

# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No. 1

Robert Burger, Editor

September, 2007

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Wednesday, September 19, 2007

The Pittsburgh Geological Society  
presents

## The Role of Geology in Planning, Designing, and Operating Underground Coal Mines in the Appalachian Region

by J. Blair McGill, Eastern Associated Coal, LLC

The importance of geology to the mining engineer and the miner cannot be overstated. If any mine is to be successful, the geology of the property must be understood as thoroughly as possible. Every mining engineer and miner is, at least in part, a geologist.

Planning a mine begins with geological information obtained from drill holes as well as that obtained from neighboring active and/or worked out mines. If the mining engineer does his job right, the mine is designed commensurate with that information.

Unfortunately, however, the mining engineer's information is always incomplete. This leaves him and the miner in a position where they will inevitably be confronted with geologic surprises. How well they react to these surprises can affect a mine's short – term performance, and in some cases determine whether or not it survives.

Mining, by its very nature, deals with the unknown and the risks associated with the unknown. This will never change, but a good understanding of geology can minimize these risks and make them manageable. For example, a mine's roof control plan will be modified many times during its life. Many of these modifications will be the direct result of geology. Also, as a mine is developed, geology can often lead to major changes to its design.

Examples of the importance of geology are numerous in the Appalachian coal field. The northern, central, and southern region each has its unique geologic features and idiosyncrasies. Knowing what these are before mining begins and correctly reacting to them after mining commences is vital to the ultimate success of the operation.

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**Social hour - 6:00 p.m.**

**Dinner - 7:00 p.m.**

**Program - 8:00 p.m.**

Dinner will cost \$20.00/person, **students \$5.00**; checks preferred. Reservations should be **emailed** to Mary Ann Gross at [magrosspgs@verizon.net](mailto:magrosspgs@verizon.net), please title as "PGS Dinner Reservation." If you are unable to use email, call (412) 440-1468 and leave your name and number of reservations needed by **noon, Monday, September 17.**

**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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# Pittsburgh Geological Society

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## PGS FALL FIELD TRIP TO ONTARIO

Join PGS on a field trip to the Bancroft-Madoc area of eastern Ontario. This region, loaded with remarkable geology, is located about half way between Toronto and Ottawa, Canada. Once in the area, we will be accompanied by Pam Sangster, District Provincial Geologist, who will introduce us to the region's geology.

Stops for this event have not yet been finalized, but possibilities include: 1) the Carden quarry where Middle Ordovician (Simcoe Group) limestone is exposed that contains beautiful fossil specimens; 2) the former Marmoraton Iron mine which was the first discovery in Canada made using airborne geophysics; 3) a cement quarry to see a Jurassic kimberlite dyke intruding Paleozoic limestone; 4) the Greenmantle farm to view spectacular minerals at a newly opened site; 5) Petroglyphs Park combining geology and history; 6) and Unimin's Blue Mountain mine—the world's largest nepheline syenite producer. Other possibilities include Be-bearing pegmatites, impact craters, and glacial lake shorelines.

The trip will run from Thursday, October 25 through Sunday, October 29, 2007, which includes one day for the drive up, two full days in the field, and one day for the return trip. More details to come in a separate announcement.

## ORIGINS OF WESTERN PA PLACE NAMES

Dunkard Creek in Greene County derives its name from the word "dunkard," which is descriptive of the baptismal method used by the German Baptist Brethren, a sect opposed to military service founded in 1708. The Dunkard Group, a Pennsylvanian and/or Permian group of rocks found in southwestern Pennsylvania, is named for Dunkard Creek.

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*If you have news items you would like included in the PGS Newsletter, please send them to Bob Burger at [r.burger@verizon.net](mailto:r.burger@verizon.net).*

## DON'T FORGET TO RENEW

It's time to renew your PGS membership for the 2007-2008 season. Please fill out the membership application included with this newsletter and return it with your dues to John Harper at the address on the form.

## OCTOBER STUDENT WORKSHOP

After a one-year hiatus, PGS is again offering the "So You Want to be a Geologist" student workshop but in a revised and expanded format. The workshop will now be a full day in length (lunch will still be provided). The format of the workshop has also changed. Career-related topics will be presented in the morning, and an outdoor practical session on sampling will be presented in the afternoon. The morning topics will include tips for success on student preparation, candidate preparation, and professional behaviors. Environmental soil and groundwater sampling techniques as well as analytical interpretation will be presented in the afternoon. Attendance will be limited to 25 students.

WHO: Students preparing for careers in geology or related professions

WHAT: A course to prepare students for professional level work

WHEN: October 6, 2007; 8:00 a.m. to 4:00 p.m. – rain or shine

WHERE: Slippery Rock University, Advanced Technology and Science Hall, Room 132

HOW: Please respond to Judy Neelan by email at [jneelan@state.pa.us](mailto:jneelan@state.pa.us) by October 1, 2007. Please indicate your name(s), your phone number, your university, and any special needs. You may also call Judy Neelan at 412 442-4087 if there are questions.

Please note that this is not a professional level course on sampling but rather an introduction for students into the significance of sampling in our professional life and the importance of doing it properly.

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## PGS Website Of The Month

<http://www.beyonddiscovery.org/content/view.article.asp?a=229>

### FALL NORTH AMERICAN COALBED METHANE FORUM

The North American Coalbed Methane Forum will hold its Fall session on October 30 – 31, 2007 at the Lake View Resort and Conference Center near Morgantown, WV. For more information, please contact Ihor Havryluk at 412-445-5803 or Dr. Kashi Aminian at 304-293-7682 ext. 3406.

### DID YOU KNOW . . . ?

- Astronomers have discovered an Earth-like planet about 20.5 light years away. Gliese 581 c orbits its star at just the right distance to sustain liquid water . . . And extraterrestrial life?
- Scientists are speculating that the increase in global temperatures at the Paleocene-Eocene boundary (about 9 to 11 degrees F) was probably related to volcanic activity at the Mid-Atlantic Ridge that spewed massive amounts of methane and CO<sub>2</sub> into the atmosphere.
- Pittsburgh's Carnegie Museum of Natural History has one of the finest dinosaur collections in the world, including the skeleton of *Diplodocus carnegii* and the most complete *Tyrannosaurus rex* skull known to date.
- They finally found kryptonite – the mineral that robs Superman of his powers!!! (The newly discovered mineral is actually called Jadarite, but it has the same chemical formula as the one written on a case of kryptonite stolen by Lex Luthor in the Superman II movie.)
- There is evidence that subduction of a tectonic plate beneath North America during the late Cretaceous may have caused the New Madrid earthquakes in 1811 and 1812.
- During creation of oceanic crust by rapid injection of magma at mid-ocean ridges, eruptions can spread lava on the sea floor and release huge volumes of hot water enriched with reduced chemicals into the water column as high as 1 km.
- Scientists believe, based on the age of oldest volcanic activity, that the Aleutian Arc in the North Pacific formed around 40–55 Ma.
- Pennsylvanian-age coal seams in North America, Europe, and China preserve the remains of the earliest tropical rain forests.
- Scientists recently documented a record of climate change in the Gulf of Mexico between 1,000 and 1,400 years BP that included sea surface temperatures warmer than today.
- The location where a fossil has been preserved influences its organic composition as much as does the original biology of the specimen.
- The rate of accumulation of eolian dust on alluvial fan terraces in arid climates is often inversely proportional to the square root of the age of the terrace.

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<b>Vice President:</b>	Mike Forth	<b>Director-at Large:</b>	Albert Kollar	<b>Counselor:</b>	Mike Bikerman
<b>Treasurer:</b>	Mary Ann Gross	<b>Director-at Large:</b>	Erica Love	<b>Counselor:</b>	John Harper
<b>Secretary:</b>	Ray Follador	<b>Director-at Large:</b>	Mary McGuire	<b>Counselor:</b>	Charles Shultz
<b>Past President:</b>	Frank Benacquista	<b>Director-at Large:</b>	Mary Robison	<b>AAPG Delegate:</b>	Dan Billman

**Memberships:** For information about memberships, please write PGS Membership Chair, PO Box 58172, Pittsburgh PA 15209, call John Harper at (412) 442-4230, or e-mail [jharper@state.pa.us](mailto:jharper@state.pa.us). Membership information can also be found at our website: [www.pittsburghgeologicalsociety.org](http://www.pittsburghgeologicalsociety.org).

**Programs:** If you would like to make a presentation at a PGS meeting, please contact Wendell Barner, Program Chairman at (412) 208-2409 or email at [barnerwl@cdm.com](mailto:barnerwl@cdm.com).

**News items:** To submit a news item in the PGS Newsletter, please contact Bob Burger at (724) 818-5659, mail at 1885 Redcoach Road, Allison Park, PA 15101, or email at [r.burger@verizon.net](mailto:r.burger@verizon.net). Be sure to also send an email address and phone number where you may be contacted.

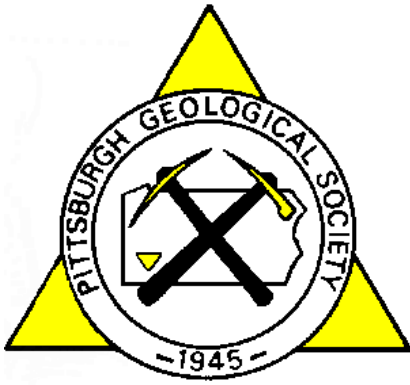
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PO Box 58172  
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# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No. 2

Robert Burger, Editor

October, 2007

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Wednesday, October 17, 2007

The Pittsburgh Geological Society  
presents

*Simulating 100 million years of radiation damage in six years:  
Experiments on plutonium-doped minerals*

by John M. Hanchar,  
Department of Earth Sciences,  
Memorial University of Newfoundland

Zircon ( $ZrSiO_4$ ) is an important mineral in understanding the Earth's crustal evolution. The stability of zircon in nature over long periods of time has led researchers to focus on zircon as the preferred mineral for geochronology. In order to provide an explanation for zircon U/Pb analyses that are isotopically disturbed, it is desirable to acquire a better understanding of radiation damage mechanisms and processes that have led to alteration of the zircon structure and the enhanced mobility of the parent or daughter isotopes. Zircon has also been proposed as a potential storage material for actinides, including weapons-grade plutonium from dismantled nuclear weapons. For investigations of self-irradiation damage effects taking place in zircon, one option is to use single crystals doped with  $^{238}\text{Pu}$ . Due to the high alpha-emitting activity of  $^{238}\text{Pu}$ , accelerated alpha-induced radiation damage in zircon crystals on the laboratory time scale (months to years) can be investigated. This is opposed to thousands to tens of thousands of years for  $^{239}\text{Pu}$ -doped ceramics or millions to hundreds of millions of years for natural zircon samples (depending on the initial U content and the geologic history of the sample). In our investigation, single crystals of synthetic zircon doped with  $^{238}\text{Pu}$ , up to 3.5 mm in size, were grown for the first time ever using a Li-Mo flux. The crystals were transparent, of pink-brown color, and free of inclusions of separated Pu oxide phases. Approximately five months after zircon synthesis, the crystals changed color to gray-brown, and after 14 months, the gray color in the crystals increased. After 24 months, the crystals were still transparent and free of inclusions of separated Pu phases. The development of cracks in the crystals has increased since crystallization, due to the cumulative dose of self-irradiation from the decay of  $^{238}\text{Pu}$  to  $^{234}\text{U}$ .

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**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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## Pittsburgh Geological Society

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### **PRESIDENT'S MESSAGE:**

#### **A CALL TO STUDENTS**

Welcome back to the fall monthly PGS colloquia. I hope you had the chance to attend the annual September presentation on Appalachian Geology. Mr. J. Blair McGill described coal mines throughout the region and vigorous discussion followed. In October, Dr. John Hanchar will arrive from Memorial University in Newfoundland, Canada. In addition to presenting a lecture on plutonium doped zircons, which he has delivered internationally as a Mineralogical Society of America distinguished lecturer, he plans on describing his department in hopes of recruiting students to apply for graduate studies in Newfoundland. As a result of revenues derived by oil plays off the Grand Banks, the Department of Earth Sciences possesses a magnificent modern building and a large array of top shelf analytical capabilities. With research projects spanning the globe, the opportunity for international study on a truly magnificent landscape with a rich cultural heritage is truly an opportunity you should hear about in detail. All students should consider attending his presentation to learn more. If I was not looking at graduate school through the rear view mirror, I would clearly explore the opportunities offered myself!

Indeed, there are many additional activities available to you this year. The field trip to Ontario will pursue adventure in just a few weeks. A workshop for students is occurring on 6 October. Finally, a fine speakers' program has been arranged for the year and it will be great to get together with you monthly. In the meantime, I hope you have the chance to enjoy the foliage during the fine fall weather.

Wishing you the best of work and play,  
Patrick A Burkhardt

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### **PGS FALL FIELD TRIP TO ONTARIO**

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The trip will run from Thursday, October 26 through Sunday, October 29, 2007, which includes one day for the drive up, two full days in the field, and one day for the return trip. Cost of the trip per person will be \$100 for transportation, gasoline, drinks, and snacks. Meals and 3-night motel stay are additional.

- On the 26<sup>th</sup> we'll start the morning looking at Paleozoic Rocks in the Belleville area, then drive north along Hwy 62 and do the Madoc-Bancroft tour.
- On the evening of the 26<sup>th</sup>, the Bancroft and Kingston gem and mineral clubs will host a dinner meeting at the Sword Inn in Bancroft. Local geologists will deliver a short talk on Bancroft mineral deposits.
- On the 27<sup>th</sup> our group will tour some sites in the Bancroft area including the Aquarose beryl pit and rare metal pegmatites. (Schedule may change depending on availability of quarries.)

Registration is limited to 15 people (sorry, but that is all the trip can accommodate), so hurry and sign up as soon as possible to get a seat on this fabulous trip to explore the geology of eastern Ontario and to hunt for some truly impressive mineral specimens. Passport OR state-issued birth certificate and photo drivers license are required to cross the border. If you do not have these, you will not be allowed into Canada. These documents will be checked before the trip departs Pittsburgh.

Check the weather reports prior to departure (can you say "October snow?") and dress appropriately. Hard hats and sturdy shoes are required for entry into the quarries.

For more info. or to sign up, contact Frank Benacquista at [fbenacquista@kuresources.com](mailto:fbenacquista@kuresources.com) or call 412-469-9331.



## ORIGINS OF WESTERN PA PLACE NAMES

Redstone Creek, which runs from the western slope of Chestnut Ridge near Uniontown to the Monongahela River at Brownsville, gave its name to the Redstone coal bed of the Monongahela Formation, which is mined at various places around southwestern Pennsylvania. The creek was so named because the exposures of coal on the hillsides near Brownsville sometimes became ignited and burned much as modern bone shale piles burn or smolder, turning the overlying shale a bright red color (called “clinker” or “red dog”).

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## DID YOU KNOW . . . ?

- The Early Cretaceous was a time of formation of numerous large igneous provinces. Scientists speculate that this was caused by a fundamentally different mode of mantle dynamics than that seen today.
- Classic Middle and Late Pennsylvanian cyclothem successions in the mid-continent of the US have been correlated across much of North America using their distinctive conodont faunas.

- If you liked *Velociraptor*, the 20-foot long bipedal dinosaurs from *Jurassic Park*, you might be disappointed to learn that *Velociraptor* was actually only about 6 feet long from snout to tail, and without the tail it would have been about the size of a large turkey (it even had feathers!).
- Glacial deposits laid down in the Carboniferous and Permian have been found throughout southern Gondwana, even as far north as 30° S latitude.
- The release and rise of volatiles that occurs preceding kimberlite dike intrusions can result in local hydrothermal alteration that create *in situ* spheroidal clasts and hydraulic brecciation in the overlying host rock.
- Everyone knows the Sudbury, Canada structure resulted from a bolide impact, but it turns out that some of the best evidence for this comes from a layer of ejecta found in northern Michigan.
- Phlogopite is a rarer member of the mica group than muscovite and biotite, but it has been mined for its heat and electrical insulating properties which are considered superior to other micas.

**PGS Website Of The Month**  
<http://geology.about.com/library/bl/imagess/blwallpaperindex.htm?nl=1>

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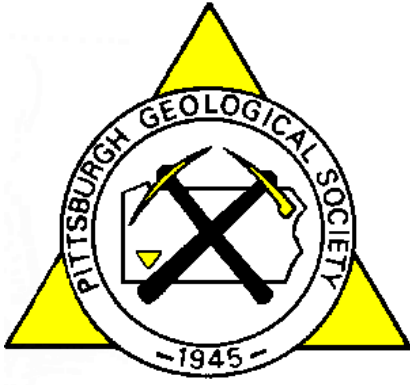
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# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No. 3

Robert Burger, Editor

November, 2007

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**Wednesday, November 28, 2007**

**The Pittsburgh Geological Society  
presents**

***Fluvial response to climate change and land use:  
Burgundy France to French Creek, PA***

by Eric Straffin,  
Department of Geosciences,  
Edinboro University of Pennsylvania

Alluvial deposits of the Loire/Arroux trunk/tributary system record distinct, synchronous episodes of regional fluvial adjustment. Long-term changes in river morphology and depositional style are controlled by changes in discharge regime and sediment supply brought about by glacial/interglacial cycles. At a finer temporal resolution, changes in facies and depositional style through the last 10 ky can be interpreted within a modern analogue model that relates vegetative cover/human influence with sediment supply, and modes of atmospheric circulation with the paths and styles of storms that drive variable discharge regimes across western Europe.

Rivers of northwestern PA, draining the late Wisconsin glacial margin, also record distinctive changes in morphology and depositional style over the last 10 ky. These changes are currently being examined, with the goal of differentiating the relative impacts of human modification of the landscape versus climatic controls.

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**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

**☛ *Please note change in our normal meeting date!* ☛**

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## Pittsburgh Geological Society

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### ORIGINS OF WESTERN PA PLACE NAMES

The Brush Creek marine zone, consisting of a thin marine limestone surrounded by black marine shales in the lower part of the Glenshaw Formation, Conemaugh Group, was named by I. C. White for Brush Creek, which flows northwestward out of Warrendale in Allegheny County to Connoquenessing Creek in Beaver County. In places, Brush Creek meanders through areas where its banks are still marshy and brush-covered, characteristics that gave the creek its name.

### PGS FALL FIELD TRIP

Last month PGS ran a field trip to the Bancroft-Madoc area of southern Ontario. The trip was well attended and participants enjoyed it greatly. Highlights included viewing the area's spectacular geology, visiting the "Beryl Pit," the Essroc Quarry, and the obligatory visit to the Duty-Free Shop. PGS thanks Ontario District Geologists Pam Sangster and Peter LeBaron for hosting the trip. Thanks also go out to PGS member Chuck Shultz, who gave a presentation of Pennsylvania geology to the Bancroft Gem & Mineral Society. Finally, special thanks go to Frank Benacquista for the long hours he devoted to organizing, planning, and leading this outstanding event.

### MEMBER NEWS

Albert D. Kollar and David K. Brezinski presented at talk in a special Geoscience and the Community Symposium at the Denver GSA national meeting, October 28 -31, on PAIS (Patrons And *lauradanae* Supporters)—A Museum-Based Community Educational Partnership. In addition, Kollar has been invited to teach a five week session on the geology of the Pittsburgh region for the University of Pittsburgh Osher Institute starting in February 2008.

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### DID YOU KNOW . . . ?

- Theoretical models of the Earth's early atmosphere (around 2.5 billion years ago) require CO<sub>2</sub> concentrations to have been 50 to 900 times higher than present atmospheric levels.
- The aggregation and dispersal of supercontinents is a fundamental process in Earth evolution, affecting growth of global mountain belts and the stability of the Earth's rotation.
- Some types of gold deposits, which are hosted by subsea volcanic activity, are composed mostly of pyrite with abundant lenses of arsenopyrite and pyrrhotite as well as gold.
- Paleoclimatological evidence suggests early modern humans migrated out of Africa during a 30,000-year period of increased monsoonal activity in the Sahara and Arabian desert area, decreasing the desert barriers that had existed for ages.
- Although Mars has only half the radius and only one-tenth the mass of Earth (it is less dense as well as being a smaller planet), its surface area is only slightly less than the total area of Earth's dry land.
- Due to an error in calculation of mean annual temperature by NASA, it turns out that the hottest year on record in the US is actually 1934, not 1998 as has been widely reported.
- A mud volcano, which measures 160 feet across and is growing beneath the sea off the coast of Trinidad, may become a new island soon.
- The US Department of Agriculture estimates that soils on US farms and grazing lands are currently storing 20 million metric tons of carbon every year, and have the potential to store a total of 200 million metric tons a year—12 to 14 percent of total US emissions.
- It turns out oil-dispersing chemicals are more toxic to corals than crude oil itself so, as far as corals are concerned, it's better that oil spills don't get cleaned up.

## PGS Website of the Month

<http://www.nps.gov/>

- Paleontologists working in northeastern China have discovered a crow-sized early bird, called *Jeholornis prima*, that lived during the Early Cretaceous and whose stomach contains more than 50 intact plant seeds—the first direct evidence of early avian seed-eating.
- Tyuyamunite is a rare uranium mineral that is essentially indistinguishable from carnotite by ordinary methods. It is formed when meteoric oxygenated waters dissolve uranium from primary uranium minerals and later deposit it in a reducing environment.

### NEXT MONTH'S MEETING

PGS will be holding its annual Guest Night on December 19. Talks at these meetings are designed to be interesting to geologists and non-geologist alike and attendees are encouraged to bring their spouses, or someone to share the evening with. This year's speaker will be Chuck Shultz. Chuck—a retired professor from Slippery Rock—is an excellent presenter and photographer. He will be speaking about the volcanoes, culture, and wildlife of Ecuador and the Galapagos Islands. Mark your calendars now.

### PUBLICATIONS AVAILABLE FROM PGS

Don't know what to get your friends, boss, co-workers, self for a holiday gift? Why not get them something from PGS? Publications, and other merchandise, are commonly available at the meetings, but may also be ordered directly from PGS using the instructions below.

Building Pittsburgh – A Walking Tour of Pittsburgh's Building Stones	\$5.00
Atlas of Major Appalachian Basin Gas Plays*	\$25.00
Gas Atlas Database on Floppy Disk*	\$15.00
Rose Run Sandstone of Ohio and Pennsylvania	\$10.00
"Lots" of Danger	\$4.00
Environmental Geology of the Pittsburgh Area	\$4.00

\* Atlas and Database together = \$30.00 + \$6.00 S/H

Shipping and handling is \$3.00 for Rose Run Sandstone, \$6.00 for the Gas Atlas (and database), and \$2.00 for all other items. To order, make check or money order payable to Pittsburgh Geological Society, Inc. Send orders directly to John Harper, Pennsylvania Geological Survey, 400 Waterfront Drive, Pittsburgh, PA 15222-4745

In addition, many of the guidebooks from past field trips are available as free downloads from [www.pittsburghgeologicalsociety.org](http://www.pittsburghgeologicalsociety.org).

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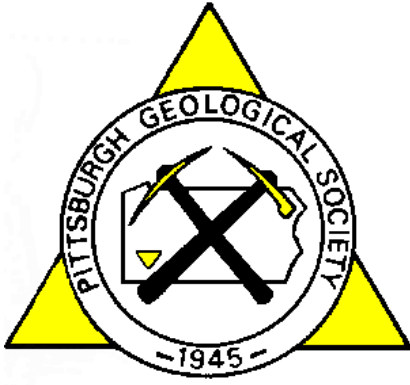
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# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No. 4

Robert Burger, Editor

December, 2007

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**Wednesday, December 19, 2007  
The Pittsburgh Geological Society  
Annual Spouses Night**

## **Volcanoes, Birds, and People: Central Ecuador and the Galapagos Islands**

by Charles H. Shultz, Ph.D.; P.G.

Ecuador sits astride the equator and on the overriding plate of the South American subduction zone. The Andean chain slices N-S through the center of the country and is dominated by twin rows of immense Pleistocene to active stratovolcanoes. Cotopaxi at 19,640 feet, one of dozens of such volcanoes, is the highest active volcano in the world. I will take you to 14,500 feet to see the glaciers capping this monster and view the enormous volcanic mudflows (lahars) that have inundated the surrounding landscape. Quito (population 1.4 million), the capital city of eternal spring at 9,000 feet, sits in the central tectonic depression filled with tens of thousands of feet of Pleistocene and Holocene volcanic sediment and is surrounded and threatened east and west by towering volcanoes collectively called Avenue of the Volcanoes. Tectonic activity accompanied volcanism. I will show you structural chaos where layering in Pleistocene pyroclastics is vertical to overturned. Besides volcanic geology, we will visit Otavalo where the largest native-American market in South America exists. It is frequented by buyers from Paris to New York.

After a brief flight to Guayaquil, Ecuador's largest city at 1.9 million, we will fly 600 miles west to Ecuador's Galapagos Islands. Collectively these are all a National Park, a World Heritage Site (1979), and a UNESCO World Biosphere Reserve (1985). The island chain, oriented NW-SE, is related to a "hot spot" on the northern Nazca Plate just south of the Galapagos Rift Zone (transform) that separates the Nazca Plate from the Cocos Plate to the north. The older islands to the SE are planated uplifted sea floor dominated by basaltic pillow lavas. Active volcanism occurs to the NW where basaltic shield volcanoes with interior calderas plus cinder cones prevail. Worldwide effort to preserve the ecology of the Galapagos continues and includes land-tortoise breeding centers, the international Darwin Research Center, restrictions on human occupation, and strict tourist controls. I'll show you giant land tortoises, marine iguanas, blue-footed boobies, and California sea lions. The Galapagos Islands are one of the most impressive areas I've ever visited and I hope to share the thrill with you through pictures. Come and enjoy!

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**Social hour - 6:00 p.m.**

**Dinner - 7:00 p.m.**

**Program - 8:00 p.m.**

Dinner will cost \$20.00/person, **students \$5.00**; checks preferred. Reservations should be **emailed** to Mary Ann Gross at [magrosspgs@verizon.net](mailto:magrosspgs@verizon.net), please title as "PGS Dinner Reservation." If you are unable to use email, call (412) 440-1468 and leave your name and number of reservations needed by **noon, Monday, December 17**.

**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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## Pittsburgh Geological Society

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### ORIGINS OF WESTERN PA PLACE NAMES

The Kiskiminetas River, formed by convergence of the Conemaugh River and Loyalhanna Creek near the town of Saltsburg, Indiana County, flows to the Allegheny River at Freeport. The name is most likely of Delaware Indian origin, although there is no consensus on the exact origin and meaning. Some think it is from *Gisch-gu* (day or daylight) and *Manitooon* (to make), signifying “make daylight” or “break camp and move on.” Others think it is derived from *Kee-ak-kshee-man-nit-toos* (cut spirit). Still others believe it is derived from words meaning “plenty of walnuts.” Take your pick!

### DID YOU KNOW . . . ?

- The time scale for the Late Triassic is not well known because there is a lack of radiometric dates and continuous marine sequences, and there are poor correlations between sections.
- Abnormally high fluid pressures in sedimentary basins are considered to be the result of a combination of fluid expansion and disequilibrium expansion.
- According to a recent study by researchers from Sweden, Puerto Rico, and the US, based on 270 years worth of records from corals and sediment cores, the recent spate of major hurricanes in the North Atlantic area (think Hurricane Katrina) are the norm, rather than the exception.
- Although kimberlites, the source of most diamonds, have been studied for decades, the depth of melting, nature of the source material, and involvement of the subcontinental lithospheric mantle remain virtually unknown.
- Oxygen isotopes found in individual crystals in volcanic rocks can help fingerprint the sources of the various magmas.
- Despite the presence of oxygen-generating cyanobacteria during the early Precambrian, gases such as carbon monoxide and methane from undersea volcanoes probably depleted the sea water, and atmosphere, of any oxygen they generated.
- Of the 28.4 million metric tons of industrial sand and gravel sold or used in the US in 2005, 35 percent was used for glassmaking, 18 percent for foundry sand, 14 percent in the petroleum industry, and 22 percent for ceramics, chemicals, metallurgy, recreation, and water filtration.
- New findings suggest that the rise in carbon dioxide associated with global warming at the end of the last Ice Age was a result of the warming, rather than its primary cause.
- A study published in a recent issue of Geophysical Research Letters indicates that glacial sediment load over the last 10,000 years is at least in part to blame for subsidence in the Mississippi Delta.
- The Snake River Plain, a sequence of volcanic fields that stretches from eastern Oregon to Yellowstone National Park in Wyoming, formed by more than 200 supervolcano eruptions over the past 16 million years.
- New information collected since the ozone scare of the 1970s indicates that the ozone-destroying chemicals used in manufacturing are steadily decreasing in the atmosphere.
- Iodine (the element, not the tincture!) is strongly associated with organic matter in deep anoxic sediments. There is commonly more iodine in released hydrocarbons than in the surrounding seawater as a result.
- Scientists are speculating that the reason parts of the San Andreas fault move at a steady pace, rather than building up energy and releasing it in deadly earthquakes, is because it is being “lubricated” by talc deposits in the rock.

*PGS  
wishes everyone a*

*Happy Holiday  
Season!*



## PGS Website of the Month

<http://www.exploratorium.edu/faultline/index.html>

### NEXT MONTH'S MEETING

Our speaker for next month's PGS meeting will be Shane Smith of Youngstown State University. He will present "Reconstructing paleodrainage networks in the Miocene Columbia River Basalt Group, Clearwater Embayment, west-central Idaho and southwestern Washington." This interesting talk will be held at Foster's Restaurant on January 16, 2008. See you there.

### HAVE YOU RENEWED YOUR PGS MEMBERSHIP?

For those of you who have not yet renewed your PGS membership

for the 2007-2008 season, it is about to expire.

To ensure your membership, and to continue receiving this newsletter along with other valuable information regarding our profession, please fill out the membership application included with this newsletter and return it with your dues to John Harper at the address shown on the form.

### PUBLICATIONS AVAILABLE FROM PGS

Don't know what to get your friends, boss, co-workers, self for a holiday gift? Why not get them something from PGS? Publications, and other merchandise, are commonly available at the meetings, but may also be ordered directly from PGS using the instructions below.

Building Pittsburgh – A Walking Tour of Pittsburgh's Building Stones	\$5.00
Atlas of Major Appalachian Basin Gas Plays*	\$25.00
Gas Atlas Database on Floppy Disk*	\$15.00
Rose Run Sandstone of Ohio and Pennsylvania	\$10.00
"Lots" of Danger	\$4.00
Environmental Geology of the Pittsburgh Area	\$4.00

\* Atlas and Database together = \$30.00 + \$6.00 S/H

Shipping and handling is \$3.00 for Rose Run Sandstone, \$6.00 for the Gas Atlas (and database), and \$2.00 for all other items. To order, make check or money order payable to Pittsburgh Geological Society, Inc. Send orders directly to John Harper, Pennsylvania Geological Survey, 400 Waterfront Drive, Pittsburgh, PA 15222-4745

In addition, many of the guidebooks from past field trips are available as free downloads from [www.pittsburghgeologicalsociety.org](http://www.pittsburghgeologicalsociety.org).

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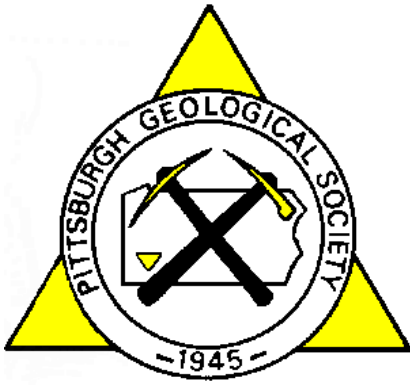
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# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No. 5

Robert Burger, Editor

January, 2008

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Wednesday, January 16, 2008  
The Pittsburgh Geological Society

## Reconstructing Paleodrainage Networks in the Miocene Columbia River Basalt Group, Clearwater Embayment, west-central Idaho and southwestern Washington

by Shane Smith, Youngstown State University

Sedimentary successions intercalated with Miocene Columbia River Basalt Group (CRBG) flows preserve a record of the depositional and erosional settings that characterized the Columbia Plateau between and during emplacement of the flows. Sedimentary interbeds in the Clearwater Embayment of west-central Idaho and southwestern Washington are composed of unconsolidated to moderately consolidated, interstratified sand, silt, clay, and gravel. Spatial distribution of sedimentary facies associations suggests that these interbeds were deposited primarily in fluvial and lacustrine systems.

Chemostratigraphic and chronostratigraphic correlations of CRBG flows permitted the chronostratigraphic correlations of intercalated sedimentary intervals throughout the embayment. CRBG correlations were completed using X-ray fluorescence whole rock geochemical analyses of samples from the flows. Paleodrainage networks were reconstructed for 12 separate time intervals within the embayment using the spatial distribution of sedimentary facies associations and chronostratigraphic correlations of interbeds. These reconstructions suggest that locations of paleodrainage networks were controlled by large volume flows during the initial emplacement of the CRBG and later by geologic structures.

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**Social hour - 6:00 p.m.**

**Dinner - 7:00 p.m.**

**Program - 8:00 p.m.**

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**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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# Pittsburgh Geological Society

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## **PRESIDENT'S MESSAGE:**

Happy New Year and greetings from Pittsburgh Geological Society! We look forward to an active year supporting your professional and intellectual pursuits of better understanding Planet Earth. In addition to the monthly colloquia, we are planning a workshop in February with the PA Council of Professional Geologists offering a review of the fundamentals and applications of Geology for those individuals preparing for the professional registration examination. Later in the spring, we will conduct another well drilling and installation workshop for students, as well as re-offering the Forbes Road field trip. The field trip commences our PGS collaboration in celebrating the 250th anniversary of Pittsburgh. Echoing the success of the fall '07 field trip to Bancroft, Ontario, the provincial survey has offered additional cooperation in presenting an about 4-5 day trip to Sudbury, probably next September.

Recent and long-ago-lapsed PGS corporate memberships are being asked to renew their support of our activities. We thank those individuals who have successfully advocated with their firms' 2008 renewals. I suppose the singular 2007 event that best ratified the value of our professional activities was the success of the protracted PGS effort to contest the Bureau of Taxation revocation of our tax-exempt status. That is correct; David fought Goliath and won again. We are pleased to continue supporting the public, students, professionals and anyone seeking to better understand their back yard, its history, and the ever-present issues associated with Earth materials and processes. We relish the State's recognition of the charitable nature of our efforts!

On a final note, I am proud to announce that the Society will be the local host to the 2011 joint spring meeting for the Northeastern and North-central sections of the Geological Society of America right here in Pittsburgh. Please join us in these many endeavors and keep our profession dynamic in the city and across the region.

Best!

Patrick A. Burkhart, PhD

## **ORIGINS OF WESTERN PA PLACE NAMES**

The Clarion River was named by surveyors in the early 1800s during a survey for a road. While camping by the river, they thought the sound of the water rippling through the woods sounded like a distant clarion call. Both Clarion County and its county seat, Clarion, were named for the river. The Pennsylvanian Clarion coal and sandstone beds of the lower Allegheny Group, and the Upper Devonian Clarion sandstones of oil and gas well drillers, all derive their names from the potent imaginations of those early surveyors.

## **DID YOU KNOW . . . ?**

- Recent studies indicate that tropical Africa suffered from severe megadroughts between 135,000 and 75,000 years ago, which might have forced early humans to migrate out of that area and into Asia and Europe.
- And speaking of early humans, anthropologists have found that walking upright on two legs is less energy intensive than walking on all fours, and might have been the impetus for our ancestors to evolve bipedalism.
- The National Research Council has concluded that a significant increase in the production of ethanol from corn could negatively impact water quality and availability in this country.
- The Himalayas are the highest mountains in the world because the Indian plate was moving at a really fast clip – more than 20 centimeters per year – when it slammed into Asia.
- Humans aren't completely responsible for the extinction of the woolly mammoth. It turns out that the elephants were on a fast decline by the end of the Ice Age because of worldwide environmental changes. Human hunters only delivered the crowning blow.

**PGS Website of the Month**

<http://www.mii.org/>

- Volcanic ash particles generally are too large to severely affect human respiration, but some are small enough to trigger asthma and other respiratory problems.
- Kansas has gone on record as the first state to reject an air quality permit for a coal-fired power plant, citing a threat to public health from CO<sub>2</sub> emissions.
- Speaking of CO<sub>2</sub>, new research indicates that agricultural soil erosion, instead of contributing significantly to CO<sub>2</sub> in the atmosphere, actually removes more CO<sub>2</sub> than it emits.
- Frank C. Hawthorne at the University of Manitoba in Canada was the most cited scientist in the world during the past decade. As many as 2,204 authors cited his work, mostly on the nomenclature of amphiboles.
- Alice Quillen, an astronomer at the University of Rochester, thinks that three local stars, including the reddish star Formalhaut in the Southern Fish constellation, may be in the process of giving birth to some Pluto-sized planets.
- The great ice sheets on Greenland and Antarctica contain more potential water, if they melt, but continental glaciers that are currently melting will actually contribute more to sea-level rise over the next century.
- German researches found that the Earth is about 5 millimeters smaller in diameter in 2007 than it was in 2005, based on Very Long Baseline Interferometry.
- Scientists looking at the isotopic signatures and dates of certain erosion-resistant minerals preserved in ancient crustal and mantle rocks at the Earth's surface have determined that they match closely, supporting the idea that the Earth's crust emerged from the mantle in pulses billions of years ago.
- Parts of North America, such as Los Angeles and New York, would be under water if the crust weren't so hot – the temperature of the crust is as important as density and thickness in affecting surface elevations.
- And since it takes continents billions of years to lose their heat, LA and NYC don't have a lot to worry about just yet.

### NEXT MONTH'S MEETING

Our meeting next month will feature John Harper of the Pennsylvania Geological Survey who will be delivering a presentation about carbon dioxide sequestration. The meeting will be a joint meeting between PGS and the Association of Environmental and Engineering Geologists. It will be held at Foster's Restaurant on February 20, 2008. We hope you can attend.

### PCPG SYMPOSIUM

The Pennsylvania Council of Professional Geologists will be holding a symposium entitled *Water and the Environment* on May 7, 2008 at the Hershey Lodge and Conference Center. For more information, visit the PCPG website at <http://www.pcpge.org/Symposium/Symp08.htm>.

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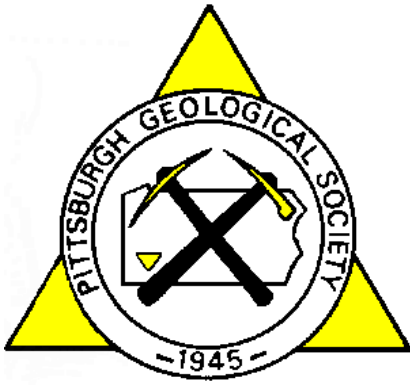
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# PGS Newsletter

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Vol. LX, No. 6

Robert Burger, Editor

February, 2008

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Wednesday, February 20, 2008  
The Pittsburgh Geological Society

## An introduction to geological carbon sequestration, with an overview of what's being done in Pennsylvania

by John A. Harper, Pennsylvania Geological Survey

Removing greenhouse gases, particularly carbon dioxide (CO<sub>2</sub>), from the atmosphere in order to affect climate change has become a long-term goal in this country as well as in many other parts of the world. One of the ways to remove CO<sub>2</sub> is through carbon capture and storage (CCS), which involves removing CO<sub>2</sub> from flue gases and storing it in such a way as to keep it locked up indefinitely. One of these ways is to sequester the CO<sub>2</sub> in underground rock reservoirs, or "sinks." The primary attraction of geological sequestration is the potential for direct and long-term storage of captured CO<sub>2</sub> emissions in close proximity to the CO<sub>2</sub> source. It is a proven technology in many parts of the world, especially where it is used for enhanced oil recovery. Geological sinks include a variety of reservoirs types, each having unique opportunities as well as problems that must be considered before storage begins.

The Pennsylvania Geologic Survey, in conjunction with the Midwest Regional Carbon Sequestration Partnership (MRCSP), has been involved in geological sequestration studies since 2003. MRCSP is a seven-state partnership led by Battelle Memorial Institute of Columbus, OH that includes government agencies, universities, environmental organizations, and industry from Indiana, Kentucky, Maryland, Michigan, Ohio, Pennsylvania, and West Virginia. MRCSP has been charged with assessing the technical potential, economic viability, and public acceptability of carbon sequestration within the region. The region is a major

source of CO<sub>2</sub>—more than 600 stationary facilities are considered CO<sub>2</sub> point sources, about half of which are responsible for emitting more than 800 million tons of CO<sub>2</sub> per year. During Phase I, the geological team studied the regional geology of the area to delineate the most promising prospective geological reservoirs and sinks for CO<sub>2</sub> sequestration through data collection, interpretation, and mapping. Initial results indicate that Pennsylvania's rock reservoirs have the potential capacity to store an enormous amount of CO<sub>2</sub>.

In 2006, the Pennsylvania Department of Conservation and Natural Resources (DCNR), parent agency of the Pennsylvania Geological Survey, began efforts to study and make recommendations for managing carbon within the state. The main objective is to develop a meaningful carbon management plan that is compatible with the core mission programs of the department. During this process, DCNR and its multitude of partners hope to understand and effectively exploit both terrestrial and geological sequestration opportunities within Pennsylvania, initially through encouraging (and, perhaps, helping to fund) demonstration sequestration projects, and eventually through such mechanisms as carbon credit trading. DCNR wants to offset at least a portion of Pennsylvania's greenhouse gas emissions while capturing any potential co-benefits such as enhancing the recovery of oil and natural gas and the growth of the state's large forest and agricultural resources.

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**Program - 8:00 p.m.**

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**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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# Pittsburgh Geological Society

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## CALL FOR ABSTRACTS!

Students are invited to submit abstracts of a Senior Research Project, Senior Design Project, Master's or PhD Thesis for presentation at the Sixth Annual Student Night joint meeting of the Association of Engineering Geologists, the Geotechnical Group of the Pittsburgh Section of the American Society of Civil Engineers, and PGS. Abstracts related to geology, engineering geology, geotechnical engineering, environmental engineering, hydrogeology, and hydrology are welcome.

Each organization will select one student to give a 15 to 20-minute oral presentation based on their abstract submittal. The remaining students will be invited to present a poster summarizing their research work. **The 3 students selected to give oral presentations will receive \$100 awards. All students who participate in the poster session will receive \$25 awards.** All students presenting research, either verbally or orally, will receive a one-year student membership to PGS, a special award certificate, and a complimentary dinner at the event. The meeting will be held at 6:00 p.m. on Wednesday, April 16, 2008 at Foster's Restaurant, Foster Plaza Bldg. 10, in Green Tree, PA.

Abstracts must not exceed 350 words and may be submitted via email to [barnerwl@cdm.com](mailto:barnerwl@cdm.com). If you have any questions, or require a mailing address for submittal, please call Wendell Barner at 412-208-2409. The deadline for abstract submittal is March 7, 2008. Notification will be given to the selected speakers on March 18, 2008.

## REQUEST FOR ARCHIVAL RECORDS

PGS is in the process of gathering its historical documents for archiving. If any of you—including our former board members—have old newsletters, field trip guides, letters-of-correspondence, or other documents such as treasurer's reports, and annual summaries that would have appeared at the PGS Changeover meetings and wouldn't mind parting with them or copying them for us, please contact Judy Neelan at [jneelan@state.pa.us](mailto:jneelan@state.pa.us). You may also mail them to us at Pittsburgh Geological Society, PO Box 58172, Pittsburgh PA 15209.

## CALL FOR NOMINEES

The Society is calling on the membership for interested candidates for next years Officer and Director-at-Large positions.

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## ON-LINE AERIAL PHOTOGRAPHY

The Pennsylvania Geological Survey (PaGS) and Penn State University (PSU) have come up with a new on-line resource for geologists, engineers, planners, historians, and curious citizens at <http://www.pennpilot.psu.edu/>. Called PennPilot, this website houses and makes available stereo aerial photography of Pennsylvania for the 1930s-1970s time period. First-generation prints housed at PaGS in Middletown and in the State Archives in Harrisburg were scanned by PSU and placed on the PennPilot website with instructions on how to view and download them. These instructions should be read carefully, especially if you are interested in how to save the data at the highest resolution. Photos are provided as stereo pairs, if desired, but they can be converted into orthoimagery.

## ORIGINS OF WESTERN PA PLACE NAMES

The town of Greensburg, originally called Newtown, became the county seat of Westmoreland County in 1785. The name was changed to honor Revolutionary War hero General Nathaniel Greene, and Greensburg was incorporated as a borough in 1799. It was little more than a stopover on the Pennsylvania Railroad until the discovery of coal in the area made it a center of the coal industry in the late 1800s and early 1900s.

### PGS Website of the Month

<http://www.ucmp.berkeley.edu/geology/tectonics.html>

## DID YOU KNOW . . . ?

- A report in Geophysical Research Letters last November indicates that Greenland is suffering from glacial eustasy—as the ice cap on top of it has been melting, the land surface has been lifting, as much as 35 millimeters between 2001 and 2006.
- Americans account for only five percent of the world's population, but we consume 25 percent of the world's oil, 68 percent of it coming from outside the United States.
- The soil and water in West Bengal, India, is so contaminated by arsenic that burning cow patties as fuel has been contributing arsenic to the local air as well.
- The highest science scores in a 57-country survey of 15-year olds goes to . . . Finland???
- The deep-ocean isotope record indicates a profound cooling about 14 million years ago. This has been interpreted as the time the East Antarctic Ice Sheet expanded to its present extent and development.
- Humans aren't completely responsible for the extinction of the woolly mammoth. It turns out that the elephants were on a fast decline by the end of the Ice Age because of worldwide environmental changes. Human hunters only delivered the crowning blow.
- Of the electricity generated in the US, 49 percent comes from coal, 20 percent from nuclear, 19 percent from natural gas, seven percent from hydroelectric, three percent from oil, and two percent from wind, solar, and other renewables.
- “Asbestos” comes from the Greek adjective ασβεστος, which means “inextinguishable.”

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**News items:** To submit a news item in the PGS Newsletter, please contact Bob Burger at (724) 818-5659, mail at 1885 Redcoach Road, Allison Park, PA 15101, or email at [r.burger@verizon.net](mailto:r.burger@verizon.net). Be sure to also send an email address and phone number where you may be contacted.

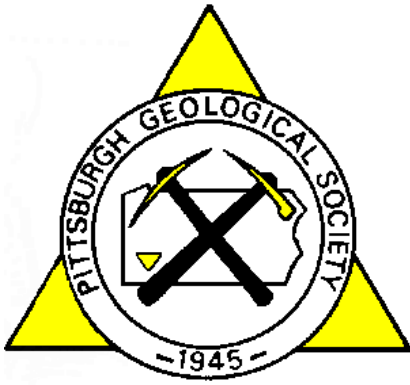
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# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No. 7

Robert Burger, Editor

March, 2008

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**Wednesday, March 19, 2008**  
**The Pittsburgh Geological Society**

## **Influences of Climate on Late Devonian Depositional Systems of the Central Appalachians**

by David K. Brezinski, Maryland Geological Survey

The stratigraphic change in lithology within the upper part of the Catskill-Hampshire succession in the central Appalachians suggests the onset of a long-term environmental change from semiarid to increasingly wet conditions. The sedimentological signature suggesting increased climatic wetness within the uppermost Catskill and Hampshire formations is nearly contemporaneous with the initiation of Late Devonian Gondwanan glaciation in the paleo-high-latitudes. The Appalachian climate record indicates that this change began in late Famennian, reaching its peak during the latest Devonian when glacial deposits are recorded in the paleo-mid-latitudes of the Appalachian Basin. Evidence of this late Famennian increase in precipitation also is recorded in the adjacent marine environments. Equivalent-age marine units in Ohio and Kentucky record progressive increases in both total organic carbon and the percentage of terrestrially-derived organic carbon. This suggests that while Late Devonian glaciers were forming in higher altitudes of the Appalachian Basin, attendant increases in both precipitation and runoff led to both increased terrestrial and marine organic productivity. This in turn led to heightened levels of organics being buried in the adjacent marine environments.

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**Dinner - 7:00 p.m.**

**Program - 8:00 p.m.**

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**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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# Pittsburgh Geological Society

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## SPRING NORTH AMERICAN COALBED

## METHANE FORUM ANNOUNCED

The North American Coalbed Methane Forum will hold its Spring session on April 29 - 30, 2008 at the Hilton Garden Inn Pittsburgh/Southpointe near Canonsburg, PA. In conjunction with the session, the Forum has arranged a one-day short course on Coalbed Methane Well Completions: Principles and Best Practices. The short course will be held on Tuesday, April 29, 2008 at the Inn. For more information, please contact Ihor Havryluk at 412-445-5803, [havryluk@zoominternet.net](mailto:havryluk@zoominternet.net) or Dr. Kashi Aminian at 304-293-7682 ext. 3406, [kashayar.aminian@mail.wvu.edu](mailto:kashayar.aminian@mail.wvu.edu).

## ORIGINS OF WESTERN PA PLACE NAMES

After the French and Indian War, a Philadelphia company began fur trading with the Indians of the Ohio Valley. When a band of renegade Indians attacked and stole a large shipment on the Ohio River, the trading company complained to the Iroquois Confederation, who settled the dispute by giving up a large tract of land that became known as “the land of the Indians,” or in abbreviated form, “Indiana.” Part of this large tract became Indiana County in 1802, and the town of Indiana formed as the center of law and commerce. Indiana is the birthplace of actor Jimmy Stewart, author Edward Abbey, and opera singer Renee Fleming, and serves as home to the largest privately owned oil and gas drilling firm in the United States, S.W. Jack Drilling Company.

## REQUEST FOR ARCHIVAL RECORDS

PGS is in the process of gathering its historical documents for archiving. If any of you—including our former board members—have old newsletters, field trip guides, letters-of-correspondence, or other documents such as treasurer’s reports, and annual summaries that would have appeared at the PGS Changeover meetings and wouldn’t mind parting with them or copying them for us, please contact Judy Neelan at [jneelan@state.pa.us](mailto:jneelan@state.pa.us). You may also mail them to us at Pittsburgh Geological Society, PO Box 58172, Pittsburgh PA 15209.



## DID YOU KNOW . . . ?

- Although boundary faults attributed to dike-induced stresses typically are normal faults, researchers recently found that potential feeder dikes from volcanic activity might cause reverse slips on nearby normal faults.
- The first evidence of swimming by dinosaurs, probably an allosaur-type animal, has been discovered in northwestern Spain; the swimming style appears to be similar to that of modern aquatic birds.
- In a recently released report, the US Geological Survey estimates that Devonian organic-rich shales in the Appalachian basin contain approximately 31.4 trillion cubic feet of natural gas, 7.5 million barrels of oil, and 562 million barrels of condensate.
- Newly described specimens of jellyfish from Middle Cambrian rocks in Utah have pushed the verified occurrence of jellyfish back to 505 million years old, or 200 million years older than previously described forms.
- From the Interstate Oil and Gas Commerce Commission: “Given the regulatory complexities of CO<sub>2</sub> storage including environmental protection, ownership and management of the pore space, maximization of storage capacity and long term liability, geologically stored CO<sub>2</sub> should be treated under resource management frameworks as opposed to waste disposal frameworks.”
- Although hominoid fossils are widely found in Africa and Eurasia, all of the fossils of hominins—our family tree—that are more than three million years old come from sites along the East African Rift.

## PGS Website of the Month

<http://www.saltinstitute.org/38.html>

- A namikier is a salt glacier that forms on the flank of a mountain created by extrusion of diapiric salt; spectacular namikiers can be seen on diapiric mountains in the Zagros fold belt in Iran.
- Two large-scale weather circulation patterns, the Northern Hemisphere Annular Mode/Arctic Oscillation and the El Niño-Southern Oscillation, play major roles in influencing midlatitude climate on Earth.

## PTTC WORKSHOP

The Petroleum Technology Transfer Council and the Pittsburgh Association of Petroleum Geologists are holding a workshop entitled “Carbonate Reservoirs” Discussion will cover the origin and characteristics of carbonate sediments, rocks and reservoirs. It’s designed to give working geoscientists and engineers enough background into the patterns, properties and complexities of carbonate rock to understand the principles that control reservoir geometry, as well as porosity and permeability distribution.

The workshop will held at the Holiday Inn—Meadowlands, Washington, PA from 8:00 am to 5:00 pm March 25, 2008. The fee is \$125, which covers the workshop, continental breakfast, morning and afternoon breaks and lunch. For more information, contact Douglas Patchen, P.O. Box 6064, Morgantown, WV 26506.

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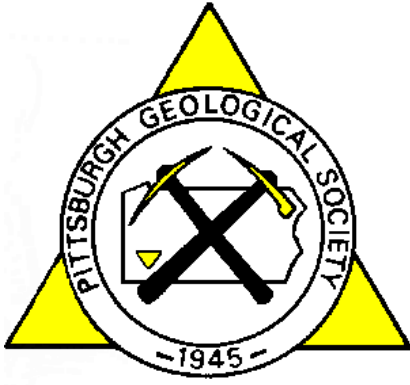
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<http://www.pittsburghgeologicalsociety.org/>

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Vol. LX, No.8

Robert Burger, Editor

April, 2008

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**Wednesday, April 16, 2008  
The Pittsburgh Geological Society**

## **6<sup>th</sup> Annual Student Night**

**Joint meeting with the Pittsburgh Geological Society, the Association of Engineering Geologists,  
and the American Society of Civil Engineers**

**PGS Award Winner**

## **Analysis of Groundwater Temperature Profiles in Chautauqua County, New York**

by James E. Fisher, SUNY-Freedonia

The goal of this project at its onset was to determine temperature profiles for several monitoring wells throughout Chautauqua County to determine baseline temperature profiles several areas in the county. These profiles would allow for comparison with future projects in determining the extent of mean annual temperature change in the area. Initial data showed that for wells at higher elevations on the Allegheny Plateau, mean annual temperatures ranged from 9.4°C to 9.8°C (48.9°F to 49.7°F), with range being attributed to microclimates, and wells on the Lake Erie Lowlands having a mean annual temperature of 11.4°C (52.6°F).

After the initial data collection, analysis showed a temperature anomaly at a well field located within the town of Clymer, NY. These wells, which are located around a pumping station and adjacent to a stream, showed significant warming trends throughout the winter months that is attributed to induced flow from the nearby stream caused by the pumping station. Further study is needed to determine the extent of vertical and horizontal flow, but data indicates complex flow in the area which incorporates stream flow, regional flow, and mixing of temperature zones from vertical flow.

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# Pittsburgh Geological Society

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ASCE Award Winner

## **A Correlation for Predicting Collision Efficiency of Colloidal Particles Coated with Natural Organic Matter (NOM) in Porous Media: The Role of Adsorbed NOM Layer Properties and Electrosteric Stabilization**

by Tanapon Phenrat, Robert D. Tilton, Gregory V. Lowry, Carnegie Mellon University

Natural organic matters (NOM) are ubiquitous in the aquatic environment. NOM can be adsorbed onto the surface of colloidal particles transporting through porous media. The adsorbed layers of charged NOM can provide additional electrosteric repulsions that enhance the migration of colloidal particles in the subsurface environment. Semi-empirical correlations for predicting the collision efficiency of electrostatically stabilized (bare) colloids have been proposed by Elimelech (1992) and Bai and Tien (1999), but their validity for predicting the collision efficiency of colloids coated with NOM has not been evaluated. In this study, we evaluate the predictive ability of these available correlations and demonstrate that adsorbed NOM layer properties have a strong influence on the deposition of NOM coated particles. The correlations were therefore modified to predict the collision efficiency of colloids coated with NOM by taking the adsorbed layer properties into account. Existing data for collision efficiencies of colloids coated with various NOM were taken from the literature (Amirbahman and Olson 1993 and 1995; Franchi and O'Melia 2003) and re-evaluated. The existing semi-empirical approaches for predicting the collision efficiency of bare particles have been demonstrated to substantially overestimate the deposition of NOM coated particles for a factor of 4.3 to 966, presumably due to fundamental differences in the strength and range of electrosteric repulsions compared to standard electrostatic double layer repulsion. The adsorbed NOM layers on colloids were estimated from electrophoretic mobility data using Ohshima's soft particle theory. To update the correlations, a steric repulsion parameter ( $N_{STR}$ ) representing steric repulsion from adsorbed NOM layers is added to the set of four dimensionless parameters ( $N_{Lo}$ ,  $N_{E1}$ ,  $N_{E2}$ , and  $N_{DL}$ ) governing the collision efficiency of charge stabilized particles originally suggested by Bai and Tien.  $N_{STR}$  involves the adsorbed NOM layer thickness obtained from Ohshima's model and the adsorbed mass of NOM on the surface of colloidal particles. Partial regression analysis has been conducted and suggested the importance of  $N_{STR}$  on the deposition of colloids coated with NOM. This study emphasizes the importance of characterizing the adsorbed NOM layer properties for the prediction of collision efficiency in porous media.

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AEG Award Winner

## **Geological and Geotechnical Parameters Required for Design of Rock Cuts in Ohio**

Yonathan Admassu, Kent State University

The geology of Ohio is characterized by subhorizontal interlayered competent (sandstones, siltstones, limestones) and incompetent (shales, claystones, mudstones) rock units. Slopes on such geology are subject to differential weathering leading to the release of rockfalls as a result of undercutting. We are conducting a research project to study geological and geotechnical parameters that influence stability of cut slopes in Ohio. Twenty four cut slopes from eastern, south eastern, south western parts of Ohio were selected and categorized into six groups based on stratigraphy. Field and lab data were analyzed using the existing rock slope stability analysis techniques which include the Hoek and Bray's (1981) procedures based on orientation of discontinuities and the rock mass rating (RMR) systems based on rating of various geological and geotechnical parameters (unconfined compressive strength, joint spacing, joint orientation ground water conditions, slake durability index). Results of analyses were compared to qualitatively defined slope performance rating (good, moderate, poor). However, no significant relationships were observed since both techniques were not developed for slope failures induced by undercutting.

In order to be able to study undercutting induced failures, we are also studying the geological and geotechnical parameters that directly control the rate of undercutting and frequency of rockfalls. The fate of generated rockfalls (slope face or catchment ditch) is also being studied. Limited data analysis shows that bedding thickness, joint spacing, rock type, relative position on the cut slope of the competent units, and the slake durability index of the incompetent units, control the rate of undercutting and the frequency of rockfalls. Slope geometry, joint spacing, bedding thickness and lithologic composition of the competent units have also been found to control the fate of rockfalls. The establishment of these relationships is an important basis to designing slopes in stratigraphic sequences of competent and incompetent rock units that are prevalent in Ohio. Slopes consisting of entirely competent or incompetent units are not uncommon in Ohio. The applicability of Hoek and Bray's (1981) method for entirely competent rock units and Franklin's shale rating system for slopes entirely comprising of incompetent rock units is also being evaluated.

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## POSTER PRESENTATIONS

The poster presentations at this year's student night include:

### **A follow-up study on rates of shale undercutting over a 30- to 40-year period: implications for roadcut stability**

Crystal D. Hubbard and William L. Niemann,  
Marshall University

### **Terrestrial in-site cosmogenic nuclide dating of ventifacts with $^{10}\text{Be}$ to constrain the deposition of alluvium in Roberts Prairie Dog Town, Badlands National Park**

Bryan John Page and Patrick Burkhart, Slippery Rock University

### **Quaternary kinematics and seismic analysis using focal mechanisms and hypocenters at the tip of the Chi-Chi earthquake rupture, Taiwan**

Mike Jarvis, Indiana University of PA

## PGS OFFICER NOMINEES

The proposed list of candidates for positions on the 2007-08 PGS Board-of-Directors include:

President: Michael Forth

Vice President: Mary Ann Gross

Treasurer: Steve McGuire

Secretary: Erica Love

There are three Directors-at-Large positions open. The current candidates are Maury Deul, Ray Follador, Bill Gould, Barbara Hamel, and Mary Robison. If you are an active member of PGS and wish to become a candidate, or know of a member who would be a good candidate, please inform Ray Follador, Nominations and Elections Committee Chair at [geodawg@comcast.net](mailto:geodawg@comcast.net) or (724) 744-0399. All candidates will be announced at the April meeting. The election will be held at the May meeting.

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sections of the road that British General Forbes built and discuss the problems encountered as he led his 6,000-man army over the Allegheny Mountains to defeat the French and establish Fort Pitt at the Forks of the Ohio. Highlights will include visits to sinks in the Helderberg Fm, spectacular views of the mountains of the Ridge and Valley, Rohr's Gap, Pleistocene bogs in the Laurel Highlands, and an abandoned limestone quarry in Linn Run State Park. The trip is Saturday May 3, 2008. Full details will be sent to the membership in a separate email when details are finalized. They will also appear on our website: [www.pittsburghgeologicalsociety.org](http://www.pittsburghgeologicalsociety.org). For further info., contact Judy Neelan [jneelan@state.pa.us](mailto:jneelan@state.pa.us).

## CATCH THE READING BUG AT YOUR LOCAL LIBRARY

The PGS has been asked to participate in the 8th Annual Summer Reading Extravaganza at the Carnegie Library of Pittsburgh on *Sunday, June 8th, from 12 - 5 p.m.* This outdoor festival sparks the interest of children, teens, and adults in reading and, hopefully, geology. More than 4,000 attended last year's event—that's a lot of people to expose to PGS and geology. If you remember reading your first book on dinosaurs and want to share that experience with others, please volunteer to help. We are looking for games, activities, giveaways/prizes, web sites, and, of course, reading lists to inspire kids and adults to read and learn more about geology. If your business can donate giveaways or prizes or if you have a free hour or two, please email Erica Love [Loveei@cdm.com](mailto:Loveei@cdm.com) to sign up to help with the festivities.

## PTTC WORKSHOP

The PTTC has put together workshop titled "Drilling and Completion in the Shales of Appalachia" that will be held on May 29, 2008 at Salt Fork State Park Lodge in Cambridge, OH. Space is limited to the first 100 registrants, so sign up early using the form found at [www.papgrocks.org/PTTC\\_SHALE.doc](http://www.papgrocks.org/PTTC_SHALE.doc).

## PGS Website of the Month

<http://www.dcnr.state.pa.us/topogeo/>

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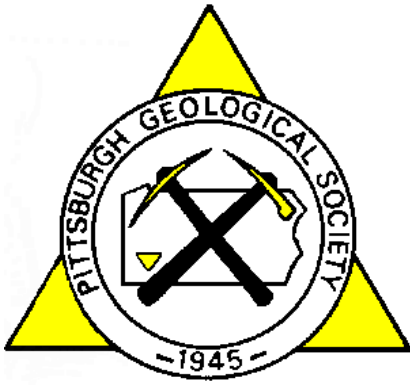
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# PGS Newsletter

<http://www.pittsburghgeologicalsociety.org/>

Vol. LX, No.9

Robert Burger, Editor

May, 2008

Wednesday, May 21, 2008

The Pittsburgh Geological Society Presents

## PANDORAS BOX: THE SKYTOP SECTION OF ROUTE I-99, CENTRE COUNTY PENNSYLVANIA

by David P. Gold and Arnold G. Doden,  
Geologic Mapping and Resource Evaluation, Inc.

The need for interdisciplinary studies in the planning and design stages of highway construction at Skytop has been emphasized by the inadvertent excavation of more than 1 million cubic yards (~1.7 x 10<sup>6</sup> tons) of Bald Eagle Sandstone containing ~5% pyrite. Failure to recognize the epigene nature (veins) of sulfide mineralization at Skytop resulted in a site characterization drilling plan that not only under-sampled the veins but also under-estimated the grade of the sulfide minerals by at least a factor of 10. Also, the failure to recognize the oxidized cap rock as the leached carapace over a cross-strike vein complex led to the decision to continue excavating deep into the reduced sulfide-bearing rock.

The pyritic sandstone was distributed into four large waste dumps, at least six major fill sites and as many as 100 minor sites as "fill" or "dressing" stone before its toxic nature was recognized. Exposure and transport of pyritic rocks have created new ground water pathways and local perched water tables that may be missed by monitoring wells. Some measure of the new regimes can be gauged from stressed vegetation on seeded cuts and embankments, as well as from the growth of efflorescent minerals such as *gypsum*, *bassanite*, *epsomite*, *rozenite*, *jarosite*, *hexahydrate*, *fibroferrite*, *melanterite*, *epsomite*, *alunite*, *alunogen*, *pickeringite*, *halotrichite*, *copiapite*, and *ettringite* in vadose zone intersections, seeps and ponds. Springs discharging acidic water developed at the base of large fills and vegetation kills occurred in acid seeps, vadose zone intersections on seeded areas over "shot rock"

fills, and where pyritic rock had been crushed and used as a dressing aggregate in the berms. Efflorescent mineral blooms in soils and rubble and bedrock are sufficient to cause a color change during evaporative dry periods. The high solubility of these efflorescent minerals leads to an initial drastic lowering of pH with a concomitant rise in sulfate ions in the runoff following rain.

The \$78 million remediation plan necessitated a reclassification of pyritic rocks into (a) *in situ* bedrock; (b) moveable rock; and (c) non-moveable "fill" in construction sites. Moveable pyritic rock will be excavated from six dump sites, mixed, with bag house lime (BHL), and buried in an "Engineered Rock Placement Area" (ERPA) repository, near Port Matilda. The ERPA site (23 acres, 3.8 million ton capacity) will be covered with clay and geofabric to minimize water infiltration. A permanent treatment facility is planned for any leachate expelled from this "dry tomb".

The slopes on the non-moveable "fill" and on pyritic rock exposed in the road-cuts have been dressed with BHL, covered with geotextile liners, and held down with a geotextile web filled with 2A limestone aggregate. Pyritic rock exposed in the road-cuts will be covered in similar fashion. Other planned remediation measures include undercutting the section of the road bed underlain by the Antes Black Shale beds, and laying a flexible black top road over the pyritic rock section.

Social hour - 6:00 p.m.

Dinner - 7:00 p.m.

Program - 8:00 p.m.

Dinner will cost \$20.00/person, **students \$5.00**; checks preferred. Reservations should be **emailed** to Mary Ann Gross at [magrosspgs@verizon.net](mailto:magrosspgs@verizon.net), please title as "PGS Dinner Reservation." If you are unable to use email, call (412) 440-1468 and leave your name and number of reservations needed by **noon, Monday, May 19**.

**Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Greentree.**

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# Pittsburgh Geological Society

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## **PRESIDENT'S FAREWELL MESSAGE**

Greetings all. I will not see you at the meeting this month, as I will be leading a student research expedition to the White River Badlands of South Dakota. As such, my final moments as President will involve convening the changeover meeting of the board on the third Wednesday of June.

Do allow me to offer a few reflections. I have really enjoyed leading the Society for two years. I constantly grow in respect for its history, as I meet and learn of our predecessors. So many players! Such a fine legacy! Supporting the initiatives of our colleagues – workshops, field trips, and the precious monthly colloquia – presents a consummate pleasure. And the students, such a sweet lot they are. It is always enjoyable to chat, discovering their stories, and reciprocating with our insights and wisdom - such fulfillment. Really, sharing your company and theirs, in concert with overcoming the revocation of our tax exempt status by the Bureau of Taxation, these acts represent the triple crown of my two year tenure.

None of this wealth would be possible, however, as a soloist. There are many of you to thank. Mary Ann Gross for steadfastly keeping our books, which sounds to me like a heavy migraine. The other board members, who regularly attend meetings, they get the jobs done. Frank Benacquista, the low profile vertebral column, hard to see but for close examination, but he is the fulcrum from which so many projects catapult. Chitin was never so tough. Our counselors, each of whom I now think of as a friend, are such great company, particularly when they joust among themselves! In particular, I am growing to trust Chuck Shultz as a brother, an awfully rare treat in the treacherous world where I spend my days. There are so many more persons I enjoy seeing regularly – Judy, Ed, Wendell, Bob, Steve – others, too many to list. Many more folks whom I only rarely see, but wish would come around more often. My days have been energized by our collegial associations!

As I look to the future, our discipline and Society will continue to face persistent challenges. Pitt, Johnstown recently placed a call for community and alumni support to assist in helping to avoid cancellation of its curriculum in Geology. Other

programs continue evolving toward environmental hybrids. Our Society also struggles to maintain membership from individuals, geoscience departments, and corporations. Through all the lean times, occasionally thinly enrolled field trips, and the like, I have learned not to pour emotion into frustration over all those folks who have not joined the ranks, but instead to relish those who have made the effort. Geology will continue to struggle with awareness, endorsement, and involvement for the foreseeable future. We all need to answer the call for participation, and attempt to bring our reluctant neighbors into the action. Along the way, however, let's not forget to enjoy the energy of our Society, in concert with the hearty dedication that so many of us express in our own ways each and every month. Our Society is strong. Through endurance, we conquer.

Fare the well, fare the well; I've enjoyed it more than words can tell,

Patrick A Burkhart, PhD

## **PGS BOARD-OF-DIRECTORS ELECTION**

The Election of officers and directors for Pittsburgh Geological Society's 2008-09 season will be held at the May 21, 2008 PGS meeting. A ballot is included with this newsletter listing one candidate each for the positions of President, Vice President, Secretary, and Treasurer. Four candidates are running to fill three two-year terms for the Director-at-Large positions.

Regular members, corporate members, and honorary members are eligible and encouraged to vote; student members are ineligible. Please complete your ballots and bring them to the May meeting. If you are unable to attend, please send your completed ballots to: PGS Election Committee, P. O. Box 58172, Pittsburgh, PA 15209. Mailed ballots must be received by PGS no later than Friday, May 16.

## **PGS Website of the Month**

<https://www.soils.org/>

## **PGS PRESENTS AWARDS AT THE 69<sup>TH</sup> PITTSBURGH REGIONAL SCIENCE AND ENGINEERING FAIR**

The Pittsburgh Geologic Society is pleased to announce the winners of our awards at the Carnegie Science Center Pittsburgh Regional Science Fair held on April 4th at Heinz Field. PGS has been a long time sponsor of awards at the Science Fair. PGS sponsored four separate awards with an award presented in each of the three Divisions, and for the second year, a Team award in the intermediate (Junior High) Division. In evaluating student projects, PGS judges considered the relevance of the project to the core scientific disciplines represented in PGS, the manner in which the student followed the scientific method in the experimental design, conduct, evaluation of the results, and overall knowledge of the subject. The PGS judges were Lisa Whited, Tom Beatty, Erica Love, and Steve McGuire. This year the judges faced a happy dilemma where all Divisions had multiple excellent projects that directly addressed geology, geophysics, geochemistry, the geologic basis of environmental problems, mining safety, and earth materials. The selection was especially difficult in the Senior Division as the judges debated long and hard between an environmental site characterization and the basic science of an oceanographic study.

**Senior Division:** The Senior Division award was presented to Ms. Alix Holcomb, a Senior at Oil City High School. The title of Ms. Holcomb's study was "Effect Annual Temperature has on the East Australia Current". The goal of the project was to determine if a correlation exists between global temperatures and current properties including temperature and current strength. A correlation could then be used to help predict the effects of climate change on the East Australian Current. Ms. Holcomb was provided satellite images by researchers at the Australian Commonwealth Scientific and Industrial Research organization (CSIRO). Current and temperature patterns were interpreted for the last 10 years of imagery. The results indicated definite relationships between current patterns and temperatures. Ms. Holcomb intends to pursue a career in oceanography at West Florida University and hopefully in the future at Scripps. Ms. Holcomb's teacher is Mr. Timothy Spuck.

**Intermediate Division:** The winner of the Intermediate Junior High Division award was Ms. Emily Fitzgerald of Economy Junior High School in the Ambridge School District. The title of Ms. Fitzgerald's study was "Water Pollution in my Area". Ms. Fitzgerald compared water quality from four streams with analytical results for bottled water. Additional qualitative descriptors were looking for living organisms and general trash status of each stream location. The judges were particularly impressed with the details contained in Ms. Fitzgerald's project log book. Ms. Fitzgerald's teacher is Mrs. DeMarco. Mrs. DeMarco has sponsored previous PGS award winners. Keep up the Good Work!

**Junior Division:** The Junior Division is made up of 6<sup>th</sup> grade students. The PGS Junior Division winner was Nathaniel Barbour who attends the Campus School of Carlow University. The title of Mr. Barbour's study was "Watering Plant: There is a Choice". In light of the need for sustainable water use practices during droughts, Mr. Barbour investigated the use of household gray water for watering plants. Graywater is household water that does not contain a sanitary component. In addition to decreasing the quantity of household water use, gray water has the added benefits of containing additional nutrients. Spider plants served as the test plant. The three treatments were gray water, tap water, and rain water. There were 10 plants in each treatment. Watering was in consistent intervals with plant width and height as the measurement variables. The gray water plants grew on average 10% higher and 28% wider. Mr. Barbour's teacher is Mrs. Wojciechowski.

**Team Award:** The Team Award was presented to Ms. Taylor Soergel and Ms. Morgan Fischer who attend Ingomar Middle School. The title of their project was "Which is the Greenest and the Greatest?" The project compared the effects of different water sources on the growth of grass. The three treatment were tap water, Vitamin Water, and Coca-Cola. The grass was allowed to grow for 21 days with measurements of grass height taken every 3 days. The Vitamin water grew best at 19.6 cm with tap water at 19.3 cm. Coca-Cola was a distant third at 10.2 cm. Congratulations to their teacher Mrs Hinds for another PGS Science Fair winner!

## **DID YOU KNOW . . . ?**

- You can fill more than 2,000 20-ounce plastic bottles for about a dollar's worth of tap water, which then sell for about \$1.39 each. Wish I'd thought of that!
- The irony of the plastic water bottles is two-fold: 1) they use about 1.5 million barrels of crude oil every year in manufacturing the bottles; and 2) most taste tests indicate that regular tap water tastes better than the stuff in the bottles.
- Paleontologists have unearthed the fossil remains of a 150-million-year-old, 50-foot-long pliosaur, a swimming reptile, on the island of Spitsbergen in the Arctic Circle. Dubbed "The Monster" by its discoverers, this predator had 60 dagger-like teeth the size of cucumbers growing in its 10-foot-long jaws.
- When they are exposed to ultraviolet light, blue diamonds typically glow in shades of bluish-green or white light, which can be very useful in telling if a gem is real or fake.
- Two recent studies suggest that forest fires can release more carbon into the atmosphere than the forest can capture through plant growth.
- If a recent assessment of Afghanistan's minerals is correct, the country could soon switch from opium trading to mining to stimulate the economy.
- Paleontologist Robert Bakker has long suggested that disease, rather than asteroids, brought down the dinosaurs. Now a new book suggests that pathogen-carrying insects, as found preserved in amber, could have wiped out the dinosaurs.
- Each US citizen produces more than half a ton of trash annually—that's 40 percent of global trash from just five percent of the world's population.
- Forget corn—ethanol made from switchgrass, a plant native to the Great Plains, is far more efficient to produce, yielding 5.4 times the amount of energy that it takes to make it as opposed to only 1.3 times for corn.
- Recent research indicates that, at least for bryozoans, the end-Permian and end-Triassic mass extinctions were the result of long-term oceanographic, rather than extraterrestrial, mechanisms.

- Joints and fractures enhance the permeability of shales because they are significantly larger than the matrix pore throats in the rock.
- The Pacific plate is plummeting beneath the North American plate in the Cascadia subduction zone at a rate of 40 millimeters per year.

## **CATCH THE READING BUG AT YOUR LOCAL LIBRARY**

The PGS has been asked to participate in the 8th Annual Summer Reading Extravaganza at the Carnegie Library of Pittsburgh on *Sunday, June 8th, from 12 - 5 p.m.* This outdoor festival sparks the interest of children, teens, and adults in reading and, hopefully, geology. More than 4,000 attended last year's event—that's a lot of people to expose to PGS and geology. If you remember reading your first book on dinosaurs and want to share that experience with others, please volunteer to help. We are looking for games, activities, giveaways/prizes, web sites, and, of course, reading lists to inspire kids and adults to read and learn more about geology. If your business can donate giveaways or prizes or if you have a free hour or two, please email Erica Love [Loveei@cdm.com](mailto:Loveei@cdm.com) to sign up to help with the festivities.

## **ORIGINS OF WESTERN PA PLACE NAMES**

Originally called Little Youghiogheny, the Casselman River rises south of Grantsville in Garrett County, Maryland and enters Somerset County, Pennsylvania about midway between the crests of Allegheny and Negro Mountains. This stream, which is named (and misspelled) for Jacob Castleman, an early hunter in the area, joins the Youghiogheny River at Confluence on the east side of Laurel Hill. The Casselman Formation, the upper half of the Pennsylvanian Conemaugh Group, was named by longtime PGS member and Pitt professor Norman K. Flint for rocks exposed in the southern half of Somerset County.

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*A special thank you goes out to all of you who have contributed items for inclusion in the newsletter this season—especially to John Harper who writes the Did you Know...? and Western PA Place Name Columns. All the best, Bob Burger (ed.)*

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**Ballot**  
Pittsburgh Geological Society  
**Board of Directors Election**  
May 21, 2008

Note: Eligible voters include regular Members, Honorary Members, and Corporate Members (one vote each, by representative). Student members are ineligible to vote.

\_\_\_ **President:** Michael Forth

\_\_\_ **Vice President:** Mary Ann Gross

\_\_\_ **Secretary:** Erica Love

\_\_\_ **Treasurer:** Steve McGuire

**Director-at-Large Positions** (vote for 3)

\_\_\_ Maurice Deul  
B. S. Geology 1942, Union College (NY), M. S. Mineralogy, University of Colorado 1947,  
Retired, occasional Consultant, longtime and Honorary Member of Society.

\_\_\_ Raymond Follador  
B. S. Earth Science 1979, Pennsylvania State University, M. S. Geology 1993, West Virginia  
University, Geologist/President, ARK Resources, Inc., Current Secretary of Society, member since  
1982.

\_\_\_ William Gould  
B. S. Geology 1980, California Institute of Technology, Ph. D. Geochemistry and Mineralogy 1989,  
Pennsylvania State University, Proprietor, WW Geosciences, member of Society since 2004.

\_\_\_ Barbara Hamel  
B. S. Environmental Science 1993, Slippery Rock University, M. S. Geology 2005, University of  
Pittsburgh, Senior Hydrogeologist, The Hutchinson Group, Ltd., Member of Society since 2002.

\_\_\_ Mary Robison  
Ph. D. Geochemistry 1978, University of Pittsburgh, Free-lance Geochemist, member of PGS since  
1970, Past President, Honorary Member of the Society, and current Director at Large.

**All ballots must be cast at the May meeting or received at the PGS  
mailing address (below) no later than Friday May 16, 2008.**

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<b><u>President:</u></b>	Pat Burkhart	<b><u>Director-at Large:</u></b>	Bob Fedinetz	<b><u>Director-at Large:</u></b>	Richard Ruffolo
<b><u>Vice President:</u></b>	Mike Forth	<b><u>Director-at Large:</u></b>	Albert Kollar	<b><u>Counselor:</u></b>	Mike Bikerman
<b><u>Treasurer:</u></b>	Mary Ann Gross	<b><u>Director-at Large:</u></b>	Erica Love	<b><u>Counselor:</u></b>	John Harper
<b><u>Secretary:</u></b>	Ray Follador	<b><u>Director-at Large:</u></b>	Mary McGuire	<b><u>Counselor:</u></b>	Charles Shultz
<b><u>Past President:</u></b>	Frank Benacquista	<b><u>Director-at Large:</u></b>	Mary Robison	<b><u>AAPG Delegate:</u></b>	Dan Billman

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