

## APPLICATIONS OF GEOPHYSICS TO ENVIRONMENTAL INVESTIGATIONS

Presented by

**JOHN LUTTINGER**

Geomatrix Consultants, Inc.  
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### INSIDE:

**President's  
Page** 2

**Geologic News**  
3 & 4

**CNYAPG  
Supporters**

**CNYAPG  
Calendar** 7

*We will convene on Thursday, November 12, at the Glen Loch Restaurant. The evening will conclude with an open question and discussion period with Mr. Luttinger. We look forward to seeing you then!*

John Luttinger, a geophysicist from Geomatrix Consultants, Inc. will provide a presentation concerning surface geophysical methods.

A review will be presented on the applications of environmental geophysical techniques to hazardous waste investigations and hydrogeological studies. Environmental geophysics involves applying remote sensing techniques to map features of interest in the subsurface. These non-intrusive methods are commonly used in hazardous waste investigations to map buried areas of waste or define subsurface stratigraphy prior to implementing ground disturbance surveys such as test pits or soil borings.

Case histories will be presented where High Resolution Electromagnetic (EM) methods were applied to map buried waste lagoons and steel drums. An example of the use of deeper penetrating EM techniques are discussed as they pertain to mapping stratigraphy for a landfill expansion project. Seismic refraction and reflection techniques are reviewed and case histories discussed relative to mapping overburden stratigraphy and bedrock topography at a proposed hazardous waste facility and a landfill siting project.

Recent advances in geophysical techniques will be discussed. These include: the integration of geophysical tools with global positioning systems and the use and interpretation of azimuthal resistivity data to characterize bedrock fracture systems.

**John Luttinger** is a geophysicist with 9 years of experience in managing and performing geophysical projects. He holds BA and MA degrees in Geology, and a BS in Electrical Engineering, all from the University of Buffalo. Mr. Luttinger has extensive experience applying EM, magnetics, seismic reflection, seismic refraction, gravity, and ground penetrating radar techniques. Among the projects Mr. Luttinger has recently managed are a seismic reflection project over the collapse of Akzo Mine, New York; a seismic refraction project at the Plattsburgh Air Force Base, New York; an electromagnetic investigation at

the Olympic  
View Landfill  
in the Pacific

northwest; a micro-gravity survey over a salt dome in east Texas; a multi-technique geophysical investigation for a landfill expansion in Altamont, California; and a multi-technique geophysical investigation for Waste Management of North America, Inc. (WMI) in Denver, Colorado. He has participated in data collection, processing, and interpretation of large multi-technique geophysical investigations for WMI in the Mojave Desert of Eastern California; Sanifall, Inc. in Oregon; and for WMI near Los Angeles California. He is a member of the SEG, EEGS, and BAPG.

## PAGE 2

# PRESIDENT'S PAGE

The drive to work is now dark both on the way in and the way out. Once again, the day passes by the windows, or, if you are doing field work, you are outside gleaning the last of the warm season! Fall is a time when we see student geologists scurrying up rock faces on the highway and for completing field work and construction. No question about it, this fall has been quite favorable for field work and outside recreation. Ours is a most fortunate profession with the balance of two benefits: indoor preparation and outdoor activity. Geologists have this opportunity in several professional positions as well.

In reference to field work and no question about it: I had the opportunity to serve my jury duty sentence on a civil case this month. During jury selection, no questions were directed to me regarding experience on active "job sites." Prospective male jurors were questioned in depth as to their "job site" experiences; however, I was specifically questioned as to my husband's experiences, although he was not being considered to serve on the jury.

It appeared neither attorney assumed I, a geologist and a female, would be exposed to "job site" scenarios. I was curious as to the perception of what a *geologist* does at a place of employment described as Environmental Consulting and Engineering. Maybe it was the word consulting that makes one think about being in an office and

telling others your professional opinion on solving their problems. I am hoping for a more robust image.

Formally trained geologists are serving in many different professional capacities, as we know from the diverse group of individuals attending CNYAPG. In truth, I am not so sure the occupational description of geologist actually describes the professional role I serve on a day-to-day basis. Nonetheless, the foundation of scientific training, including critical thinking skills, serve well in life: technical education, practical experience, and a little blessing of luck and intuition.

As I considered the consequences of completing the job as a juror, I reflected on different functions we play in the professional arena. I was once told that geologists do not manage projects through remediation, particularly with respect to the engineering aspects. Since I know several individuals, geologists, managing all aspects of environmental projects, I found this statement implausible. Consider how many people in consulting take on various roles other than those specifically defined by their formal education and degrees. It was interesting how people from a variety of professions were transported into the job of juror, and in less than a week, work as a cohesive unit of jury.

I am particularly pleased that scientific education includes learning the ability to operate from changing perspectives and capacities. Who better than a person with a scientific education to consider the interaction of various contributing factors in making decisions and judgements? My

favorite question asked by the sharper of the two attorneys (in my opinion) was, if we would be able to put aside our personal experiences and opinions, wait until all evidence was presented, then make our decision drawing on reasonable judgement and our everyday personal experiences.

To the attorneys' credit, they did ask the jury an open-ended question, offering the opportunity to identify any information we thought they should know about us. Where do you start to answer such a question? Regardless, my experiences on job sites do not change my ability to serve as a fair and impartial juror. I was asked if I acquired information, compiled and assessed it, to make judgements, which I do. Given that, there was no way out of the jury box. There I was, a respected member of the legal system. Granted, it was a temp position...on an as-needed basis but, hey, the whole court room stood in respect when the jurors, entered. In some offices, a decent good morning comes only after coffee.

In the jury room, people were referred to by occupational titles as opposed to actual names. For example, one would say, "I don't know, ask the Librarian, or Carpenter, or Endangered Species Advocate, or Scientist." I felt like we were in a scene from *Gilligan's Island* with such character titles. I was given the Scientist title, designated spokesperson, and since I was the only one who brought a calculator, did the math when it came to determining the damages award. The Restaurant Owner brought in a cake, which was as necessary as the calculator to the collective.

Jury Duty: Just what I needed to do in the

midst of real life. Six days of critical information and data intermixed with the more prominent, insignificant information extraneous to the actual decision. As if there are not enough decisions to make and disputes to resolve that week as a project manager. But, I do love the process of law in action. I really did enjoy the art of courtroom language and presentation of the facts and opinion. A great deal of expert opinion was in play. For one week, I had to, under New York State Subpoena, consciously put aside my professional responsibilities, and decide the legal affairs of our community, at a billing rate of approximately \$5.00 an hour, paid in a lump sum fee of \$40 per day. Who could refuse?

See you at the meetings,  
Vita DeMarchi, P.G.

Consider, would a geologist be a fair and impartial jury member in the following potential up-and-coming lawsuit: (as reported in the Herald American on Sunday, October 25, 1998): ***Pipeline blows, kills seven, injures four:*** *A natural gas well in Bryceland, LA, exploded and caught fire Saturday afternoon, killing seven of the 13 workers on the crew and injuring four. the crew apparently was drilling for natural gas when the well blew.*

## PAGE 3

# GEOLOGIC NEWS

## A Year with OCC's Geology Club

by Jen Wallace

To sum up the spirit of this group, one word comes to mind...ACTIVE! OCC's Geology Club has been involved in many interesting activities, from whitewater rafting, annual trips to the Outerbanks of North Carolina, to fossil hunting right in our own back yard. In fact, we unearthed an *Agoniatites vanuxemi* sample on the site of OCC's new technology building. The fossil's image now resides on the back of our club's t-shirts. All of our endeavors are in the pursuit of adventure and a desire to learn more about our natural geologic world

The past year (97-98), the Geology

Club offered many great experiences. In the fall, we embarked on a weekend of field trips in and around the Catskills with a group from SUNY Cortland. Traveling just south of Albany, we visited the Brauer research station and took trips to surrounding areas. It was both intellectually and socially stimulating to go into the field and share knowledge with students and professors alike.

As winter came upon us, we turned our focus to the classroom and held an informal speaker luncheon featuring several local geologists. This proved to be both interesting and informative, as we gained insight on possible careers and guidance on planning our futures in the field of geology. Encouraged by the success of our winter reception, we invited several more professionals to share an afternoon with us. Geology Club would like to again thank Vita DeMarchi, Nancy Gensky, Gerry Gould, Buck Gabriel, Sarah McCullough, and Dave

Palmerton for the meaningful discussion and entertainment that brightened our cold weather months.

The Outerbanks of North Carolina was the destination of our annual spring trip. This spring, our trip was quite an adventure for all who attended. We traveled by van down the coast and were ferried out to majestic Portsmouth Island. After three days on the island, we went inland to the vast expanse of a phosphate mine in Aurora, NC. The size of the mine was incredible, as well as the size of the fossilized sharks teeth that could be found there. Many returned home with near perfect samples. It was a true geologic treat!

We wrapped up our year in May with a tour of western New York. Camping at both Lechworth and Allegheny State Parks, we viewed the gorges and native geology. We swung past the shore of Lake Erie and collected perfect fossils of trilobites, brachiopods, and many other animals that

OCTOBER 1998

were just popping out of the rocks and into our collection bags. It was great to relax and enjoy a few days of fossil collecting after a grueling week of finals.

Our Geology Club at OCC is just a small group of people who know how much to have fun, have a special way of looking at the world, and enjoy each other as much as they enjoy geology. We owe the diversity and high quality of our activities in part to our own efforts, but mostly to our wonderful friends and advisors at OCC: Meg Harris, Ed Ponto, and Fred Jaquin. I am confident this year will be even better than our last and will provide great things for all to experience.

## **NYSGA** *by Meg Harris*

The 70th Annual Meeting of the New York State Geological Association (NYSGA) was held at Binghamton University October 2 - 4. Some of the familiar faces seen included Jerry Bastedo of the BAPG, Bill Kelly and don Cadwell representing the State Geological Survey, and from the CNYAPG, Jerry Zaykoski, George Kelley, Barb Hill, Nancy Craft, Fred Jaquin, Meg Harris, and a group of students from the OCC Geology Club.

Many opted for the Saturday field trip entitled "Finger Lakes Gorges Revisited," led by Peter Knuepfer and Tim Lowenstein of SUNY Binghamton. Enfield Glen was the most talked-about park visited and many were impressed with a stop to see prograding deltaic deposits. A field trip to Schoharie County to see Devonian fluvial to shallow marine strata allowed participants to see sand bodies with trough crossbedding, current ripple marks, many types of burrows, and interbedded storm deposits along with terrestrial deposits of paleosols with root casts overlain by the famous Gilboa tree trunk molds and casts. The leaders of this trip, Scott Jarvis and John Bridge, followed Saturday's trip with a workshop on Sunday analyzing drill core samples take from the area visited. Other trips receiving good reviews included a workshop on Environmental geophysics held at a local landfill, and a survey of the best outcrops in the Susquehanna and Mohawk Valleys.

Dr. Richard Alley, of Penn State, delivered the keynote address at Saturday night's banquet. He described his years of work on the Greenland ice coring project. The field conditions were incredible to imagine, especially the "Johnny-on-the-Spot" in sub-zero weather! We were all

taken with the idea of carving one's own laboratory space from the bowels of a glacier that goes back thousands of years, allowing us to see a pattern of climate change that appears to show relative stability during glacial and interglacial periods but wild fluctuations during transition between the two. The lesson taken might be that when things start to take a turn, change can happen much more quickly than we had ever expected.

Next year's meeting will be hosted by SUNY Fredonia. The new president, Gordon Baird, has promised a wide array of field experiences in western New York for us to pick from. Hope to see you all there!

## **NY Remnant Volcano Site Local Field Trip Potential**

Saratoga County is the home the only known volcanic rock, the remnant of a volcano that erupted more than 370 million years ago. The aged volcano, named locally as "Stark's Knob" is located approximately 1 mile off Route 4, just north of the village of Schuylerville, on a dirt road marked as Stark's Knob Road. The site is named after John Stark, the Revolutionary War general who erupted his cannons from atop the volcanic hill in 1777. Historian say the "knob" was up to 100 feet higher back than. None the less, Stark's knob is the highest spot in the town of Northumberland, offering a spectacular view north to the Adirondacks and east to the Hudson River and Green Mountains of Vermont. The volcanic basalt was chiseled away in quarrying operations that supplied gravel for nearby railroad beds. Although the volcanic rock has been reduced, it gives geologists a better cross-sectional view. Geologists agree the volcano erupted beneath ocean waters, with lava hardening into pillow-shapes. There remains some disagreement about where the volcano actually erupted. Some geologists maintain it erupted in Northumberland; others suggest the eruption happened elsewhere and was transported during tectonic activities.

## ***Geological Processes Imitate Life***

## ***Forms***

As an update to Dr. Cathy Newton's CNYAPG January 1997 presentation: StarDate Online reports that scientists are continuing their assault on claims that a rock from Mars contains evidence of past microscopic life on the Red Planet. After analyzing samples of the rock, many scientists say the evidence of life was really produced by natural geological processes on Mars, or contamination on Earth.

In 1996, researchers from Stanford University and NANA's Johnson Space Center reported evidence of life in a meteorite discovered in Antarctica. All scientists agree that chemical tests show that this cosmic rock came from Mars. Evidence of past microscopic life included small blobs of carbon-based chemicals, magnetic minerals, and microscopic structures that look like fossils.

Several research teams have refuted individual pieces of evidence. One of the most recent reports came from researchers Hap McSween, Ralph Harvey, and John Bradley, who examined a small piece of the meteorite with an electron microscope. Their research showed that the carbon blobs and the magnetic minerals grew together in layers as the result of natural geologic processes, and were not produced by microscopic organisms.

**More News from Mars**  
from **StarDate Online** at  
[http://pio.as.utexas.edu/radio/  
s\\_radioscript.html](http://pio.as.utexas.edu/radio/s_radioscript.html)

## **More Martian Geology**

An article from the BBC News Online Network states that scientists are learning about the volcanic past of Mars by studying the smallest volcanoes on the planet. Mars is a world of grand mountain ranges, deserts with shifting sand dunes, vast canyons that dwarf anything found on Earth, and huge extinct volcanoes three times the height of Mt. Everest. Recently, the orbiting Mars Global Surveyor spacecraft focused on a small "shield" volcano and has obtained the

first close-up images. Planetary geologists believe that it may hold important clues about Mars' more active geological past.

## **Leonid Meteor Storm & Earth's Space Technology: Clash of the Titans?**

The November 17 Leonid meteor storms will present an elevated, though not serious, threat to spacecraft in the vicinity of the Earth for about a half-day, according to Department of Defense and NASA experts who have been studying the potential risk to spacecraft.

The annual Leonid shower, this year a storm, is expected to have an intensity not seen in more than three decades. Even so, the event could provide a dramatic "light show" for some parts of the world, particularly East Asia and the western Pacific region. The Leonid meteors originate from the debris released from the Comet Tempel-Tuttle which completes an orbit around the Sun every 33 years, leaving a trail of debris such as dust and other tiny particles. The Comet passed perihelion, its closest approach to the Sun, early in 1998, setting the stage for probable meteor storms in 1998 and 1999.

The peak of the 1998 shower or storm is expected at about 19:45 UT on November 17, that for the 1999 event should occur at 1:50 UT on November 18, and that for the 2000 Leonids should be on November 17 at 8:05 UT. One should expect the duration of the storms (when they occur) to be about 7 hours or so, centered on the peak. We can estimate that the Leonids will show a rate of somewhere between 500 and 10,000 meteors per hour, with the best guess being about 5,000 per hour.

The point from where the Leonid meteors appear to radiate is located within the constellation Leo and is referred to as the radiant. To best observe the Leonids, wear appropriate clothing for the weather. Lay outside in a reclining lawn chair with your feet pointing towards the east (the general direction of the radiant). Do not look directly at the radiant, because meteors directly in front of you will not move much and fainter ones may be missed. Instead, keep your center of gaze about 30 or 40 degrees above or west of the radiant. The Leonids can be observed right into morning twilight.

**Check the following Web sites for more information:** [www-space.arc.nasa.gov/~leonid](http://www-space.arc.nasa.gov/~leonid) and [www.spacecom.af.mil](http://www.spacecom.af.mil).

## **The Dating Game**

Research conducted by geoscientists from the Massachusetts Institute of Technology and the National Museum of Natural History (GSA Today, Vol. 8 No. 9) suggests the absolute age of lithified volcanic ash beds can be "determined" (perhaps more appropriately "estimated") to uncertainties of less than one million years through application of uranium-lead dating on zircons separated from the ash beds.

This research may be applicable to the study of rates regarding evolutionary radiations, mass extinctions, and other evolutionary events. Reported applications include evidence that the exotic, soft-bodied Ediacaran organisms immediately underlie (predate) the Cambrian explosion and that the Cambrian explosion may have lasted less than 10 million years. New data also suggest the Cambrian explosion occurred approximately 543 million years ago instead of the typically mentioned date of approximately 590 to 570 million years ago. Additionally, studies employing the new technique suggest the profound mass extinction at the end of the Permian lasted less than 1 million years.

November 4-6, 1998

**Annual NYS Industry-Environment Conference**, Sheraton in Saratoga Springs, New York. Call (518) 584-4000 for information.

November 12, 1998

**CNYAPG Meeting @ the Glen Loch Restaurant in Jamesville.** Mr. John Luttinger of Geomatrix Consulting, Inc. will be our guest speaker. come early and enjoy a cash bar, followed by dinner at 6:15 p.m. The presentation will begin at 7:15 p.m.

November 17, 1998

**Leonid Meteor Storm:** visible after 2:45 pm est

December 10, 1998

**CNYAPG Meeting @ the Glen Loch Restaurant in Jamesville.** Mr. Michael Coia, Director of Remediation at Phytoworks, Inc. will be our guest speaker. He will discuss utilization of plants to reduce concentrations of organic and inorganic constituents, including mercury, in soil and water. He will present applications of this innovative treatment technology. Check out the PhytoWorks Web site in advance at [www.phytoworks.com](http://www.phytoworks.com).

January 14, 1999

**CNYAPG at a possible new location.** Kevin Bernstein, Esq., with Bond, Schoeneck & King, will discuss the professional working relationship between geologists, engineers, and attorneys. CNYAPG will invite members of the local ASCE to join us.

February 12, 1999

**CNYAPG** will host a **Geology Student Poster Session**, in addition to a guest speaker at the February meeting.

April 1998

**CNYAPG Walking Tour** with Mr. Bob Preyer of the MOST. Tour downtown Syracuse, reflecting on the geologic origins of local buildings and stone work. The tour will conclude with dinner and a guest speaker at a downtown location.

**Directions to the GlenLoch**

### What Next?

Do you have any ideas for a CNYAPG sponsored Spring Field Trip or Seminar? Let us know at [www.dreamscape.com/cnyapg](http://www.dreamscape.com/cnyapg).

**CUT & PASTE  
MAP HERE**

Keep the newsletter input coming. Send ideas, articles of interest, requests, and questions for the newsletter to Vita DeMarchi at [vdemarchi@secor.com](mailto:vdemarchi@secor.com).

✱ CONTRIBUTIONS TO THIS MONTH'S  
CNYAPG NEWSLETTER  
WERE MADE BY:  
Vita DeMarchi Meg Harris  
Jon. S. Fox Jen Wallace Gerry Gould  
Buck Gabriel Georgia Popoff

**TAKE NOTE:** Due to an increase in dinner costs, dinner is not \$15.00 if reserved 24 hours in advance and \$17.00 at the door. Make your reservations today by calling

O'Brien & Gere Engineers at (315) 437-6100, extension 2656.

# CNYAPG NEWSLETTER SUBSCRIBER 1998

*The Board Members would like to thank all of the corporate and individual supporters of CNYAPG throughout the past year. We would like to encourage you to continue your pledge of support throughout the upcoming year. Contact Steve Crook at (315) 437-1429 or (518) 827-5720 details.*

OCTOBER 1998

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## CNYAPG

**PO Box 567**

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The CNYAPG was founded in 1993 to strengthen and advance the geologic sciences as a profession and to provide an open forum for the exchange of ideas; to promote the protection of public welfare through the professional practice of geologic sciences; to inspire and maintain the highest standards of professional conduct, business ethics, and personal honor of the membership; to foster the spirit of scientific research throughout the membership; to publish and otherwise disseminate information related to the geologic sciences and associated technologies; to maintain and encourage intra- and inter-association activities, to enhance the association's programs, and to encourage the affiliation of individual members with other scientific and technical organizations.

**OCTOBER 1998**