cracking, gem identification, Wheel of Fortune, vendors, gems, mineral, fossils, meteorites, raffle prizes, museum; contact Mary Fong Walker, (760) 728-1130; e-mail: fgms@sbcglobal.net; Web site: www.FGMS.org

Oct. 7-9--MOUNT IDA, ARKANSAS: 22nd Annual World's Championship Quartz Crystal Digging Contest; Mount Ida Area Chamber of Commerce; Montgomery County Fairgrounds, Fairgrounds Rd.; Thu. 9-3, Fri. 9-3, Sat. 9-3; adults \$80 (\$95

late registration); meet other miners, keep all you find, maybe even win a prize; contact Maureen Walther, Mount Ida Area Chamber of Commerce, Mount Ida, AR 71957, (870) 867-2723; e-mail: director@mountidachamber.com; Web site: www.mountidachamber.com

Oct. 8-10--BIG SUR, CALIFORNIA: 19th annual show, "Big Sur Jade Festival"; South Coast Community Land Trust, Pacific Valley School PTO; Pacific Valley School, Hwy. One, opposite Sand Dollar Beach in Los Padres National Forest; Fri. 12-6, Sat. 10-5, Sun. 10-5; free admission; jade, jewelry, sculpture, raffle; contact Kirk Brock, (831) 659-3857 or 831-402-1143; Web site: www.bigsurjadefestival.com

Oct. 8-10--MOAB, UTAH: 51st annual show; Moab Points & Pebbles Rock Club; Old Spanish Trail Arena, 5 miles south of Moab on Hwy. 191; Fri. 10-7, Sat. 10-7, Sun. 10-4; free admission; vendors, demonstrations, spin wheel, displays, door prizes, field trips; contact Jerry Hansen, P.O. Box 1459, Moab, UT 84532; e-mail: moabrockclub@live.com

Oct. 8-10--PLEASANTON, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Alameda County Fairgrounds, 4501 Pleasanton Ave.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

Oct. 8-10--SACRAMENTO, CALIFORNIA: Show, "Gem Faire"; Scottish Rite Center, 6151 H St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail:

info@gemfaire.com; Web site: www.gemfaire.com

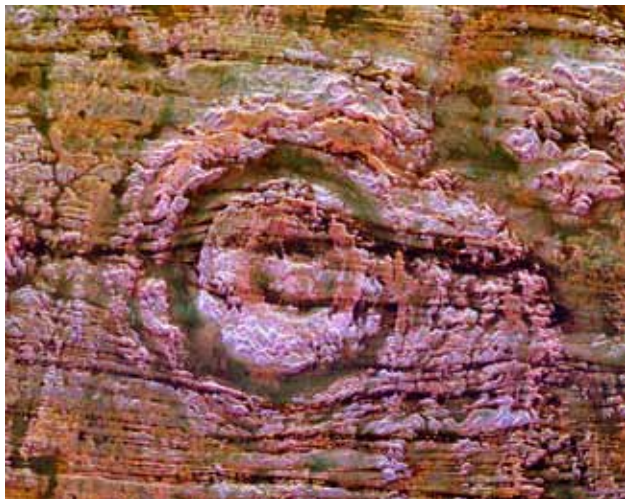
Oct. 9-10--FORT WORTH, TEXAS: Show and sale, "LMRA Rockfest Fort Worth"; Lockheed Martin Recreation Assn.; LMRA Trinity River Park, 3400 Bryant Irvin Rd.; Sat. 10-5, Sun. 10-5; free admission; rocks, flint, gems, minerals; contact Steve Shearin, 860 Stafford Station Dr., Saginaw, TX 76131, (817) 777-1997; e-mail: steve.l.shearin@lmco.com; Web site: www.facebook.com/profile.php?id=100001244652268&v=app_2309869772#!/group.php?gid=132202050142082

Oct. 9-10--GRASS VALLEY, CALIFORNIA: Show, "Earth Treasurers 2010"; Nevada County Gem & Mineral Society; Nevada County Fairgrounds, Main Exhibit Hall, 11228 McCourtney Rd.; Sat. 10-5, Sun. 10-5; rock and mineral exhibits, special petrified wood display, display cases, hourly prizes, mineral identification, children's games, raffles, door prizes; adults \$2, children free; contact Kim Moore, (530) 470-0388, or Joyce Emerson, (503) 559-2595

Oct. 9-10--PAYSON, ARIZONA: 13th annual show; Payson Rimstones Rock Club; Mazatzal Hotel & Casino Event Center, Tonto Apache Reservation; adults \$3, children under 12 free; gems, minerals, fossils, lapidary equipment, children's (and adults') education center, spinning wheel, silent auction; contact Barry or Margaret Jones, (928) 476-3513 or (928) 970-0857

Test Your Knowledge

Test your knowledge and see if you can guess where on Earth (or off) this image is from. Answer will be in next month's issue.



Test Your Knowledge — Last Month's Answer



Gosses Bluff, Northern Territory, Australia

142 million years ago, an asteroid or comet slammed into what is now the Missionary Plains in Australia's Northern Territory, forming a crater 24 kilometers in diameter and 5 kilometers deep. Today, like a bull's eye, the circular ring of hills that defines Gosses Bluff stands as a stark reminder of the event. The crater is located just south of MacDonnell Ranges. It is highly eroded. The circular ring of hills is actually the results from differential erosion of the central uplift within this large complex crater. The crater rim is eroded to the point that it is no longer visible although is probably located along the grayish colored drainage system outside the inner ring.

Membership News

Next Board Meeting

The next Board Meeting will be Wednesday, Sept. 22, 7:30 a.m. at Ruby K's.

Join the LAGS Google group for the latest club information! <http://groups.google.com/group/los-alamos-geological-society>

Follow LAGS on Facebook! www.facebook.com

Useful Links (courtesy of AGS Newsletter)

Four Corners Geological Society – www.fourcornersgeologicalsociety.org

Wyoming Geological Society – www.wyogeo.org

Utah Geological Association – www.geology.com

Club Calendar 2010

Sept. 21—LAGS Regular meeting. Shari Kelley will be the speaker.

Sept. 22–25—NMGS Annual Fall Field Conference in the Four Corners area.

Sept. 22—LAGS board meeting at Ruby K's at 7:30 a.m.

Sept. 25—LAGS field trip to clean out the shed.

Oct. 9-11—Field trip to Cooke's Peak.

Oct. 19—LAGS Regular meeting. Speaker TBA.

Oct. 23—Field trip TBA.

Oct. 31–Nov. 3—GSA Annual meeting in Denver, CO.

Dec. 13-17—AGU Fall meeting in San Francisco.

Newsletter Deadlines

email: lmendius@hotmail.com

If you have items that you would like to see in the newsletter, please contact Louise Mendius on or before the last Thursday of the month. The deadlines for each newsletter issue are:

October 2010 issue: September 27, 2010

November 2010 issue: October 28, 2010

December 2010 issue: November 24, 2010



LOS ALAMOS GEOLOGICAL SOCIETY
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Science Fair Judges:	Richard Stead and Paul Bradley	

Our organization is devoted to studying and promoting interest in geology, mineralogy, archeology, paleontology, and the lapidary arts. Membership is available to any person, family, or institution in sympathy with the objectives of the Society.

General meetings are held on the third Tuesday of the month at the Christian Church, 92 East Road, Los Alamos at 7:30 p.m. The Executive Board meets the fourth Wednesday of the month. Field trips are held the Saturday following the general meeting. Exceptions to the schedules for field trips are published in the Obsidian Observer.

All activities and field trips of the Society are open to the public; reservations may be required for some events. All memberships are family memberships with annual dues of \$20. The dues entitle a family to participate in LAGS activities until the end of the calendar year. Any officer of the Society may be contacted for additional information.

The Society is a member of the RMFMS and an affiliate member of the AFMS, and is a sponsor of the New Mexico Symposium at Socorro, NM. Articles may be printed from the Obsidian Observer if credit is given to authors and their publications.

FIRST CLASS