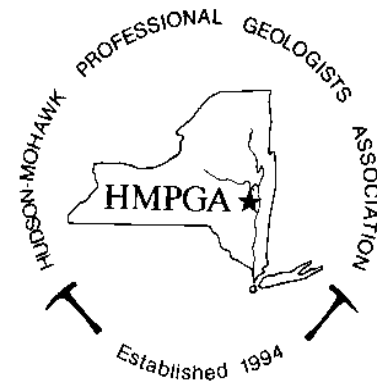


# Hudson-Mohawk Professional Geologists' Association

*January Newsletter*

[www.hmpga.org](http://www.hmpga.org)



**January 30, 2008**

## Strange Springs and Caves: What the Chemistry of Deep Groundwater Can Tell Us!

Arthur N. Palmer

**Abstract:** Most groundwater follows shallow paths and emerges at fresh-water springs. In contrast, some springs and caves contain smelly, pulsating, or bubbling water with unusual chemistry. There are many springs and wells of this kind in New York State. Certain caves outside the state have been formed by similar kinds of water, and their characteristics differ greatly from those of most cave types.

For example, sulfur water is a common water-supply problem in areas where sulfate deposits are exposed to hydrocarbons in anoxic conditions. When this water forms caves, the result can be extraordinary, with processes, fluids, features, and deposits that are unknown to most people. Cave patterns are very complex, and secondary gypsum, sulfur, unusual clays, and bacterially driven redox reactions are abundant. Less common are high-CO<sub>2</sub> springs with pulsating flow that bubbles or spurts. The CO<sub>2</sub> can come from volcanic processes or metamorphism of carbonate rocks at depth. Mixing with near-surface meteoric water of lower CO<sub>2</sub> can produce extensive caves that consist mainly of fracture-guided networks of galleries dissolved in limestone or dolomite. Bedrock dissolution in mixed sulfate-carbonate aquifers can produce deep-seated porosity by conversion of dolomite to calcite. In the first two examples, Fe-Mn hydroxides and oxides may also be common precipitates. In the last two examples, spring water is highly supersaturated with respect to calcite and tends to precipitate that mineral as travertine or tufa on the surface.

Identification of dissolved ions in spring or cave water can distinguish the subsurface reactions that have taken place. Calculation of saturation indices and gas partial pressures provides further information about these processes, as well as mineral stability. Radioactive and stable isotopes give clues to water sources, how long the water has been in the ground, and (at cave-fed springs) rough indications of how long the water has been in contact with the bedrock or with air.

### *About the Speaker*

**Arthur N. Palmer** is former director of the Water Resources program at the State University of New York (SUNY) at Oneonta, where he is Professor Emeritus of Hydrology and Geochemistry. He has received the Science Award from the National Speleological Society, the Lifetime Achievement Award from the Karst Waters Institute, SUNY Chancellor's Awards for teaching and research, and a Distinguished Teaching Professorship. He is a fellow of the Geological Society of America and a GSA Kirk Bryan Award recipient. Art and his wife Peggy have been involved with cave and karst studies for several decades, and they are authors of about 100 journal articles and several books on the subject. They also teach a summer course on Karst Geology for Western Kentucky University at Mammoth Cave National Park.

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HMPGA sponsors, coordinates, and participates in events to help educate the community and its members with respect to geological or geotechnical issues. Events include regular meetings with evening dinners and guest speakers. Other events include workshops, short courses, or field excursions. If you have questions, comments, or suggestions for our organization, please contact a HMPGA Officer or Board Member.

### January's Meeting and Event Information:

**When:** January 30, 2008

**Schedule:**

**Calaway Grill**  
*The Saratoga Room*  
(attached to the Wingate Hotel)  
661 Albany Shaker Road, Colonie

Board Meeting	4:00pm
Social Hour	5:00pm
Dinner	6:00pm
Program (free)	7:00pm

**Dinner:**

\$10.00/person for student members  
\$20.00/person for members  
\$22.00/person for non-members

**Notes:**

Vegetarian or fish meals are available with prior request. Individual will be responsible for the cost of dinner unless a cancellation notice is received 24 hours prior to the meeting. Walk-ins will be charged an additional \$2.00.

**Reservations:** Reservations are required for dinner attendance. Call or e-mail Diane Merolla at (518) 348-6995 or [dmerolla@alphageoscience.com](mailto:dmerolla@alphageoscience.com) by noon on **January 30, 2008**. Please register even if you are only attending the Program.

Thank you in advance!



## PRESIDENT'S MESSAGE

Happy New Year!

Hopefully you all had a wonderful Holiday season and were able to spend some quality time with family and friends. The beginning of a new year provides us with the opportunity to reflect on our accomplishments of the year past, and to think about what we hope to achieve in the year ahead. Having the opportunity and privilege to serve as HMPGA President for the second half 2007 has certainly been a rewarding experience for me on both a personal and professional level, and I look forward to the first half of 2008. I am truly thankful and appreciative of the hard work that is put forth by the HMPGA Officers and Board of Directors on a daily basis to insure that the organization is not only meeting, but surpassing, the needs and expectations of our valued members. From identifying exciting and meaningful topics for our monthly dinner meetings, to thinking of new and innovative ways to expand our outreach efforts to local colleges and universities, to increasing the number of active members and Corporate sponsors, the dedication and efforts of the HMPGA Officers and Board of Directors is surpassed by no others in my humble opinion! And as always, we welcome your ideas, comments, and suggestions on how we can make HMPGA even better than it is today.

We have an exciting slate of speakers lined up for 2008, beginning with Dr. Art Palmer, Professor Emeritus of Hydrology and Geochemistry at SUNY Oneonta, on January 30<sup>th</sup>. Those of you who were fortunate enough to attend our spring 2007 field trip to the Schoharie Valley will recall that Dr. Palmer is a renowned expert on karst geology and the formation of caves. In fact, Dr. Palmer and his wife Peggy have been involved with cave and karst studies for several decades, and they are authors of about 100 journal articles and several books on the subject. At the January 30<sup>th</sup> dinner meeting, Dr. Palmer will be discussing *"Strange Springs and Caves: What the chemistry of deep groundwater can tell us."*

For our February meeting we have scheduled Dr. Jacquie Smith of the College of St. Rose. Dr. Smith will be discussing her research on glaciers in the Andes – perhaps we should arrange for a field trip! In next month's newsletter I will report on the remaining topics and speakers that we have lined up for the spring.

Therefore, please make your reservations now to attend our January dinner meeting to be held at the Calaway Grill in Colonie on January 30<sup>th</sup>. (Please note the date change to the last Wednesday of the month due to renovations that are currently ongoing at the Calaway Grill). Plan to arrive between 5:00 p.m. and 6:00 p.m. and enjoy a cold beverage with fellow geologists. Dinner will be served at 6:00 p.m. and the talk will begin promptly at 7:00 p.m.

Our membership renewals are in pretty good shape, but we are still waiting on payment from a few of you. Therefore, if you haven't already done so, please send in your dues as soon as possible. A current membership form is available on our website ([www.hmpga.org](http://www.hmpga.org)).

I look forward to seeing you on January 30<sup>th</sup> at the Calaway Grill!

Steve Le Fevre  
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Darwin Day is an annual, international commemoration of the birthday and ideas of Charles Darwin, a British naturalist born February 12, 1809, and author of the seminal book *On the Origin of Species by Means of Natural Selection*.

The Paleontological Research Institution gratefully acknowledges Stephan Loewentheil and Cornell University for their leadership support for Darwin Day.



Transcripts from this year's events now available:

*Darwin@Cornell 2007: A Community Discusses Evolution and Human Nature*

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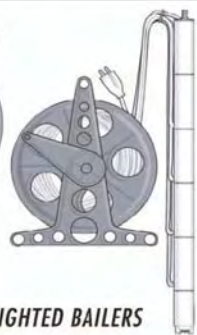
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## Bridges from My Memory

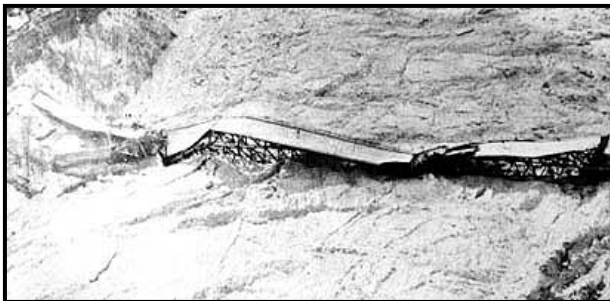
*By Kernan Davis*

When I was a young lad, bridges fascinated me – terribly. They seemed only incrementally less hazardous than the awful chasms and dark swirling waters that they spanned. This little phobia began on the occasion of my fifth birthday, when my parents took me to visit Niagara Falls for the first time.

To admire the falls, and the lovely autumn foliage, my parents walked me out onto the magnificent Falls View Bridge – a steel lattice arch, linking the nations of Canada and the United States. Hinged upon huge masses of steel and concrete, founded on the rock solid Thorould sandstone, just above the river's edge, this was a sound structure, according to the brochure that my father read to me. But, I did not like being on that bridge. The cold wind seemed to make it sway from side to side, and the cars and trucks seemed

to make it bounce up and down. That and the damp mist remain in my memory to this day. I would not look beyond the railing. I cried, my mother sighed and we went home. After all, I was just a little boy, and my parents, like most folks, paid little attention to the fears of little boys.

A few months after that visit, unseasonably warm winds broke up the ice sheet on Lake Erie, sending floes down stream, over the falls and into the plunge pool, where they formed a magnificent white bridge across the river, between the two nations. Water and weather drove that ice mass against the vulnerable hinges of the arch. On January 27<sup>th</sup>, 1937 at 4:20 in the afternoon, the wonderful Falls View Bridge gave a sigh and tumbled into the gorge to lie upon the ice until springtime. Then, piece by piece, it rolled off, into the swirling waters of Niagara.



Undeterred, our two nations built a new bridge, completed in 1941. The Rainbow Bridge, using an entirely different self-standing steel arched-beam design with massive thrust blocks, dug deep into bedrock, fifty feet above the river's water. It stands there today, as firm and solid as ever.

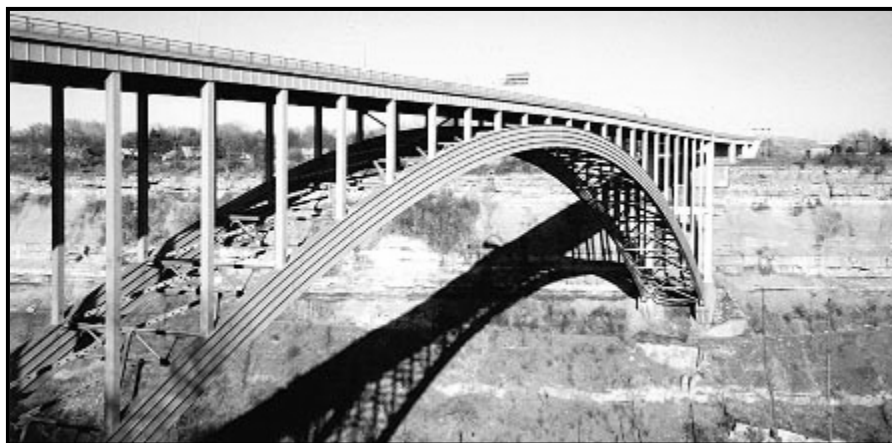
Many years after my first visit, I found myself working as a geologist on the design and construction of the Niagara Power Project. As part of the overall plan, highways and parkways were to be built, leading to a new bridge site near Lewiston, far downstream from the falls, rapids and whirlpool. Its design would replicate that of the sturdy Rainbow Bridge.



In late winter of 1960, I stood on the gorge face, high above the river, next to the first exploratory drill hole for American foundations for this new bridge, my feet on the Thorould sandstone, my eyes looking directly at the base of the Reynales dolomite. Between my feet and head, lay a pitiful excuse for a rock formation: greenish-grey, crumbly, oozing mud from its occasional joints. Other than in the Niagara Gorge, this formation does not crop out, except as a slippery slope: the enigmatic Neagha shale.

In our design of the power plant, we paid particular attention to this little formation, encasing it in cement, to prevent weathering and excluding it from any load-bearing function. But here it was, at the very location of the thrust blocks for the new bridge.

Needless to say, I loudly warned the bridge design engineers about this little layer of ghastrly grey shale. It may be thin, but must not be ignored. They grumbled and mumbled and enlarged the mass of the thrust blocks to eliminate the Neagha from any load-bearing function. The new Queenston-Lewiston Bridge still stands today.



Kernan Davis must not be the only elder who has had more than a half-century of geological adventures, but he seems to be the only one who writes about them. If you have an interesting tale to tell, contact our newsletter editor. If you prefer, Kernan can help you prepare your story.



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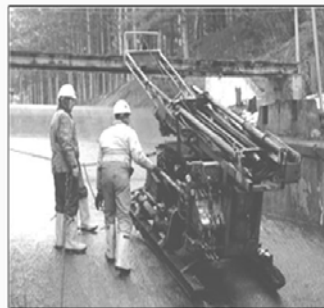
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### CAPITAL DISTRICT BREAKFAST CLUB PRESENTATIONS:

The Capital District Environmental Breakfast Club is an informal group of environmental professionals that meets monthly to discuss current environmental issues. Each meeting features a speaker on a topic of interest, a regulatory update, and an open forum. Meetings are held on the first Friday of each month except July and August.

The Environmental Breakfast Club meets at the Holiday Inn Turf on Wolf Road in Colonie, New York. Meetings start at 7:30 am. The cost is \$12 per person, which includes a full breakfast buffet.

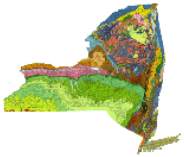
You can find out more details about the Capital District Environmental Breakfast Club at their website:  
[www.youngsommer.com/CM/Custom/TOCEnvironmentalBreakfastClub.asp](http://www.youngsommer.com/CM/Custom/TOCEnvironmentalBreakfastClub.asp)



### Buffalo Association of Professional Geologists (BAPG)

The BAPG conducts regular membership meetings on the third Wednesday of the month, January through June and September through November. Meetings feature distinguished speakers and interesting topics. Field trips and technical seminars sponsored by the BAPG encourage the exchange of scholarship and expertise.

Visit [www.bapg.org](http://www.bapg.org) for more information!



### Central NY Association of Professional Geologists (CNYAPG)

The CNYAPG conducts regular meetings on the second Thursday of each month from September to May. Meetings feature dinner and distinguished speakers whose presentations invite comment and discussion.

Visit [www.cnyapg.org](http://www.cnyapg.org) for details!



### LONG ISLAND ASSOCIATION OF PROFESSIONAL GEOLOGISTS

The Long Island Association of Professional Geologists (LIAPG) is a not-for-profit professional organization dedicated to the professional and business needs of geologists located in the Long Island / Metro New York area.

To contact members or view upcoming events sponsored by the LIAPG, go to their website:  
[www.lipg.org](http://www.lipg.org)



## AIR AND WASTE MANAGEMENT ASSOCIATION (AWMA) NORTHEAST SECTION:

The Mid-Atlantic States Section of the Air and Waste Management Association (MASS-A&WMA) is a professional non-profit association of engineers and scientists working in the environmental field, with a particular focus on issues related to air and waste. The Association strives to provide an opportunity to enhance the profession by providing opportunities for its members to network with other professionals.

Visit the AWMA website for information on professional activities and updated news!

[www.mass-awma.net](http://www.mass-awma.net)



## THE GEOLOGICAL SOCIETY OF AMERICA (GSA)

The GSA strives to be a leader in advancing the geosciences, while enhancing the professional growth of its members, and promoting the geosciences in the service of humankind.

Discover events and information on their website: [www.geosociety.org](http://www.geosociety.org)



## New York State Museum

The **New York State Museum** is a major research and educational institution. It is dedicated to promoting inquiry and advancing knowledge in the fields of geology, biology, anthropology, and history, through the investigation of material evidence germane to New York State's past, present and future.

For information on upcoming exhibits visit: [www.nysm.nysed.gov](http://www.nysm.nysed.gov).



## New York State Council of Professional Geologists

*The **NYSCPG** strives to strengthen and advance the geologic sciences as a profession, promote the protection of public health and welfare and the environment through the professional practice of geologic sciences, and create high standards of ethical conduct among its members and within the profession of geology, as well as the legal standing of geologists and their ability to practice geology in New York State by promoting the licensing of geologists in New York State through statutory regulation.*

To learn more about supporting the licensure of professional geologists in NYS, visit: [www.nyscp.org](http://www.nyscp.org)



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