

Atlanta Geological Society Newsletter

Next meeting of the Atlanta Geological Society is
October 30, 2012

Fernbank Museum of Natural History (Clifton Road)
Social begins at 6:30 pm – Meeting begins at 7:00 pm

October 2012

ODDS AND ENDS

Ben Bentkowski, Newsletter Editor

There are many interesting news stories from the last month and they are presented in the following pages. I'd like to focus on the recent conviction of seven Italian seismologists and geologist for failing to predict an earthquake. That's the news headline, anyway. The official words from the indictment are that they gave "inexact, incomplete and contradictory information" about whether small tremors felt in L'Aquila were the precursor to a larger earthquake. These seven men are members of the Italian National Commission for the Forecast and Prevention of Major Risks and they have been sentenced to six years in prison and a \$10.2 M fine. 309 people were killed as a result of the 6.3 earthquake which occurred in April 2009.

We all know you cannot predict earthquakes precisely, much less that it will occur at night when most of the victims in this case were sleeping. Apparently, the National Commission had just concluded a meeting just before the earthquake and did not issue a warning even with the recent swarms of tremors in this area. There was a report of comments by Commission members suggesting that the people have a glass of wine and relax.

Continued on Page 3

OCTOBER MEETING

Join us Tuesday, October 30, 2012 at the Fernbank Museum of Natural History, 760 Clifton Road NE, Atlanta GA. The meeting social starts at 6:30 pm. The speaker will be Dr. Bill Witherspoon. His topic will be "Geology on the Edge – SF Bay, Yosemite, and Volcanoes East of the Sierra" is a preview of a California trip that Bill hopes to lead in June 2013. The presentation will include 3D tours of the California landscape (internet connection permitting). Browse annotated pictures and poke around in Google Earth yourself at <http://georgiarocks.us/california>.

Dr. Bill Witherspoon has been a geologist-instructor at DeKalb County Schools' Fernbank Science Center since 1997. He loves showing geological marvels to teachers and the public. In 2001 he led a 9-day teacher training trip to Arizona to take in Meteor Crater, Sunset Volcano, dinosaur tracks, Hopi mesas, and the Grand Canyon. He is co-author of *Roadside Geology of Georgia*, to be published by Mountain Press in spring of 2013.

See page 3 for further highlights.
Hope to see you there.

Reaching underground resources

Vaporize the rock—no drilling required

October 16, 2012 Nancy W. Stauffer, MIT Energy Initiative

Accessing critical resources such as geothermal energy and natural gas requires drilling—an expensive, energy-intensive, messy process with today’s technology. An MIT team has been looking into a more elegant approach. Instead of grinding rock to bits, they would use a continuous beam of energy to vaporize it and then blow out the tiny particles that form with a high-pressure stream of injected gas. Using a novel experimental setup and a device used in fusion experiments, the researchers have now vaporized rock for the first time. Based on their experimental and theoretical findings, they conclude that the energy generated by that device—beams of millimeter-long waves—could do what lasers have never done: serve as a cost-effective, efficient means of drilling our way to a cleaner and more sustainable energy future.



In this setup, a gyrotron at the top sends a continuous millimeter-wave beam through the copper tube toward the rock sample at the center, and water flows through the surrounding coil. During operation, the device is lowered into the steel chamber below and sealed. Based on the flow volume and temperature rise of the water, the researchers can deduce how much of the incoming energy is absorbed by the rock. Photo: Justin Knight



The dark pattern on this granite sample shows where the beam hit the rock, causing it to bubble and vaporize. The new setup enabled the team not only to vaporize rock for the first time but also to take real-time measurements that provided new insights into key thermodynamic properties of rock up to extremely high temperatures. Photo: Justin Knight

For much more information, please see the original article: http://mitei.mit.edu/news/reaching-underground-resources?utm_source=MIT+Energy+Initiative&utm_campaign=873db5abeaeNewsletter_Test10_16_2012&utm_medium=email#.UIg9cADLiiM.email

ODDS AND ENDS continued

Earthquakes are the least predictable major natural disaster. Mt. St. Helens and Mt Pinatubo gave weeks of warning that something big was going to happen soon. This weekend's Hurricane Sandy has been predicted for nearly a week to impact the mid-Atlantic area. But earthquakes happen without any definitive, recognizable warning indicators. The best the USGS can do at this time is to recognize that a big earthquake is occurring and send out real time warnings that may or may not get to you before the seismic waves get to you.

So, it seems it is more a story about risk communication than the ability to predict an earthquake. It would seem to me that if you are a member of the National Commission for the Forecast and Prevention of Major Risks you should be less cavalier in your casual remarks especially to people who live in earthquake prone areas. There is a fine line between alarming the public and providing an adequate and fair warning of risk. In the meantime...

Keep on Rockin'
Been Bentkowski
Newsletter Editor

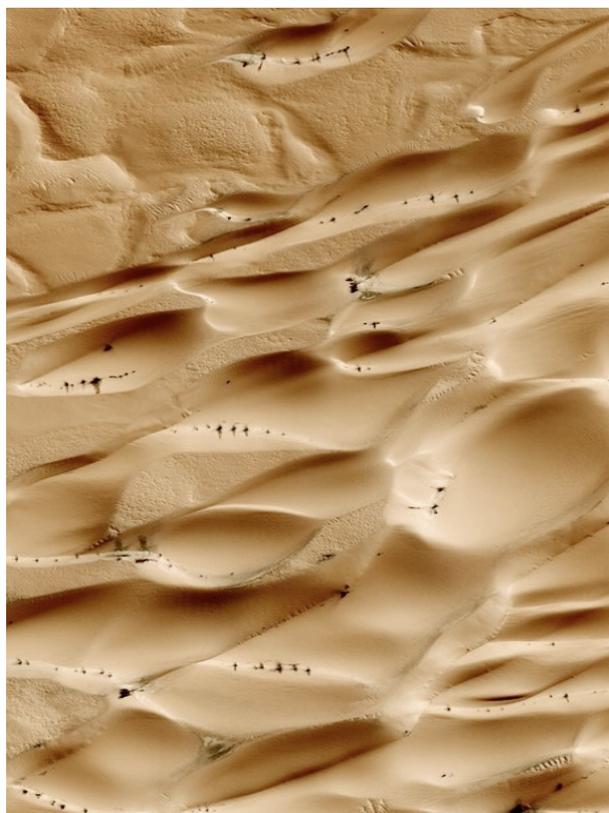
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Hipster Obsidian



Dr. Witherspoon; OCTOBER SPEAKER HIGHLIGHTS include:

- Sea cliffs in San Francisco Bay, exposing rocks turned blue by high-pressure metamorphism, and colorful jumbled bits of Pacific seafloor scraped off onto the North American plate;
- One of California's most quake-prone faults, marked by cracks in buildings and UC Berkeley's building modifications to prepare for the "Big One";
- Gold rush towns of the Sierra foothills, next to a ridge left by a river of lava;
- Glacier-sculpted features at Yosemite Valley, the High Sierra, and Mammoth Lakes;
- Mono Lake, a desert jewel with odd spires of evaporite rock;
- America's youngest mountain chain, made of natural glass extruded like toothpaste from volcanoes as young as 800 years old;
- The active fault zone that created the Sierra Nevada with a trap-door-like motion;
- One of the two active supervolcanoes in the 48 contiguous states;
- A popular ski mountain, at whose base are signs warning of death-dealing gas emanations;
- Hot springs closed to the public after sudden temperature spikes killed bathers;
- An aqueduct that waters the metropolis 400 miles to the south, alongside a gorge the Owens River cut through gigantic flows of volcanic ash.



From Mars, via BoingBoing:

See those weird, black, spidery things dotting the dunes in this colorized photo taken by the Mars Reconnaissance Orbiter in 2010? Yeah. Nobody knows what those things are.

What we *do* know about them just underlines how incredibly unfamiliar Mars really is to us. First spotted by humans in 1998, these splotches pop up every Martian spring, and disappear in winter. Usually, they appear in the same places as the previous year, and they tend to congregate on the sunny sides of sand dunes — all but shunning flat ground. There's nothing on Earth that looks like this that we can compare them to.

<http://boingboing.net/2012/10/03/the-weird-black-spidery-thin.html>

AGS Members... Geology Enthusiasts Needed!!

If you are an AGS member and would like to contribute to the Professional Registration Committee by leading a lecture on one of the subjects listed below, then please contact me either by e-mail or at the monthly AGS meetings. The lecture should be for one hour followed by a Q&A session. We need different speakers for each workshop. Your volunteering to teach on one of these subjects is essential to the success of the Professional Registration Committee – we need more widespread participation by the AGS membership. Speakers can be compensated for expenses and will receive certificates to acknowledge their participation.

The following content domains are covered in the Georgia Professional Geologist exams:

- | | |
|---|---|
| A. General Geology | B. Mineralogy, Petrology, & Petrography |
| C. Sedimentology, Stratigraphy, & Paleontology | D. Economic Geology & Energy Resources |
| E. Structure, Tectonics, & Seismology | F. Hydrology & Environmental Geochemistry |
| G. Engineering Geology | |
| H. Quaternary Geology, Geomorphology, & Surficial Processes | |

We do not "teach the test" our aim is to review fundamental concepts of the earth sciences and acquaint candidates with industry specific information not easily obtainable from the literature. Please inform anyone who might be interested in becoming a professional geologist of our workshop. Please consider joining us even if you are not a P.G. candidate. The workshops are interesting and informative.

Ken Simonton, P.G., Chair
Professional Registration Committee

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Only Healthy Groundwater Ecosystems Provide Clean Groundwater

ScienceDaily (Oct. 1, 2012) — Two thirds of drinking water in Germany is obtained from groundwater. At the same time groundwater is in no way a lifeless resource with at least 2,000 known species and numerous microorganisms mainly helping to clean the groundwater and improve the quality of drinking water. However, the protection of this habitat has not yet been established in law. The Institute for Environmental Sciences of the University of Koblenz-Landau has now presented a draft for the geographical classification of groundwater fauna, which could be used as an important step for the evaluation of the environmental status of groundwater. Its aim is the long-overdue establishment of suitable measures for the sustainable, ecologically-oriented management of groundwater.

European groundwater is bustling with at least 2,000 highly adapted, often very rare species such as turbellaria, rotifiers, water mites, fresh water amphipods and olms. Groundwater therefore provides one of the largest continental and oldest habitats in Europe. The so-called ecosystem services provided by groundwater creatures are highly relevant: the species-rich bacteria and fauna clean the water in the subsoil by decomposing organic material which has fallen from the surface to the bottom.

The creatures are also particularly suitable as bioindicators. Due to their specialisation to the habitat, they are particularly susceptible to changes such as infiltration of surface water, fertilisers and pollutants such as metals and temperature fluctuations. Compared to chemical analysis methods, they can provide a much earlier indication of changes in the water and in so doing make a significant contribution towards ensuring the quality of groundwater and therefore drinking water.

With the publication of the essay "Stygoregions -- a promising approach to a bioregional classification of groundwater systems," the research team led by associate lecturer Dr. Hans Jürgen Hahn of the Institute for Environmental Sciences of the University of Koblenz has developed a proposal for the biogeographical classification of groundwater habitats in Germany. For this publication, data from the project "Development of biological evaluation methods and criteria for groundwater ecosystems" commissioned by the Federal Environment Agency (UBA) and the LAWA (the German Working Group on water issues of the Federal States and the Federal Government represented by the Federal Environment Ministry) as well as numerous other studies by the University of Koblenz-Landau was evaluated. This is the first ever proposal for a definition of ecological references for groundwater over a wide area. These may provide an important basis for defining whether the environmental status of groundwater is good.

The scientists proposed a groundwater-specific classification with four potential so-called stygoregions for groundwater, taking Germany as an example. "Sustainable groundwater management is only possible if the groundwater ecology is taken fully into consideration," explains Hahn. "Fortunately those responsible for water management and water supply are open minded about this issue, because they too know that only healthy groundwater ecosystems provide clean groundwater." <http://www.sciencedaily.com/releases/2012/10/121001083544.htm>

Note: This is an academic article from Germany, not any US/State official policy. BB, Ed.



This picture shows a nearly intact fossil of *Fuxianhuia protensa*. The inset shows the fossilized brain in the head of another specimen. The brain structures are visible as dark outlines. (Credit: Specimen photo: Xiaoya Ma; inset: Nicholas Strausfeld)

Cambrian Fossil Pushes Back Evolution of Complex Brains

ScienceDaily (Oct. 10, 2012) — Complex brains evolved much earlier than previously thought, as evidenced by a 520-million-year-old fossilized arthropod with remarkably well-preserved brain structures.

The remarkably well-preserved fossil of an extinct arthropod shows that anatomically complex brains evolved earlier than previously thought and have changed little over the course of evolution. According to University of Arizona neurobiologist Nicholas Strausfeld, who co-authored the study describing the specimen, the fossil is the earliest known to show a brain.

The discovery will be published in the Oct. 11 issue of the journal *Nature*.

Embedded in mudstones deposited during the Cambrian period 520 million years ago in what today is the Yunnan Province in China, the approximately 3-inch-long fossil, which belongs to the species *Fuxianhuia protensa*, represents an extinct lineage of arthropods combining an advanced brain anatomy with a primitive body plan.

The fossil provides a "missing link" that sheds light on the evolutionary history of arthropods, the taxonomic group that comprises crustaceans, arachnids and insects.

The researchers call their find "a transformative discovery" that could resolve a long-standing debate about how and when complex brains evolved." Some believe that insects evolved from the an ancestor that gave rise to the malacostracans, a group of crustaceans that include crabs and shrimp, while others point to a lineage of less commonly known crustaceans called branchiopods, which include, for example, brine shrimp.

Because the brain anatomy of branchiopods is much simpler than that of malacostracans, they have been regarded as the more likely ancestors of the arthropod lineage that would give rise to insects. However, the discovery of a complex brain anatomy in an otherwise primitive organism such as *Fuxianhuia* makes this scenario unlikely. "The shape [of the fossilized brain] matches that of a comparable sized modern malacostracan," the authors write in *Nature*. They argue the fossil supports the hypothesis that branchiopod brains evolved from a previously complex to a more simple architecture instead of the other way around.

References:

Xiaoya Ma, Xianguang Hou, Gregory D. Edgecombe, Nicholas J. Strausfeld. **Complex brain and optic lobes in an early Cambrian arthropod.** *Nature*, 2012; 490 (7419): 258 DOI: [10.1038/nature11495](https://doi.org/10.1038/nature11495)

University of Arizona (2012, October 10). Cambrian fossil pushes back evolution of complex brains. *ScienceDaily*. Retrieved October 26, 2012, from <http://www.sciencedaily.com/releases/2012/10/121010131436.htm>



FERNBANK MUSEUM

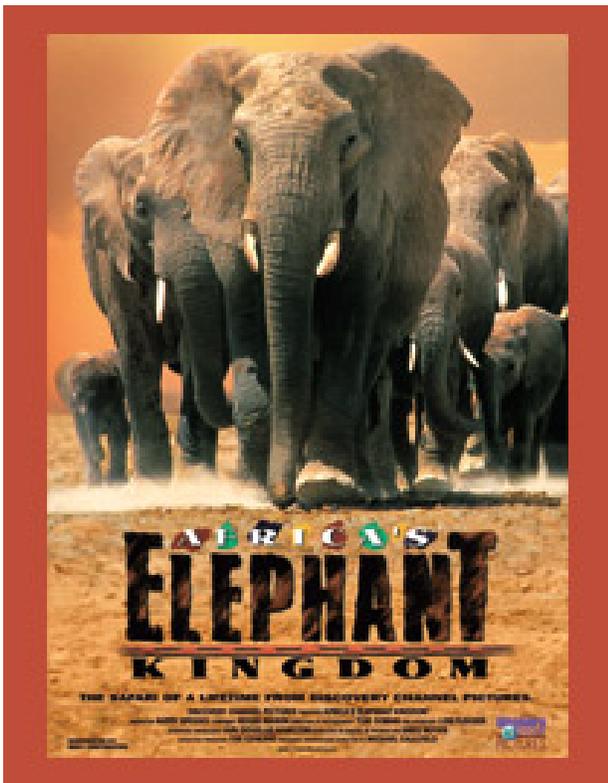
of NATURAL HISTORY

Fernbank Museum of Natural History

Upcoming Public Programs and Events

(All programs require reservations, including free programs)

Now Showing in the Fernbank IMAX movie theater:



Journey into Africa for a glimpse of the elephant world during an unforgettable safari over waterfalls, rivers, plains and forests. *Africa's Elephant Kingdom* follows in the footsteps of one special elephant family as they survive and flourish on the immense plains of Kenya.

TO THE ARCTIC Swim alongside a polar bear and her cubs and discover a world beneath the ice where corals and odd creatures thrive. Fly above a thundering herd of caribou making their way to their calving ground then gaze across hundreds of miles of snow-bound peaks and floating ice in the Arctic Ocean.

Fernbank Museum of Natural History

767 Clifton Rd, NE, Atlanta, GA 404-929-6400

Special Exhibits On View: <http://www.fernbankmuseum.org/explore-exhibits/special-exhibitions>



Genghis Khan On view October 5, 2012 - January 21, 2013

Immerse yourself in his world of conquest, diplomacy, innovation and destruction. *Genghis Khan* features one of the largest collections of 13th-century artifacts from the Mongol Empire ever gathered in a single showing, many which have never been on display to the public. Explore a *ger* (or yurt)—the traditional house of Mongol nomads. Walk through a battlefield and face the thundering sight and sound of mounted warriors and Mongol siege engines. Ruthless warrior? Or revered statesman? Experience the NEW special exhibition *Genghis Khan* and decide for yourself.

Celebrating Fernbank Museum October 5, 2012 – January 21, 2013

In celebration of Fernbank Museum's 20th anniversary, this unique exhibition reveals the beauty and wonder of the Museum's incredible exhibitions, special features, Fernbank Forest and more. Visitors will experience an artistic and modern view of natural history through the inspired reflections of the Decatur Digital Photo Meetup.

For tickets and details on exhibits, films, and events, please visit the website at www.fernbankmuseum.org Follow us on Facebook or Twitter for the latest news and updates! Please see the website for details about Martinis and IMAX on Friday nights.

...and there a mysterious announcement set for November 16!

CURIOSITY FINDS OLD STREAMBED ON MARS

Sept. 27, 2012: NASA's Curiosity rover mission has found evidence a stream once ran vigorously across the area on Mars where the rover is driving. There is earlier evidence for the presence of water on Mars, but this evidence -- images of rocks containing ancient streambed gravels -- is the first of its kind.

"From the size of gravels it carried, we can interpret the water was moving about 3 feet per second, with a depth somewhere between ankle and hip deep," said Curiosity science co-investigator William Dietrich of the University of California, Berkeley. "Plenty of papers have been written about channels on Mars with many different hypotheses about the flows in them. This is the first time we're actually seeing water-transported gravel on Mars. This is a transition from speculation about the size of streambed material to direct observation of it."



NASA's Curiosity rover found evidence for an ancient, flowing stream on Mars at a few sites, including the rock outcrop pictured here, which the science team has named "Hottah" after Hottah Lake in Canada's Northwest Territories. Image credit: NASA/JPL-Caltech/MSSS

The finding site lies between the north rim of Gale Crater and the base of Mount Sharp, a mountain inside the crater. Earlier imaging of the region from Mars orbit allows for additional interpretation of the gravel-bearing conglomerate. The imagery shows an alluvial fan of material washed down from the rim, streaked by many apparent channels, sitting uphill of the new finds.

The rounded shape of some stones in the conglomerate indicates long-distance transport from above the rim, where a channel named Peace Vallis feeds into the alluvial fan. The abundance of channels in the fan between the rim and conglomerate suggests flows continued or repeated over a long time, not just once or for a few years.

The discovery comes from examining two outcrops, called "Hottah" and "Link," with the telephoto capability of Curiosity's mast camera during the first 40 days after landing. Those observations followed up on earlier hints from another outcrop, which was exposed by thruster exhaust as Curiosity, the Mars Science Laboratory Project's rover, touched down.

"Hottah looks like someone jack-hammered up a slab of city sidewalk, but it's really a tilted block of an ancient streambed," said Mars Science Laboratory Project Scientist John Grotzinger of the California Institute of Technology in Pasadena.

The gravels in conglomerates at both outcrops range in size from a grain of sand to a golf ball. Some are angular, but many are rounded. "The shapes tell you they were transported and the sizes tell you they couldn't be transported by wind. They were transported by water flow," said Curiosity science co-investigator Rebecca Williams of the Planetary Science Institute in Tucson, Ariz.

http://science.nasa.gov/science-news/science-at-nasa/2012/27sep_streambed/

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AGS 2012 Meeting Dates

Listed below are the planned meeting dates for 2012. Please mark your calendar and make plans to attend.

October 30 Bill Witherspoon – Geology on the Edge

November P.G. Study Group – Needs to be scheduled

November 30 AGS Mtg.

December No meeting, enjoy the Holidays

2013

January 29

February 26

March 26

April 30

May 28

ATLANTA GEOLOGICAL SOCIETY

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ANNUAL MEMBERSHIP FORM

Please print the required details and check the appropriate membership box.

DATE: _____

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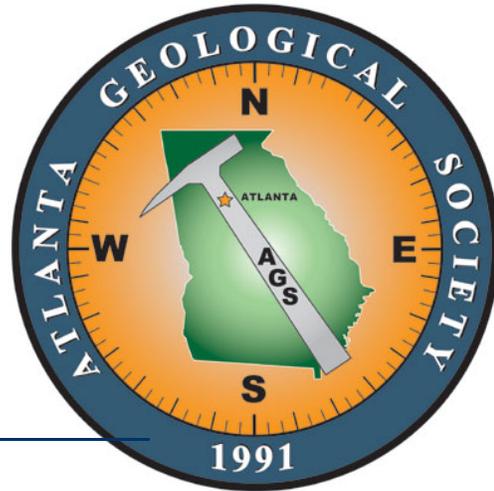
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STUDENT \$10

PROFESSIONAL MEMBERSHIP \$25

CORPORATE MEMBERSHIP \$100

(Includes 4 professional members, please list names and emails below)

NAME: _____

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NAME: _____

EMAIL: _____

NAME: _____

EMAIL: _____

NAME: _____

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For further details, contact the AGS Treasurer: stacy.durden@gmail.com.

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