Hydrogeology Division Celebrates 50th Anniversary at Annual Meeting in Portland

This year’s GSA Annual Meeting in Portland marks the 50th anniversary of the founding of the GSA Hydrogeology Division and several activities are planned to celebrate this event including a special Sunday afternoon Technical Session entitled “50 Years of Hydrogeology at GSA: Looking Back and Looking Forward,” a Tuesday anniversary reception, a Division booth within the Exhibit Hall that will feature information, historical memorabilia, a new logo-water bottle (see page 3) and lastly, this special issue of The Hydrogeologist newsletter which features four articles written by some of the Division’s founding members remembering the Division’s first Chair and co-founder, George Burke Maxey. We hope you enjoy the issue and we hope you can join us for the celebration in Portland.
Hello! The Hydrogeology Division has been busy this past year. We have a fantastic program planned for the 2009 GSA meeting in Portland. We will celebrate our 50th anniversary. We have a booth reserved in the Exhibit Hall so please stop by and see us. Also we have a reception planned for after the luncheon. We hope that everybody stays around and talks and this is NOT a ploy to get you to attend the Business meeting! Just to be absolutely clear – there will be TWO receptions; one after the luncheon and our usual Student Reception.

It is the time for thanks. Ed Harvey has served as the Hydrogeology representative to the Joint Technical Programming Committee. Everyone needs to thank Ed for organizing the technical program this year. Most people do not realize how important the Treasurer/Secretary is, I must thank Brian Katz who held the Division together and provided excellent advice this past year. The members of the Division need to thank the members of the various Committees (the Birdsall-Dreiss, the Meinzer, the Distinguished Service Award, and the Nominating Committees) who selected excellent awardees. A new committee this year is the Student Reception Committee. This event has matured over the years and was in need of a more permanent committee. Previously the past chair of the Division organized the Student Reception and corralled people as needed. This year, Eric Peterson and Steve VanDerHoven have stepped forward to oversee the donation of door prizes. I understand that Todd Halihan will be back to MC the event. I thank you, Eric, Steve, and Todd. I am sure that they will still be coralling people at GSA to help with the reception. Please make sure you say “Yes, I would like to help with reception”. Finally, I thank the GSA Fellows of the Division who made the effort to nominate other Division members for GSA Fellow.

See you in Portland!

Please support the Birdsall-Dreiss Lectureship! Donations can be made through the GSA Foundation at: https://rock.geosociety.org/donate/donate.asp or by calling Joan Bell, GSA Foundation, (303) 357-1067.
New Hydrogeology Division Logo & Comemorative Water Bottle

by Janet Herman & Ed Harvey

This year, in honor of the 50th anniversary of the Division, the Management Board has designed a new logo for the Hydrogeology Division and we will officially launch it by placing a single color version of it on a special commemorative stainless steel bottle that will be for sale at this year's Annual Meeting.

The logo, a modification of the current Geological Society of America logo, depicts groundwater beneath the quarter sphere of the earth using blue shading and the “hydrat” symbol, used to denote the position of the watertable. The logo will grace the cover page of future newsletters and the website and will be used on Division collectables and merchandise. The Division received support from the Geological Society of America to create the logo and we hope it will serve to better identify the Division and give Division members a sense of pride when they display or wear it in the future.

The bottle was co-branded uniquely for us through Klean Kanteen™, purveyors of the Original Stainless Steel Bottle. In 2004 Klean Kanteen™ introduced the first personal hydration bottle made from stainless steel to give health and environmentally conscious people an alternative to plastic. Made entirely out of toxin-free materials, the bottle is composed of high quality, 18/8, food-grade stainless steel topped with a BPA-free polypropylene (pp#5) cap.

The commemorative bottle will be offered in exchange for a donation at the Portland Annual meeting with a portion of the proceeds going to support graduate student research grants. A minimum donation of $30 is requested. Bottles will be available in two sizes (18 and 27 oz) at the Division’s Exhibit Hall booth starting Monday and at the Hydrogeology Division Luncheon, Awards, Business Meeting, and 50th Anniversary Reception on Tuesday, Oct. 20, from 12-4 pm in the OCC, Oregon Ballroom 204. So, stop by one of these venues, make a donation, and walk away with your very own Division Water Bottle.

Oh, and hurry, supplies are limited!
50 Years of Hydrogeology at GSA: Looking Forward & Looking Backward

by Jean Bahr

As part of the celebration of the 50th anniversary of the Hydrogeology Division, there will be a special topical session on Sunday October 18th starting at 1:30 PM titled “50 Years of Hydrogeology at GSA: Looking Back and Looking Forward”. Dick Parizek, one of the initial members of the Division, will share his recollections of the lively debates that preceded founding of the Division and offer his perspective on evolution of our science over the subsequent 50 years. Patricia Bobeck’s presentation “America Meets Henry Darcy” will describe early and recent efforts in North America to understand the historical context of Darcy’s career and his collaborations with others such as Dupuit. Mary Anderson will discuss the Meinzer Award and the evolution of science recognized in publications by the awardees over the last 45 years. Jozsef Toth, the first Meinzer awardee, will follow with a talk that builds on his seminal work by examining springs in the context of regional flow systems. Regional flow is also a theme in the talk by Brian Katz and co-workers on past, present and future studies of the Floridan Aquifer System. A presentation by David Lee and co-workers will review past and current efforts to quantify discharge of groundwater to surface water systems, a component of the hydrologic budget that was largely unappreciated when the Division was founded 50 years ago. A topic of increasing interest is carbon dioxide in groundwater, particularly as it relates to proposed large scale carbon storage and sequestration. Presentations by Gwen MacPherson and by Martin Saar and Jimmy Randolph will address historical, current and likely future research directions in that area. The concluding speaker in the session, John Bredehoeft, promises to offer provocative thoughts on the directions of hydrogeology in the 21st century.
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<td><strong>7:00 a.m. - noon</strong></td>
<td>Field Trips</td>
<td>President’s Student Breakfast (FREE) 7:00 a.m. - 8:30 a.m. (OCC, Oregon Ballroom 201/202/203)</td>
<td>Technical Sessions 8:00 a.m. - 12:00 p.m. Exhibits Open 9:00 a.m. - 5:30 p.m.</td>
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<td>Hydrogeology Div.  Management Board Meeting 11:00 a.m. - 1:00 p.m. (Hilton, Broadway I)</td>
<td>Ground Water Journal Editors Meeting 12:00 noon - 1:30 p.m. (OCC, Oregon Ballroom 202)</td>
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<td>T24. Groundwater Resources in Developing Countries - The Contributions and Legacy of Robert N. Farvolden: A Memorial Session to Commemorate the 50th Anniversary of the Hydrogeology Division</td>
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<td>T19. Characterizing, Predicting, and Managing Long-Term Contaminant Flux for Complex Subsurface Environments (Posters)</td>
<td>WE</td>
<td>9:00 AM - 6:00 PM</td>
<td>OCC Hall A</td>
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<tr>
<td>T20. Contaminant Hydrogeology: Contaminant Fate and Transport in Geological Systems (Posters)</td>
<td>WE</td>
<td>9:00 AM - 6:00 PM</td>
<td>OCC Hall A</td>
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<tr>
<td>T8. Terroir - The Relationship of Geology, Soils, Hydrology, and Climate to Wine: A Special Tribute to George Moore</td>
<td>WE</td>
<td>1:30 PM - 5:30 PM</td>
<td>OCC B113</td>
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<tr>
<td>T19. Characterizing, Predicting, and Managing Long-Term Contaminant Flux for Complex Subsurface Environments</td>
<td>WE</td>
<td>1:30 PM - 5:30 PM</td>
<td>OCC E141/142</td>
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<tr>
<td>T26. Hydrogeology in an Ice-House World: Effects of Glaciation on Surface and Groundwater Systems</td>
<td>WE</td>
<td>1:30 PM - 5:30 PM</td>
<td>OCC D139/140</td>
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### Hydrogeology Related Field Trips

<table>
<thead>
<tr>
<th>Field Trip</th>
<th>Start Day</th>
<th>Start Time</th>
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<tr>
<td>409. Fire and Water: Volcanology, Geomorphology, and Hydrogeology of the Central Cascades and Adjacent Areas, Oregon (3 days)</td>
<td>THU, Oct 15</td>
<td>8:00 AM</td>
</tr>
<tr>
<td>417. Terroir Tour of the Northern Willamette Valley 1 (1 day)</td>
<td>FRI, Oct 16</td>
<td>10:00 AM</td>
</tr>
<tr>
<td>424. Terroir Tour of the Northern Willamette Valley 2 (1 day)</td>
<td>SAT, Oct 17</td>
<td>10:00 AM</td>
</tr>
<tr>
<td>439. Hydrogeology of the Columbia River Basalt Group (CRBG) in the Willamette Valley, Oregon (3 days)</td>
<td>THU, Oct 22</td>
<td>8:30 AM</td>
</tr>
<tr>
<td>431. Terroir Tour of the Columbia Gorge</td>
<td>THU, Oct 22</td>
<td>10:00 AM</td>
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Distinguished Service Award to Ira Sasowsky

By Janet Herman & Bill Simpkins

The 2009 award for Distinguished Service is presented to Ira Sasowsky in recognition of his outstanding and sustained service to the Hydrogeology Division. The award specifically acknowledges his active management of Division communications, most notably editing the Newsletter and leading its transition to electronic format and his service as co-editor of Environmental & Engineering Geoscience in which he brought manuscript reviewing into fully digital format.

After a detour to the oilfields of the northern Great Plains, Ira Sasowsky received his B.S. in Geology from the University of Delaware in 1983. Ira subsequently earned graduate degrees in Geology from The Pennsylvania State University (MS, 1988; PhD, 1992). Ira’s research explores the interaction of water with the near-surface environment, particularly in carbonate terranes. He uses aqueous geochemistry, paleomagnetic dating, and genetic modeling to understand the linkages between water flow and landscape evolution. After a few years in consulting, Ira joined the University of Akron (Ohio) in 1995 where he is currently Professor of Geology & Environmental Science and Director of the Center for Environmental Studies.

Ira’s service in GSA has been extensive. He was editor of The Hydrogeologist newsletter from 1997 to 2001 and initiated the conversion to electronic publication. He has convened numerous topical sessions at the annual meetings, and was Technical Program Co-Chair for the 2006 North-Central Section Meeting. He has also served on the Hydrogeology Division Historical and Nominating Committees, as well as on the GSA Ad Hoc Committee on Accreditation and Long-Range Planning (Publications) Committee. Ira was elected a GSA Fellow in 2003.

Congratulations Ira! On behalf of your friends and colleagues within the Hydrogeology Division.

To nominate a colleague for the Hydrogeology Division’s Distinguished Service Award visit the website http://gsahydrodiv.unl.edu/DistinguishedService.htm
During a career of more than four decades, Wyndham Michael (Mike) Edmunds has made seminal contributions to multiple topics in hydrogeochemistry. These include controls on water quality in regional aquifers, groundwater recharge over a variety of time and space scales, and the origin of mineral and thermal waters. He has received the 2009 O.E. Meinzer Award for four publications that represent the depth, breadth, and sustained productivity of his research (see inset at right).

Edmunds et al. (1982) was among the first papers to delineate regional-scale processes of hydrochemical evolution by integrating a broad suite of groundwater and sediment analyses with geochemical modeling. Edmunds and Walton (1983) complemented Edmunds et al. (1982) by highlighting hydrochemical evolution in a carbonate aquifer, documenting how water quality changed in the upgradient part of the system as a result of agrichemical inputs, and identifying natural attenuation of nitrate at the regional scale. Using numerical modeling, Cook et al. (1992) demonstrated how chloride and stable-isotope profiles in the unsaturated zone can preserve sub-decadal to century-scale fluctuations in recharge. Edmunds and Milne (2001) drew together 15 studies demonstrating the emplacement of paleowaters in coastal aquifers across northern and western Europe.

Mike Edmunds’ output has been not only meticulous and prolific, but of great practical relevance. Perhaps more than any other hydrogeologic researcher of his era, he has worked in multiple regions, developed and developing, humid to arid, including Europe, Africa, Asia, and the Americas. His research exemplifies how the combination of technical innovation and scientific insight can yield an improved understanding of groundwater availability.

Mike earned an Honours BSc in Geology (1964) and his PhD in geochemistry (1968), focusing on the genesis of garnet...
Susan Hubbard has been selected as the 2010 Birdsall Dreiss Distinguished Lecturer. The lectureship is made to one person annually by the GSA Hydrogeology Division; Hubbard is the 32nd GSA Birdsall-Dreiss Lecturer and the first from a National Laboratory. Susan S. Hubbard is a staff scientist at Lawrence Berkeley National Laboratory, where she leads the Environmental Remediation and Water Resources Program. She received a BA in geology from UC Santa Barbara, an MS in geophysics at Virginia Tech, and a PhD in Engineering from UC Berkeley. She has previously worked at the U.S. Geological Survey and for the petroleum industry. Her research at Lawrence Berkeley Laboratory focuses on advancing the use of geophysical methods for shallow subsurface characterization and monitoring, with a particular emphasis on development of data integration methods and application of those methods to water resource and environmental-remediation problems. She co-edited the first book on hydrogeophysics and has published over 60 papers on this topic. She serves on several scientific advisory boards, as the Associate Director for the Berkeley Water Center, as a Co-Editor for the Vadose Zone Journal, and as an Associate Editor for the Journal of Hydrology. At the request of interested institutions, Susan will present one of the two lectures summarized below. More information and a lecture request form are available at http://susanhubbard.lbl.gov/birdsall.html

Toward X-Ray Vision: Geophysical Signatures of Complex Subsurface Processes

Developing a predictive understanding of water and contaminant fate and transport is complicated by natural heterogeneity, as well as by the disparity of scales across which hydrological, geochemical, and microbiological processes dominate. Because some geophysical attributes are sensitive to hydrological and biogeochemical properties that govern flow and transport, geophysical methods hold potential for minimally invasive subsurface characterization and monitoring. This presentation will describe recent hydrogeophysical and biogeophysical advances, obtained using laboratory experiments; radar, seismic, and complex electrical field datasets; and stochastic integration methods. This research suggests that geophysical methods can provide significant insights about our complex subsurface system. This seminar is intended for engineering, hydrogeology, and earth science audiences who are interested in advanced approaches to explore complex subsurface systems as is needed to guide environmental remediation and water resources management.

Waves and Wine: Geophysical Characterization to Guide Precision Viticulture

Precision viticulture strategies that focus on promoting uniformly high winegrape quality throughout vineyard blocks require information about the nature and interaction of factors that can impact grape quality—such as soil moisture, canopy density, and micrometeorological properties. Although advanced ground-based and airborne geophysical datasets are now available to provide information about soil variability and vegetation, the wine industry is still at an early stage in using these approaches to guide viticulture. This presentation discusses advances in precision viticulture that have been realized through experimentation at several California vineyards through interpretation of geophysical attributes (electrical, ground penetrating radar, and remote sensing) in terms of soil and canopy properties and the use of such data within statistical and water-balance numerical models to explore vineyard variability. The overall objective of this research is...
Reflections on the 2009 Birdsall-Driess Lecture Tour

By Chunmiao Zheng

I was very honored to be selected as the 2009 Birdsall-Dreiss Distinguished Lecturer. Although the lecture tour has been time-consuming and at times physically draining due to constant traveling, it has given me the experience of a lifetime. I kicked off the tour with the first lecture at the University of Alabama in January 2009. I will conclude the tour with the 70th lecture at CSIRO Land and Water in Perth, Australia in November 2009. The 70 lectures cover eight countries in four continents and 25 states in the United States.

I prepared two lectures for my tour. The first lecture is entitled “Understanding Solute Transport in Extremely Heterogeneous Porous Media: Lessons Learned from 25 Years of Research at the MADE Site.” It summarizes all the field-based research at a well-known tracer experiment site and provides a long-term perspective on the challenges of modeling and predicting plume-scale solute transport in heterogeneous aquifers. The second lecture is entitled “Will China Run out of Water?” It examines China’s water scarcity and environmental problems amid the country’s unprecedented economic growth. Of the two, the lecture on Chinese water issues has been requested more often because of its appeal to general audiences. But on a number of occasions, I gave both lectures: one to a general audience and the other to a smaller research group.

The year 2009 was certainly not ideal to do a lecture tour. Everywhere I went, I was greeted by the grim news of more budget cuts and staff layoffs as a fallout of the global financial crisis. Still, there is undeniable excitement and enthusiasm for hydrogeological research and education at every level. A clear trend I have seen from my visits is that more and more hydrogeologists are working with natural and social scientists from other disciplines to tackle difficult problems that are intrinsically complex and multidisciplinary in nature, such as global changes, sustainable development, and eco-hydrology. New breakthroughs in measurement and observing technologies are opening new doors for resolving old challenges in traditional hydrogeological research fields such as aquifer characterization, contaminant transport, environmental restoration, geofluid migration, and groundwater management. The hydrogeology profession is well and alive!

By Chunmiao Zheng

Sale of Bobeck’s Darcy Book to Benefit Division

By Patricia Bobeck

At the Portland meeting, you have the opportunity to purchase a copy of the English translation of Henry Darcy’s Public Fontains of the City of Dijon to benefit Hydrogeology Division students. Patricia Bobeck, book translator and Division member, will donate 30% of conference book sales to the Division’s scholarship fund. So why not use this special promotion to purchase a copy for yourself, as a gift for graduating students, and/or your university or corporate library.

Darcy’s original French version is available in only about twenty rare book libraries worldwide, and is accessible only to speakers of mid-19th century French. The book, written in 1856 near the end of Darcy’s life, is a description of the water supply system he built in 1834-44 and an encyclopedia of Darcy’s water knowledge. Appendix D is a discussion of filtration that includes the description of the water experiments that led to Darcy’s law. A 28-plate atlas of engineering drawings, originally published separately, is included in the English translation.

The book will be for sale at Ms. Bobeck’s presentation on Sunday October 18 (Session #57) for $99. She will also be available at the luncheon. For more information, please visit www.pbobeck.com.
Reflections of the the Formation of the Hydrogeology Division

By Dave Stephenson

There were two founders of the Hydrogeology Division in 1959: George Maxey and Phil LaMoreaux. Maxey was a Professor at the University of Illinois and Head of the Groundwater Geology and Geophysical Exploration Division of the Illinois Geological Survey. Lamoreaux was Chief of the Ground Water Branch of the U.S. G. S. and the future Alabama State Geologist. Maxey became the first Chair and participated very actively in Division affairs for 18 years until his untimely death. He was followed by 19 Chairs from academia, 18 from agencies (mostly the U.S. G. S.), 9 from industry, 2 from research institutions, and 2 from other categories (politics and the Library of Congress). The Division has had a population of almost 2000 members in the explosive days of the Hydrogeology industry in the 1980s and 1990s. It has frequently been the second largest division within GSA. No one of the current members seems to have a written record or memory of just who the Charter Members were, but perhaps someone will attend the 50th Anniversary Celebration in Portland and be able to fill that gap.

M. King Hubbert (left) chatting (and clinking glass) with József Tőth (right) at the general banquet at the Society’s Meeting. Mr. Hubbert was quite frankly pleased that the Award was given for a work based on his clearly seminal yet, at the time, somehow insufficiently appreciated paper, “the Theory of Ground-Water Motion.” (Photo provided by J. Tőth).
It takes “champions” to accomplish anything today and the Hydrogeology Division of the Geological Society of America (GSA) was fortunate to have Phil LaMoreaux and Burke Maxey (aka George) in it beginning fifty years ago. Many other people contributed but they were the two “champions”. They were two different types of personalities – Phil was a gentleman and Burke was a “bull in a china shop”. But together they were a pair that could and did accomplish many things. Both had come up through the U.S.G.S. Water Resources Division in the 1930s and 1940s. Burke entered academia in the 1950s while Phil stayed at the U.S.G.S. before returning to Alabama as State Geologist and eventually as a consultant.

I first met Phil when I was a graduate student at Florida State University in 1955. He gave a talk about ground water geology and spent time talking to the students. The next year I went to work full time at the Illinois State Geologic Survey (ISGS) and took courses toward a Ph.D. part time as did many others. The ISGS had about 150 employees with 15 people in the Ground Water Section. Burke had just arrived to head the Ground Water Section and to teach Ground Water Geology at the University of Illinois in 1955. It always was an exciting time when Burke was anywhere.

Two years ago I was talking to Phil about the beginnings of the Hydrogeologic Division in the GSA. There was opposition to forming a Hydrogeology Division. Luna Leopold, head of Water Resources of the U.S.G.S., was opposed because he did not see a need for it. Phil told me that during one of Burke’s visits to Washington, Burke went into Luna’s office to argue for the formation of the Division. One did not walk into Leopold’s office but that did not stop Burke. And eventually they won Leopold over. The Engineering Division of GSA also felt that ground water belonged in that division since engineers were responsible for the development of water supplies including ground water; and there was a general reluctance on the part of GSA which was composed of academicians while ground water geologists were more in the applied area. GSA has changed in the last 50 years – and for the better.

At the GSA meeting in Pittsburgh in 1959, the Hydrogeology Division was formed consisting of a relatively small group of geologists. Technical papers were first given at a Division session in 1960. We have come a long way and now constitute the second largest Division by membership and certainly among the largest in number of presentations at the national and regional meetings.

In the beginning the ground water session(s) were held in a small room. One had to get there before the session started to get a seat and soon standing room was filled to overflowing and commonly spilled out into the hall. We eventually were scheduled into larger rooms. We requested that there be a Ground Water luncheon or breakfast. No success in the beginning, so we met informally. Now we have hundreds at the luncheon and awards ceremony.

In the “coffee room” – actually a lab – at the ISGS during the 1950s, we had many discussions as to whether we were ground water geologists or hydrogeologists; even discussions as to whether ground water is spelled as one or two words. If surface water is two words, so ground water should be two words. The resolution of the name was that of the Hydrogeology Division and it held its first session in 1960 at the Cincinnati meeting. There were a series of papers given by Joe Callhan, Bill Walton, Paul Seaber and others. There were also hydrogeology papers given in the Engineering Geology Division as had been done previously, as well as in the Geomorphology Division, and other scattered Divisions.

So what are we now? No question, we are hydrogeologists presenting many papers in the Hydrogeology Division (and even President of the GSA). Fifty years ago ground water models were physically built with transistors on sheets of plywood. Today they are programmed on computers. Chemical results were done to parts per million at best and we now expect micrograms per liter or less for the complex organic compounds. Environmental geology was almost unknown fifty years ago and today it employees thousands of geologists with training in hydrogeology, statistics, organic chemistry, modeling, etc. We have come a long way in the past 50 years and I am sure we will go a long way from our start in a few crowded sessions.

Grover H. Emrich, Ph.D., P.G.
EMRICH & ASSOCIATES
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Scientific societies have all ways played an important role in the development of hydrogeology in the United States. The Hydrogeology Division has played an especially strong and focused role in helping hydrogeology become accepted as a specialized area of geology on par with the more traditional areas of geology; such as petroleum and structural geology. The Hydrogeology Division’s strong role in annual and sectional meetings has markedly enhanced technology transfer in hydrogeology; as has also the lecture series that the Division supports. Those that initially founded the Division could not have visualized the role that the Division would be destined to play in the development of the science of hydrogeology and in GSA.

I did not attend the inaugural meeting in 1959. I was a budding groundwater geologist in the Indiana District of the USGS at that time. Claude Roberts, my District Chief, attended the meeting and encouraged me to join Division, which I did. Many of the original members are no longer with us and many of them were either former members or active members of the USGS. As the Division membership grew and hydrogeology became accepted as a specialized area of geology, the membership broadened and now encompasses a large representative segment of hydrogeologist from academia, the private sector, and State and Federal government.

The development and growth of the Division has all ways been tied to the relatively small group of members that were willing to contribute their time and energy to serve on the various committees of the Division and the Executive Committee. The Division has all ways been fortunate to have talented and devoted members serve in these positions.

I have had the privilege and honor to have been associated with many of these members and to have served on many of the committees with them. Several committee assignments merit comment. George Davis, as Division Chair, tasked Darryl Pederson and me to develop the framework for a Division Distinguished Service Award. We initially suggested that the award be called the George Burke Maxey Distinguished Service Award. The Society was against naming a Distinguished Service Award specifically after an individual. We worked around this objection by designating the Division’s Distinguished Service Award as being established in honor of George Burke Maxey. The award was posthumously to Burke Maxey. His wife, Jane, attended the Division meeting to accept the award.

The original bylaws of the Division were viewed by many as some what wordy and cumbersome. Paul Seaber was one of more outspoken members concerning this matter. The Division tasked Paul to revise the bylaws. He drafted me to assist him. The revised bylaws were more directly stated, streamlined, and simplified. Since that time the bylaws have been revised a number of times.

The DNAG volume on hydrogeology was probably the most challenging effort ever undertaken by the Division. Bill Back and Paul Seaber chaired the organizing meeting for the volume. They were the driving force behind the initial thinking about what the volume should attempt to accomplish. Their vision was an ambitious one. By the time the meeting was over, they had commitments from most of the attendees to contribute to the effort and an agreement on the structure of the volume. The volume was to consist of three major sections; hydrogeologic regions, comparative hydrogeology, and groundwater and geologic processes. Some how, they were able to convince me to take on the responsibility of coordinating the hydrogeologic regions section of the volume and eventually to become an editor. Little did I realize that would entail responsibility for about half the volume. All three of us contributed chapters to the volume, as well as fulfilling organizational and editorial responsibility. About a third of the way through preparation of the volume, Paul retired from the USGS and took a job overseas. With Paul working outside the U.S., Bill and I took on full responsibility for the volume. In order to bring the volume to completion, Bill and I ghost wrote some of the chapters based on initial materials provided by those authors responsible for those chapters. The effort required of the editors was time consuming, tedious, and at times very challenging. Bill chose the picture on the cover of the volume. The volume was the result of contributions of more than 100 hydrogeologists, most of which were members of the Hydrogeology Division. Unfortunately many of the contributors are no longer with us as well as my two coeditors and friends, Bill Back and Paul Seaber.

Paul Seaber’s overseas employment had another impact on the Division. Paul was trapped in Kuwait when Iraq invaded the country in the prelude to the first Gulf War.

Please see Looking Back on page 26.
Memories of George Burke Maxey: A True Mentor & Co-Founder of the GSA Hydrogeology Division

By Dave Stephenson

[ Mentor: an individual, always more experienced, who helps and guides another individual’s development. This guidance is not done for personal gain. ]

George Burke Maxey (taken in 1973)

One is fortunate in the developmental stages of a career to have a mentor who truly guides your progress. I had two. The first was “Doc” Frithiof Fryxell of Augustana College in Illinois, where I obtained an undergraduate degree in geology. Shortly into the first class with “Doc”, I knew my future was to be a geologist. He instilled in me a great appreciation for the earth and earth’s history, guided me into a summer field camp in Wyoming (which ultimately became my home state), and counseled me into graduate school and later into what turned out to be a long career in hydrogeology. He was the first Park Ranger/Naturalist in the Grand Teton National Park when it opened in 1929 and subsequently instilled a deep appreciation for the geology of Jackson Hole in his students. He was a gracious and humble teacher and mentor, and he became a long-time friend.

Prior to graduating in 1961 from Washington State University with a Master’s degree in Geology ¾ in the summer and fall of 1960, it was obvious that getting a job in geology would be difficult. On the streets of such oil & gas boom towns of Denver and Houston, firms were not recruiting. I contacted “Doc” and asked him what to do. He advised that I switch from petroleum geology to groundwater and apply to the University of Illinois to work with Professor George (Burke) Maxey on a Ph.D. program. He also put me in touch with folks at the Illinois State Geological Survey (ISGS), Ground Water Section, for employment.

Thanks to “Doc”, I did begin employment with the ISGS and first met Burke—who soon became the second mentor in my professional development. My first paying job as a professional started in June 1961 in the Naperville office of the ISGS. Jim Hackett was an office mate and Bill Walton was a frequent visitor in an adjacent office of the Illinois State Water Survey. In August 1961, I moved to Champaign where I started the Ph.D. program in groundwater and worked for the ISGS—both under Maxey’s supervision.

Just two months into the academic year, Burke asked me to his house one evening to say that he was moving to Nevada in January to begin the Water Resources Center of the Desert Research Institute (DRI). He asked me to join him as the first employee of his new group. How could I refuse that opportunity? So, in January 1962, my wife and I caravanned to Nevada with Burke, his wife Jane, sons Lee and Dan, daughters Nelly, Ann, and little P.J (Pamela Jean), plus their dog Hey Boy.

Not long after arrival and while I was still getting settled into the new DRI job, Burke hired Pat Domenico.
Memories of George Burke Maxey:
The Early Years - 1954 to 1960

By Arthur J. Zeizel

These recollections of George Burke Maxey are written to help honor his contribution to the field of Hydrogeology and to provide some insights and guidance to hydrogeology educators and scientists. As these comments are read, hopefully some understanding will emerge concerning what there was in this great man that could foster such incredible success in the development of so many outstanding hydrogeologists and related professionals.

These comments are better read with some understanding of their source. I was one of the earliest, “Maxey Protégés” but became a considerably unusual one. My career started as a traditional hydrogeologist but shortly afterwards I left that field for a quite different career path—one that ultimately led to national and international activity in natural hazards loss-reduction. This career path moved through the fields of flood plain management, comprehensive water resources planning and management, environmental geology, and then into research management and the development of policy and programs in natural hazards loss reduction. Addressed were such hazards as floods, earthquakes, landslides, subsidence, and volcanoes. Also involved were such activities as changing national and local building codes and planning guidelines, and even the construction of a massive earthquake engineering testing facility.

Career objectives were to use science to help identify and put into place policies and programs for the protection of life and property from natural disasters. One goal was to prevent the loss of life from disasters and to reduce increasing Federal disaster assistance and flood insurance costs. I worked with the White House Office of Science and Technology Policy, the National Academy of Sciences, the National Science Foundation, and the scientific and technical agencies of government, such as the U.S. Geological Survey, the National Oceanic and Atmospheric Administration and the National Institute of Standards and Technology. It also involved working with state and local governments, universities, and the private sector.

What was there in Burke’s personality and the education and training that he provided to his students that made such diverse and non-traditional careers possible?

Burke was a brilliant, forceful and dynamic personality. As a teacher he was inspirational, caring, and supportive as well as being stimulating, challenging, and demanding. When you were down, he picked you up, expressed his confidence in you, and then helped you move on. Both as a person and a teacher, he was unconventional, intense, blunt, profane at times, and driven to help solve the problems facing our society.

I was privileged to be one of Burke’s first students at the University of Connecticut (Uconn) in 1954, a privilege shared with Dick Parizek and Joe Rosenshein. Burke had

Please see Early Years on page 21.
These remarks are based on recollections of almost 20 years as George Burke Maxey’s student, research assistant, and ultimately professional colleague and close family friend. As they did with many other student peers, Burke and his wife Jane adopted me into their extended family, and their big house on Urbana’s Green Street became a second home. Emphasis is on his very personal and quite effective approach to teaching and application of sound hydrogeologic principles for the general public good. Burke burned life’s candle at both ends as well as in the middle, and he just missed his 60th birthday; but he never felt compelled to win popularity contests. His lasting legacy now includes 4 generations of eminent geoscientists and engineers.

Please see Illinois & Nevada on page 23.
I first met George Burke Maxey in the fall of 1958, as I began my candidacy for a Ph.D. in the Department of Geology at the University of Illinois. I came to the department having only a vague idea of what aspect of geology I would focus on, but I had heard that a new academic discipline called “ground-water geology” would be an interesting and perhaps a profitable one to pursue. Shortly after my arrival, Dr. George W. White, Department Chairman, suggested that I meet with Dr. Maxey at the nearby Illinois Geological Survey. Little did I know at the time that this meeting would be the start of a long and rewarding association with a remarkable teacher, colleague, and friend.

“Burke” (as he was known to those who knew him personally; we students could always recognize a more formal relationship when someone called him “George”) was the consummate student advisor. He cared deeply about his students, both from a personal standpoint and from an educational standpoint. His parties for students were legendary, but for me his small and stimulating classes and one-on-one interactions probably had more profound effects. Discussions did not just center on ground-water geology but included a broad range of geologic as well as social, political, and philosophical topics. At Illinois, a candidate for a graduate degree would take his or her Master’s orals by visiting in sequence the offices of various geology professors. In most instances, the subject matter of the questioning was predictable with each professor. But not with Burke! He could just as easily ask a student to identify a fossil, name a stratigraphic unit or sequence, or discuss a rock specimen (which likely as not would be a lump of coal), as well as the expected topic of ground-water geology. This approach made for much nervousness as each candidate entered Burke’s office!

It was on trips that Burke was the ultimate teacher. These could be field trips, trips to meetings, or cross-country excursions. I remember going to my first GSA Annual Meeting in 1960, in Denver. Burke had been selected as the Acting Chairman of the newly-formed Hydrogeology Division the year before in Pittsburgh. In Denver, he was elected the first official chairman, and it was an exciting time for those of us who had come to Denver to participate in this new venture.

After a day of technical sessions, we would gather in his hotel room for drinks and lively discussions of what we had learned from the technical sessions and what we should be questioning. Burke was noted for challenging assumptions, objectives, and standard practices. His blunt style often antagonized project leaders and bureaucrats, but his goal was always the same – do it right, and do it better. Among the things that he drilled into our heads over and over was to know and express explicitly the objectives of a project or a report, and to assess whether the activities would or did meet those objectives. Those guidelines stuck with me throughout my USGS career and later as a journal editor.

My most memorable trip with him was an automobile trip that John Hawley, Roger Wolff, and I (and perhaps one or two others) took with him from Illinois to Nevada in the early summer of 1959. At Burke’s invitation, John and I had agreed to participate in the multi-disciplinary Humboldt River Research Project in Nevada that Burke had been asked to head up. As I recall, Roger, a fellow student at Illinois, had never been West and came along for the adventure. The trip was an ongoing seminar that included, for example, discussions of the distinctions between faults and joints as we drove through various mountain ranges and the identification of stratigraphic units as we gazed in awe at the Grand Canyon from the North Rim. For John and me, the journey ended at Winnemucca, Nevada, where Burke took us out to the flats of Grass Valley, scuffed the surface with his boot, and declared, in effect, that “Some folks say that these are deposits of Pleistocene Lake Lahontan. Your jobs are to find out if that’s true and to determine how the distributions of alluvial-fan, lacustrine, and Humboldt-River deposits affect the occurrence and availability of ground water. See you in Urbana in the fall!” Talk about tough love! But with Burke’s guidance and encouragement we spent the next three-plus years “finding out,” and we each managed to produce a dissertation based on that work.

For me, though, the dissertation did not come easily. During the summer of 1962 I developed a classic case of “writer’s block.” By then, Burke had left for the Desert...
Mentor from page 16.

Pat and I soon thereafter were sent out to evaluate the hydrogeology of the Sand Springs Range/Dixie Valley area preparatory to the Atomic Energy Commission detonating a nuclear device some 1205 feet underground in the Sand Springs Range. Pat and I lived in a trailer in the desert for six months supervising drilling of numerous test wells in the alluvium and in the granodiorites of the Sand Springs Range, conducting aquifer pumping tests, and mapping the Quaternary Geology of the region.

It was during the collection of water-level data from the few existing stock wells in the study area that I received my first field lesson from Burke. I was gently and slowly pulling out the chalked steel tape from a well where the water table was about 200 feet below the surface. Burke ran over, pushed me aside, grabbed the tape and began vigorously pulling it out of the well—saying you don’t want to let the wetted chalk dry out on the way up. I never again was slow in “chalking.”

One event of the time related to President Kennedy’s Cuban missile crisis. In the fall of 1962, it seemed rather sure that we were going get into a nuclear war with Russia over Cuba. At the time, my wife was just a month away from giving birth to our first daughter. Following Burke’s example, each night I drove a DRI four-wheeled drive Scout home, filled with gasoline, extra gasoline cans, rifles, ammunition, knives, books on home birthing, lots of powdered milk, water cans, canned foods, and lots of matches. The plan was to go to a cave in the Sand Springs Range area and survive on jack rabbits and quail. Maxey had his own cave and wanted only his family to be there—one time he didn’t want students around. Fortunately, diplomacy won and we didn’t go native. It took years to use up the matches. I still have the rifles and most of the shells.

In 1963, Pat Domenico and I lived in Las Vegas Valley for three months doing the evaluations leading to construction of an electric analog model of the Valley groundwater regime. Pat and I supervised drilling 19 test holes and evaluated hundreds of drillers’ logs to arrive at aquifer characteristics and boundaries for the model. This model was to be a water-management tool for North Las Vegas and Las Vegas, but about the time it was completed, digital models came into use. Burke was involved with much of that study and of course obtained the funding for the activities.

In early 1964, I returned to the University of Illinois to finish the Ph.D. program. Burke was furious with me for not staying in his fledgling graduate program at Nevada. As Jane put it, I fell from grace with Burke. A main reason to return to Illinois was to work with Bob Farvolden, who left DRI to take Burke’s place in heading the groundwater program at Illinois. Following degree work, I developed the Hydrogeology program at the University of Wisconsin-Madison and starting sending some very excellent graduate students to work with Burke on DRI projects that also became their thesis projects. It didn’t take long for Jane to inform me that I was “back into good graces” with Burke.

To further describe Burke and what he meant to his students, I quote a passage from Gil Cochran, who was a Research Professor, Water Resources Center, DRI, working with Burke (from: George Burke Maxey: A Lasting Influence on the Course of Modern Hydrology: Ground Water, Vol. 17, No. 1, Jan/Feb 1979): “To have known him was an experience, and to each who did I am certain that experience was different. Burke ... had undying faith in the ability of young people to produce. ... Burke made people think, whether it was in a classroom, in the field, or in a meeting. ... He was always perceptive and offered up difficult questions—not infrequently of one word—why? Often Burke would team up with friends such as Ray Kazmann and Jim Warman to let a speaker know when he was off-base. Those were exciting meetings for everybody—except the speaker. It seems like many meetings are quieter now: There is a need for someone to step forward to help fill that role to ensure that we keep trying to answer the question of ‘why?’”

Burke was a consultant to UNESCO, the United Nations, the World Bank, the Atomic Energy Commission, and many other national and international organizations and governments. He came a long way from doing a Ph.D. thesis on Cambrian trilobites at Princeton to being one of the eminent hydrologists of all time. He worked with O. E. Meinzer, Jim Hackett, Tom Eakin, and many, many others of the formative days of modern hydrogeology. What is long-lasting in my memory are the many many evenings spent at the Maxey household, especially on a Friday night in Reno. We would gather at his home, have drinks, go to a restaurant where Burke would always send the first bottle of wine back, and then go back “home” for a long night of conversation and drink.

It was a sad day in 1977 on receiving word of his death. At the time, and most appropriately, Burke was living on Aquifer Way in north Reno. Following his death, Bill Back and I co-edited: Contemporary Hydrogeology—The George Burke Maxey Memorial Volume of the Journal of Hydrology (Vol. 43, 1979). I also authored a GSA Memorial Volume (Vol. 9) article. Both of these
articles and the Gil Cochrane article give many more details of Burke’s life and legacy.  

Important to the GSA Hydrogeology Division is the fact that Burke and his long-time colleague Phil LaMoreaux were the leading founders of the Division in 1959. It is the hope of the Division Management Board that a number of the charter members of the Division will be present at the Portland, Oregon meeting on October 20 to raise a toast to Burke, Phil, and the success of the Division.

Dave Stephenson  
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Early Years from page 17.

just returned from Tunisia and was starting his teaching career. Our first meeting in his office was tense. He flat out told me that I could not take Historical Geology and Paleontology at the same time even though I was formally registered for both. One was a prerequisite for the other. He insisted that I drop Paleontology. When I countered that doing so would make it necessary for me to add another semester to my education, one that I could not afford, he showed his compassion and willingness to bend rules by letting me go forward with both courses. Perhaps, my performing well in both courses was one factor that helped him identify me as someone with potential.

Burke’s ability to identify people with potential and to encourage and develop that potential was a key factor in his success as an educator and professional. His own potential was discovered by receiving similar recognition. As a bellboy in a small hotel in Missoula, Montana, a professor from Princeton University somehow identified Burke’s potential and made it possible for him to enter Princeton and complete a doctoral program in record time.

Another memory from his early days as a professor at Uconn was his unusual approach to his students. He was a fully competent professor, but also one who wanted to get to know each of his students on a personal basis. Some of these students became lifelong friends. Dick Parizek, other students, and I, frequently would join Burke in intense discussions of professional and world issues. These discussions, often in bars and lubricated with beer, contributed to our professional education and an improved understanding of the issues facing our society.

His wonderful willingness to develop friendships with his students, however, did not detract from his responsibilities as their professor. He was demanding and held his students responsible for stellar academic performance.

One episode comes to mind. After dining and drinking with Burke late into the night, a few of us did not deliver the work he required the next morning. Burke furiously chewed us out and let us know, in no uncertain terms, that assigned work was to be delivered on time and in a satisfactory manner no matter what social activity he or anyone else participated in with us the night before! A life’s lesson forcefully given.

I was welcomed into the Maxey family when I traveled with them to Red Lodge, Montana in the summer of 1955 to participate in the field camp given by Princeton University. This feeling of being a member of his family continued to his death.

Burke left Uconn in 1955 to take joint positions as the Head of the Groundwater Geology and Geophysical Exploration Division of the Illinois State Geological Survey and a Professor of Geology at the University of Illinois. When I completed my studies at Uconn for my undergraduate degree in February 1956, Burke offered me a position as a Research Assistant with the Illinois Survey. Burke brought Dick Parizek to Illinois in a similar manner in June, 1956.

The following fall, Burke encouraged me to begin graduate study while keeping my position as a research assistant. As my boss and now my major professor, Burke guided me both as an emerging hydrogeologic professional and as a student. He drove home the need for high quality research and encouraged me to challenge and improve not only the basic assumptions, methods, findings, and conclusions of my own work but also those of others. He demonstrated the value of interdisciplinary approaches to problem-solving and of constantly questioning and asking the uncomfortable questions of why, or why not. These characteristics became ingrained into my personality and served me well in both my professional and personal life. Many benefits were derived from this assertive and somewhat aggressive approach but, not infrequently, it also caused considerable conflict and stress.

Burke’s ability to change existing practices and even his strongly held positions on matters was shown by two events in Illinois.
One was the manner in which graduate students were treated at the Illinois Geological Survey. Traditionally, new graduate students were assigned to perform the, “scutt” work for more advanced doctoral candidates. Burke, over the vociferous objection of some of these advanced candidates, imposed his view that, “his” students, Dick Parizek and I, were to be assigned their own research projects and not serve others. That decision made it possible for me to complete my Ph.D. program in only four years.

Burke was stubborn and strongly held his views and positions. At the same time, he was able to be flexible and change his position. One example of this was when it became time for me to choose my dissertation research project. Burke wanted me to study the groundwater resources of the Wabash River Valley in Southern Illinois. From discussions with Bob Bergstrom and Jim Hackett at the Survey, I wanted to study the shallow dolomite aquifers in DuPage County in the Chicago metropolitan area. Heated discussion and argument between us followed. Finally, Burke agreed to let me do as I wished. As both my boss and major professor, he could have simply said,” Do as I say, dammit!” He instead chose not to impose his will.

That decision of Burke’s and the work that followed were key determinants in my career becoming focused upon the interaction of urban development and the geologic environment and the application of research. Subsequently, upon completion of the Ph.D. program my career path led to accepting a position as an environmental planner with the Northeastern Illinois Metropolitan Area Planning Commission in Chicago. I joined a multidisciplinary, comprehensive study of the water resources of the six-county Chicago metropolitan area. The resulting report, The Water Resource in Northeastern Illinois: Planning Its Use served as a guide to water resource management in the Chicago metropolitan area and later was used by the Supreme Court of the United States in its landmark decision on the diversion of the water from the Great Lakes Basin by surrounding states.

Burke was furious that I chose this position with a planning agency instead of accepting a post-doctoral grant to continue hydrogeologic studies at Stanford University. He felt that I was abandoning our promising field of hydrogeology to become a, “common planner”. This caused an estrangement that lasted for several years. However, during this time Burke himself began to consult on water resource planning for UNESCO, the United Nations, and the World Bank. One of my greatest satisfactions in my professional life was when I approached Burke at a GSA meeting, extended my hand and said, “Burke, welcome to the planning profession”. This broke the ice and our friendship was renewed for life.

The term, “environmental geology” began to appear in the geologic literature in the late 1950s. By now, there may well be a generally accepted definition of that term. In my mind, environmental geology involves a focus upon the interaction of man’s activity and the geologic environment that is intensified by urban development. It requires close cooperation between earth scientists and the professions and organizations that plan and manage urban development. I believe that Burke and his hydrogeologic colleagues at the Illinois State Geological Survey played a leading role in the growth of the field of environmental geology in this country.

Perhaps my main contribution to the emerging field of environmental geology was encouraging increased cooperation between earth scientists and metropolitan and urban planners. This resulted in part from a five-year; $5.0 million research and demonstration project carried on cooperatively by the Department of Housing and Urban Development, the U.S. Geological Survey, and the Association of Bay Area Governments. This project was recognized by the American Planning Association in 1981 with a National Planning Award for its contribution in support of local and regional planning on natural hazards, natural resources, and other environmental factors. More importantly, it fostered a cultural change in the manner in which geologists related to the professions and organizations involved with urban planning and development. Some scientists actually began to work in local government planning and zoning agencies.

My interaction with Burke lessened when he left Illinois in 1961 to build a water resources program at the Desert Research Institute and the University of Nevada and I joined the Federal Government in Washington, D.C. in 1967. My career moved further from the field of hydrogeology to policy and research management in water resources and environmental geology at the Department of Housing and Urban Development. Later, when the Federal Emergency Management Agency was created in 1979, I began to work in that new agency primarily in natural disaster loss-reduction policy and research management.

The knowledge and characteristics instilled in me by Burke Maxey in my formative years served me well throughout an unusual and personally rewarding professional career. Critical thinking, the need for interdisciplinary approaches, a willingness to challenge and to try to improve existing policies and programs, and most of all, to persevere- all were critical to whatever professional success that I achieved.

I believe that most of his students that went on to become contributing educators and scientists would credit a large
part of their success to the influence of George Burke Maxey.

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Illinois & Nevada from page 18.

as well as a wonderful personal family. The following quote from a recent biographical sketch (Hawley, 2005, p. 14) summarizes Burke’s seminal contributions to my early career:

George Burke Maxey, who ultimately founded the Desert Research Institute groundwater-research program in Nevada (1961-1977), was [one of two] early source[s] of support and inspiration (cf. Maxey and Jameson, 1948; Maxey and Shamberger, 1961; Maxey, 1968). He directed my academic and graduate research activities at the University of Illinois (UIL: 1957-1962), the Illinois Geological Survey (ISGS: 1957-1959), and the Nevada Department of Conservation and Natural Resources (1959-1962). Burke Maxey was a master builder of hydrogeological-research groups; and “making any Maxey team” required total immersion in whatever that group was doing at the time, including an activity-continuum ranging from class, field and scutt work to research and/or all-night “communal recreation.” I survived that hectic pace, mainly due to the incredible faculty and graduate-student research team that Burke assembled during his Illinois years. Other de facto mentors of the time included my major professors and research advisers Don Deere, Ralph Grim, Jack Hough, George White, and Al Beavers (soil mineralogist), as well as John C. Frye (ISGS Chief). Most important were many grad-

student peers, some of whom were co-workers in my Nevada dissertation research area, especially Keros Cartwright, and officemates Bob Farvolden and Bill Wilson (e.g. Bredehoeft and Farvolden, 1964; Dudley and McGinnis, 1962; Hawley and Wilson, 1965).

I recently discovered a “vintage-Maxey” photo (above) while trying to dispose of the geojunk packratted in my basement office. The scene is from one of Burke’s famous ground-water class excursions, which were a mixture of practical, field-oriented hydrogeology, professional networking, and Socratic “symposia-type” sessions on the “meaning of life.” This trip was to a National Ground Water Conference in Columbus, Ohio (spring of 1960 to my best recollection). Burke made sure that we were well-introduced to leading hydrogeologists attending the conference. One notable was Phil LaMoreaux, then head of the USGS-WRD Ground Water Branch, whom I had never gotten to meet in my early days (1954, 1957) as a junior-staff member in the Indiana District Office. Phil and Burke were among the principal co-founders of the Hydrogeology Division at the 1959 GSA Annual Meeting in Pittsburgh; and Phil and I last met at the 2006 Philadelphia Meeting.

The Ohio trip included tours of an industrial groundwater production facility near Dayton, and radial-collector wells and a water-transmission system in the Miami River Valley near Cincinnati. The featured group photo was taken during the Dayton-area well field visit. Our (USGS?) host is front-row right, with John Kempton at front left. Smiling Burke is naturally top-row center, with Art Zeizel on the far right and me (as always) to the far left. Howard Pohn is between Art and Burke, but the names of the other students draw a blank. Art Zeizel and his housemate of the time, Richard Parizek were undergraduate students at the University of Connecticut who followed Burke to Illinois in 1956. John Kempton and Art were then with Burke’s IGS-Groundwater & Geophysical Exploration Section; and both continued on to outstanding professional careers, respectively, with the ISGS and FEMA. Howard Pohn was with the USGS when we last met in the early 1970s.

In his last year at UIL (spring 1961), Burke took our GW Seminar group to the large USGS artificial-recharge research facility in the Grand Prairie area near Stuttgart, Arkansas. Our hosts were facility director Richard Sniegocki and Eldon Dennis, then State District Chief. We were Dennis-family house guests in Little Rock, because Eldon and Burke were long-time friends who had previously collaborated in desert-basin ground-water studies in Utah.
during WWII (Dennis et al., 1946). This early exposure to the potential and pitfalls of artificial recharge of alluvial-aquifer systems (Johnson and Sniegocki, 1967) has served me well in subsequent studies in Nevada, New Mexico, and western Texas. The biggest lesson learned, however, was from my first direct experience with the problems that Federal scientists faced in many parts of the American South relating to Civil Rights issues of the day. Eldon Dennis had recently served on the State Commission (Gov. Faubus appointee) that was charged with selecting the first Black students to attend Little Rock Central High School. The backlash from this momentous event turned out to be very unpleasant for Eldon and his family.

The educational impact that Burke Maxey had on most of his UIL graduate students, some of whom were also on the IGS staff, related to his adeptness at utilizing the many interdisciplinary and institutional resources available in the Urbana-Champaign area. For example, the Illinois Water Survey and IGS were both state government divisions separate from the university system, but scientists and engineers like Bill Walton, head of the Water Survey’s Ground Water Division, always seemed available for guest lectures and personal consultation. Moreover, all groundwater students had to be well grounded not only in “classic” field-oriented geology, but also in one or more closely allied disciplines such as engineering geology, soil mechanics, clay mineralogy, soil science, and geohydrology. Perhaps the most popular interdisciplinary program of the period was a one-year introduction to theoretical and applied soil mechanics developed by Ralph Peck of the Civil Engineering Department and usually taught by Herb Ireland. Soil-mechanics instruction was almost always complemented by Don U. Deere’s engineering-geology “case-history” courses, and by at least one class in clay mineralogy taught by Ralph Grim.

What about hydrogeology textbooks? There weren’t any! Too many advances had been made since 1941 to use the excellent works of C.F. Tolman (1937) and O.E. Meinzer (1942) as more than historic-reference tools. David Deming (2002) was only about 6 years old when we really needed him. My dog-eared copy of USGS-WSP 887 (Wenzel, 1942) is an example of one of the many publications that Burke Maxey insisted that we try to absorb, as were a number of other more contemporary USGS and state-agency documents. He did have an agreement with McGraw-Hill to write a new “Tolman-type” introductory textbook, and he tested many ideas on us in his lectures. Moreover, he felt compelled to carry on the “Meinzer tradition” (Maxey, 1979; Hawley and Kernodle, 2008). After Burke’s 1961 decision to take on the water-resources program at the Nevada Desert Research Institute (DRI), that textbook dream was never realized.

In 1959, the Nevada Department of Conservation and Natural Resources initiated a major collaborative effort to better characterize the water resources of the western Humboldt River basin. Burke Maxey was asked to direct the multi-agency Humboldt River Research Project (HRRP), which included the UNM-Mackey School of Mines, ISGS-GW & Geophysical Exploration, UIL-Geology, and USGS-WRD. Bill Wilson and I suddenly discovered that the focus of our graduate-research programs had shifted from the Midwest to north-central Nevada; and parts of the next three years were spent in the Humboldt River Valley, with the rip-roaring town of Winnemucca as our headquarters. Following our last field season, Burke had one more superb educational surprise in store. He had arranged for “internships” for three HRRP team members (John Bredehoeft, Bill Wilson, and me) at USGS Water-Research Centers in the fall of 1961. John was assigned to work with Robert Bennett in Washington, D.C.; Bill went to Joe Poland’s research laboratory in Sacramento; and because I seemed to have an aptitude for bio- and hydro-stratigraphy, I was sent to Mineola, NY, to assist Joseph Upson in building a hydrogeologic-framework model of the Long Island aquifer system.

By 1961 Burke was totally committed to establishing a state-of-the-art water resources research program at the new DRI in Reno and Las Vegas, and so he made the permanent move back to Nevada late that year. To make sure that I actually completed my dissertation research, however, he hired me for one more month of HRRP completion work in the summer of 1962. This led to the unique experience of having my initial dissertation-defense session in our Winnemucca field area. Besides Burke, my inquisitors included George White, John Frye, Poul Graff-Petersen (Danish clay mineralogist representing Ralph Grim), Roger Morrison (USGS), and Bob Farvolden (mentor no. II).

The first student to make the move from Illinois to Nevada with the Maxey family was Dave Stephenson, who was also Burke’s first hire at the DRI Water Resources Center. Dave was soon followed by Pat Domenico, Marty Mifflin, John Hardaway, and John Harsh. Many Maxey students moved on to other regions; but most remained within the ever-expanding sphere of Burke’s strong personal and professional influence. Notable examples of individuals among my contemporaries who became world-class hydrogeologists include John Bredehoeft, Pat Domenico, Bob Farvolden, Marty Mifflin, Dick Parizek, and Dave Stephenson.
I owe my introduction to Burke Maxey to Joe Rosenshein, my supervisor at the USGS Indiana-District Office after my return from active military service (1954-1956). Burke had been Joe’s graduate advisor at the University of Connecticut; and Joe sensed that my “in and out of the box” acting and thinking style just might be good survival skills in Burke’s ground-water programs at the ISGS and the UIL. So in early May 1957, I was sent to Urbana-Champaign to meet with Burke and Geology Department Chair, George White, who would consider my possible future in hydrogeology and closely related fields. Since my undergraduate experience was strong in math and general science, but with a bare minimum of geology, I had to start with a catch-up year in advanced undergraduate course work and summer field camp. If I did well in this academic program and as a part-time research assistant at the IGS Ground Water and Geophysical Exploration Section, they would then decide if I had any future in the geology profession.

It now appears that I did have a future, but probably not in “mainstream hydrogeology” (whatever that may be). Because water-resources concerns are much too important to be confined to a particular box, I suggest that the central theme of this retrospective is that the genius and greatness of George Burke Maxey and the other GSA Hydrogeology Division founders relates to the fact that many were anything but “ground-water geologists.” Horrors upon horrors, some were primarily mathematicians, physicists, chemists, and engineers; and others were geomorphologists, sedimentologists, and stratigraphers. This observation still applies to present and future members of this Division, as is clearly demonstrated by the accomplishments of Meinzer Awardees and Birdsall-Dreiss Lecturers during the past half century.

References

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Student & Colleague from page 19.

Research Institute in Reno, Nevada. When he learned of my floundering, he urged me to come to Reno with my boxes of notes and he would see if he could get me back on track. Between his efforts and those of Bob Farvolden, a former office mate at Illinois who was working for Burke at the time, they succeeded in getting me over the hump. I never had that problem again in my entire professional career, and I have always been profoundly grateful to Burke and Bob for curing me of that mind-numbing malady.

Burke had so many contacts in his profession that he was often instrumental in obtaining teaching, consulting, or other positions for his newly-minted graduates. He used to tease us by saying that we should pay him ten percent of our first year’s salary as a professional! That payment, of course, never materialized, but I often thought during my first year with the USGS that he surely had earned such a fee.

My last visit with Burke occurred in the mid-1970s, shortly before he died in 1977. I had come from my home office in Tampa to the Denver Federal Center for a training class. Bill Dudley invited me and Burke, who also was visiting in the area, to dinner at his house. Bill was another former student of Burke’s and at the time was Chief of the USGS Nuclear Hydrology Program (NHP) and as such was responsible for the Survey’s participation in hydrologic investigations at the Nevada Test Site (NTS). Because of Burke’s Nevada connections, he was quite familiar with those programs. Over cocktails and dinner, the two of them debated the roles and activities of the USGS, the DOE, and the National Laboratories at the NTS. Having little knowledge of the programs involved, I was primarily a listener as the discussion rolled on. Little did I know that in 1979 I would replace Bill at NHP when he moved on to Wyoming as District Chief. How I wished I could have resumed that discussion with Burke and tapped his extensive insights into Nevada hydrogeology, but it was too late.

Burke’s legacy lives on in what he often referred to as his “children” and “grandchildren,” namely his students and later their students (and probably now their students, or “great grandchildren”). It is a legacy that all of us can be proud of!

William E. Wilson  
U.S. Geological Survey (Retired)

Looking Back from page 15

Paul was First Vice Chair and was to replace me as Division Chair at the end of the 1990 meeting. With Paul’s status unknown, the newly elected First and Second Vice Chairs did not feel that they were ready to step into Paul’s position. The Executive Committee requested that I serve another year as Division Chair and at the end of that year Paul would take over the Chair. Instead, I agreed to serve as Chair until Paul would be able to take over the position. In February 1991, Paul assumed Chair of the Division. As result, I had the dubious honor of having the longest tenure as Division Chair.

I enjoyed the years that I was active in the Division. I had the satisfaction of contributing to its growth. During those years, the Division grew in stature in the GSA. I had the opportunity and honor to be associated with many of the leaders in hydrogeology. In the next 50 years, I expect that the Division will continue to enhance the science of hydrogeology as effectively as it has in the past 50 years.

Editor’s Note: The articles on the early years of the Hydrogeology Division, and personal reflections about George Burke Maxey contained within this issue were submitted by Division members in response to an editor’s call for stories. Consequently, I published all of the information I received. Thus, the absence of articles about Division’s co-founder Phil LaMoreaux reflects a lack of volunteered information and not a comment on his importance, or relevance to the Division. I would welcome submissions describing his contributions and mentoring. Thus, if you would like to submit a story about LaMoreaux, I would be happy to print it as a special supplement to the newsletter on the Division’s website.
**WANTED: NEWSLETTER EDITOR - WEBSITE ADMINISTRATOR**

The Hydrogeology Division is seeking a volunteer to assume the duties of Editor of the Division’s newsletter “The Hydrogeologist” and the Division website. The newsletter is published twice a year and is currently assembled using Adobe PageMaker. The website is updated several times a year. The new editor would be responsible for transitioning away from the current PDF/paper copies to a HTML format. If you are interested, please contact Carol Wicks <cwicks@lsu.edu> or Scott Bair <bair.1@osu.edu>. Questions about the duties and time commitment should be directed to Ed Harvey <feharvey1@unl.edu>.

**Meinzer from page 10.**

in polymetamorphic rocks, at the University of Liverpool. In 1966, he began a 35-year career at the British Geological Survey, where, to quote Willy Burgess of University College London, Mike became “the father of hydrogeochemistry in the UK”. His research initially encompassed chemical processes in aquifers in Great Britain, the impacts of acid rain on shallow groundwater quality, and, as noted by Yousif Kharaka of USGS, “some of the earliest investigations of geothermal resources,” particularly the chemistry of hot, dry-rock reservoirs. Subsequent studies in the Sahara and Sahel sparked Mike’s sustained interest in groundwater recharge and paleohydrology in semi-arid regions. Since the mid-1990s, he has coordinated several major projects sponsored by the European Commission, including baseline groundwater quality and paleohydrology of aquifers across Europe. He retired from an Individual Merit position at the BGS in 2001 but retains an appointment there as Honorary Research Associate. In 2002, Mike became Research Director of the Oxford Centre for Water Research. He holds the title of Visiting Professor of Hydrogeology in the Oxford University Centre for the Environment, where he coordinates the MSc program in Water Science, Policy, and Management.

“Congratulations Mike from you friends and colleagues in the GSA Hydrogeology Division!”

**Lecturer from page 11.**

to use advanced approaches to delineate and guide the management of vineyard based on natural site variability. Such approaches are expected to lead to more uniform vegetation and winegrape characteristics within vineyard blocks, while potentially reducing water, fertilizer, and energy use. This lecture is intended for those interested in the practical use of advanced datasets to guide precision agriculture.

**Reflections from page 12.**

I wish to take this opportunity to acknowledge the Geological Society of America Hydrogeology Division for giving me the opportunity of a lifetime. I also thank the University of Alabama for granting me a release from teaching and providing additional travel support. I am deeply indebted to the numerous faculty and students for taking the time to share their research ideas and experiences with me. Finally, I am grateful to all my local hosts whose hospitality, thoughtfulness and friendship has made my lecture tour a truly unforgettable journey.

To nominate a colleague for the Hydrogeology Division’s Meinzer Award visit the website http://gsahydrodiv.unl.edu/OEMeinzer.htm

Do you have an interesting idea for a short scientific article? Perhaps an opinion on a new policy or technique? Any exciting news in your professional life? Upcoming conference? An announcement of interest to the hydrogeological community? If so, why not publish it in The Hydrogeologist? Send your submission ideas to feharvey1@unl.edu.
Hey there everyone! It’s me again. As you can see, I’ve come out of retirement to help the Hydrogeology Division with the newsletter during this vacancy in the editor’s position. With this special commemorative issue I have tried to combine the traditional fall stories - annual meeting program, Meinzer and Distinguished Service Awards, etc. with some historic pieces from some of our distinguished founding members. I hope you find the blend satisfactory and the reflections on our history informative and enjoyable reading.

F. Edwin (Ed) Harvey, Interim Editor
The Hydrogeologist
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