

TPG

Volume 51, Number 4

THE PROFESSIONAL GEOLOGIST

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AIPG Publication Policy, October 4, 2010. AIPG encourages submission of articles and editorials for publication in *TPG* on topics related to the science and profession of geology. Submittals shall be of interest to the members of AIPG, other professional geologists, and others interested in the earth sciences. Articles and editorials may be noted as follows at the discretion of the Editor, "The opinions, positions and conclusions presented herein are those of the author and do not necessarily reflect the opinions, positions or conclusions of the American Institute of Professional Geologists." All materials submitted for publication, including author opinions contained therein, shall include accurate and appropriate references. The Editor has the authority to solicit, edit, accept, or reject articles and editorials and other written material for publication. The Executive Committee has the authority if it so chooses to act on any particular case to support or overrule actions of the Editor regarding the solicitation, editing, acceptance, or rejection of any particular article, editorial, or other written material for publication.

American Institute of Professional Geologists (AIPG) is the only national organization that certifies the competence and ethical conduct of geological scientists in all branches of the science. It adheres to the principles of professional responsibility and public service, and is the ombudsman for the geological profession. It was founded in 1963 to promote the profession of geology and to provide certification for geologists to establish a standard of excellence for the profession. Since then, more than 10,000 individuals have demonstrated their commitment to the highest levels of competence and ethical conduct and been certified by AIPG.

The mission of the American Institute of Professional Geologists (AIPG) is to be an effective advocate for the profession of geology and to serve its members through activities and programs that support continuing professional development and promote high standards of ethical conduct.



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For AIPG news and activities go to www.aipg.org.

My name is Lisa Matson and I am currently a junior at Northern Illinois University. I have joined their geology program and over the summer, I was given a wonderful opportunity to join the AIPG on their trip to Kentland Indiana. The main focus of the trip was to learn about shatter cones and to find examples of them in the quarry we visited. I found the trip to be very educational and fun!

This was the first geology trip I have ever taken and I could not have asked for a better experience. I had no idea what to expect when I arrived. I was a little nervous because I had just joined the geology program and had not had many geology classes under my belt yet. I was worried that I wouldn't know as much as others and that it would be difficult to follow along with everyone on the trip. I was very wrong. Everyone was welcoming and eager to learn. We were given packets full of information about what the trip was about and everything we were going to learn.

For the first time, I was able to interact with professional geologists, as well as other students, and geology lovers in general. Interacting with everyone opened my eyes to different careers out in the geology field. We all came from different backgrounds and it was interesting to hear about what aspect of geology everyone was working in or studying.

This trip was an experience I will never forget. I love to show people my samples of shatter cones and tell them all about how they form due to high impacts such as meteorite impacts. Actually being out at the quarry allowed me to see how geology works on a completely different level than studying it from a class. I was actually standing where a meteorite landed and I could see the effect it had. The meteorite exposed many different types of rocks and minerals that we use on an everyday basis. After taking this trip, I was even more excited about starting school and getting into my geology classes. I want to thank the AIPG for putting this trip together and for their commitment to helping students learn.

Sample of a shatter cone found at the Kentland Meteorite Impact Site.



Lisa Matson at the Kentland Indiana meteorite Impact Site.

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The Kurkar Sandstone

Stephen Pierce, CPG-08726

Introduction

While working in Israel for Zion Oil & Gas at its Caesarea office, Israel, I had the opportunity to observe an intriguing series of sandstone ridges that trend parallel to the coast and named the Kurkar Sandstone. The Kurkar Sandstone is a Pleistocene calcareous sandstone (eolianite) that forms north-south morphological ridges parallel to the Israel coastline (on and offshore) from Gaza in the south to just south of Haifa in the north. The part of the Kurkar discussed herein is located in the north from Caesarea to Atlit, as shown in Figure 1.

The Kurkar is interesting for many reasons including its resource as an aquifer in the Sharon coastal region, as a habitat for rare birds, and its use as building stone since Biblical times. And parts of the Kurkar have a complex, poorly understood cementation history.

General Geology

Structure

The Kurkar sandstone, or more formerly the Kurkar Group, is basically a stratigraphic feature. The Kurkar Gp. consists of several Pleistocene sandstone ridges that trend parallel with the coast of Israel. The ridges are very elongate, having widths of about a quarter mile. The ridge that is observed traversed by the seismic line south of Atlit (ZI-5074) is unbroken for at least 16 miles, resulting in this case in a width to length ratio of 1:64, Figure 2. Six or seven Kurkar ridges are known in Southern Israel in the Gaza area, whereas only three are observed onshore to the north. These ridges have also been observed in the coastal offshore.

Although the Kurkar has been recognized and studied for a considerable time with many papers being published, I had never seen a complete profile through the Kurkar until Zion Oil & Gas acquired seismic data in the Atlit area in 2008. The location of the relevant portion of the line is shown in Figure 2, marked as A-B. Seismic line ZI-5074 is an east-west line that crosses the Kurkar just south of Atlit. The seismic line was chosen to begin at this location because the hard limestone surface would affect the seismic quality and I wanted to know its effect on the quality of the seismic data.

As can be seen in Figure 3, the migrated seismic section of the seismic reflectors



Figure 1. Map of Israel showing the areal extent of Kurkar Sandstone in red block in the area of interest.

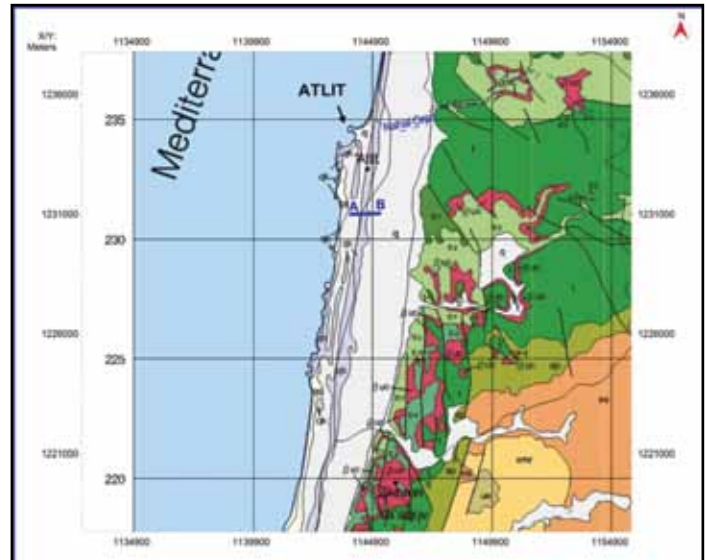


Figure 2. Geologic map showing the coastal Kurkar Sst. in the area of Atlit. Ridges strike north-south along the coast (blue-grey). From the 1:200,000 Geologic Map of Israel, GSI. Green areas represent Late Cretaceous carbonates, beige and orange are Eocene chalks and red areas are Late Cretaceous volcanics. Grey areas are Quaternary alluvial.

tors appears to be thickened at the surface in the area directly below the blue labeled KURKAR SST. The cross-section of the Kurkar in Figure 3 suggests a rhomboid geometry. Stacking velocities indicate a thickness of 400 to 500 ft.

Also visible in Figure 3, note that the reflectors immediately below the Kurkar are horizontal in general while those below approximately 100 msec appear to rise toward the right (east). This represents a major Pleistocene-Late Cretaceous angular unconformity as shown by the geologic map of the area in Figure 2.

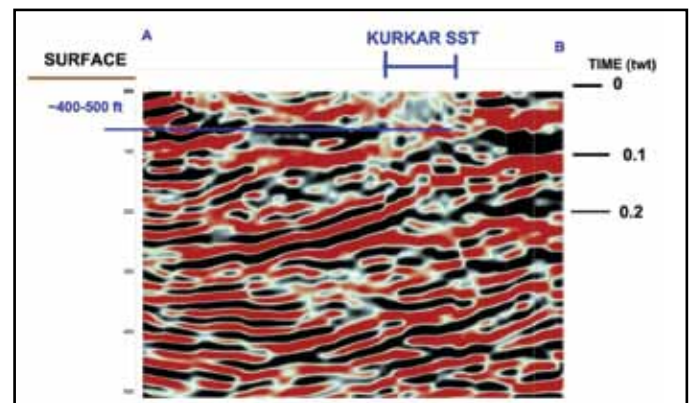


Figure 3. Migrated seismic section from Zion Oil & Gas ZI-5074. The upper most 200 msec are shown. Note the disturbed reflectors below Kurkar Sst shown in blue. West is to the left (A) and east to the right (B).

Stratigraphy

Stratigraphically, the Kurkar consists of six cross-bedded fine to medium grained sandstones separated by a red silty clay paleosol named the Hamra, as shown in Figure 4.

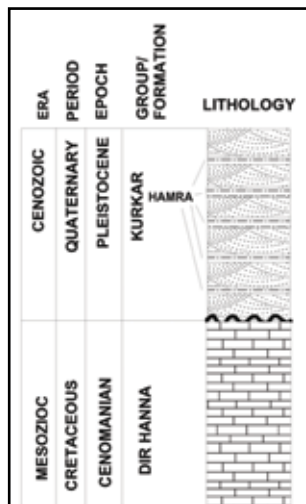


Figure 4. Suggested generalized stratigraphic section of the Kurkar Gp. In the Atlit area, Northern Israel, the Kurkar is underlain by the Late Cretaceous Dir Hanna Fm.

In outcrop, the Kurkar exhibits large sets of crossbeds that are clearly discerned, as shown in Figures 5 and 6. Just south of Caesarea near Hadera, outcrops of the Kurkar appear to be unconsolidated loose sand separated by thin beds of calcite cemented sand. However, at Atlit the Kurkar is completely calcite cemented.

The complete Kurkar Gp. has not been mapped in the Atlit area due to lack of exposure of the complete section; however, it has been mapped further to the south near Pardes Hanna, approximately 13 miles south. The thickness of the Kurkar in general appears to vary between 300 to 700 ft (Gvirtzman, et al, 1983). The thickness appears to be between 400 ft to 500 ft. in the Atlit area (Figure 3).



Figure 5. Out crop of the Kurkar sandstone near Caesarea. Car shows scale.



Figure 6. Close-up of the outcrop in Figure 5, above. Note the cross-bedding. The ridges are hard calcite cemented sandstone while the hollows are loose quartz sand. Pocket knife is shown for scale.

Clearly visible in Figure 6 is thin-bedded unconsolidated sand separating slightly thinner lamina of calcite cemented sandstone.

Thin sections of the sandstone show the Kurkar to be composed primarily of fine to medium grain, sub-rounded to rounded, very well sorted quartz grains subordinated by fossils such as red algae shown in Figures 7a and 7b. The primary mineral is quartz with subordinate calcareous red algae and other shallow marine calcareous fossils. The sandstone appears to be a sub-round, well sorted, fossiliferous quartz sandstone with abundant primary porosity as shown in Figure 7a. There is the suggestion of carbonate diagenesis in Figure 7a. Meteoric water appears to have produced two rinds of calcite sparry cement. These rims may represent annual events, created during annual precipitation cycles.

In contrast, samples of the Kurkar collected just 12.5 miles north near Atlit and where seismic line ZI-5074 was acquired are clearly completely calcite cemented.

Origin

The immediate source of the sand comprising the Kurkar is the coastal sand dunes of the Sharon Plain, shown in grey in Figure 2. The origins of the Kurkar ridges are probably products of foredune development by Late Quaternary dune-forming winds that trend southwest-northeast. There is a maximum limitation to the stable sand height and when that limit is reached another ridge parallel to the first is formed by small oscillations of sea level, (Tsoar, 2000). The ultimate source of the dune sand originates from the northerly currents carrying and depositing sand from the Nile River.

The calcite source is presumably from the Cretaceous carbonates found abun-

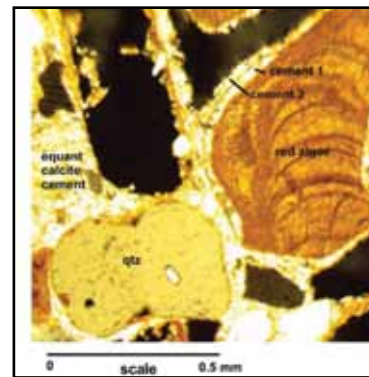


Figure 7a. Thin section of Kurkar sandstone collected near Caesarea. The yellow crystal is quartz, black is open pore space, and the striated object is a red algae. Crossed- polarized light.

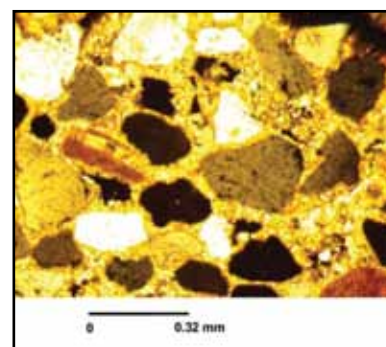


Figure 7b. Thin section under cross-polarized light of Kurkar collected near Atlit where line A-B crosses Kurkar ridge. Grains of different shades of gray and black are quartz in differing extinction angles. Fossil debris is shown as red.

dantly in the area and is shown in green in Figure 2.

At least in the Caesarea area, the precise internal cementation processes are poorly understood. Particularly intriguing are the alternating lamina of calcite cemented and unconsolidated quartz sand shown in Figure 6. My interpretation is that this rhythmic banding suggests cyclic episodes of sparry calcite cementation.

Note that Figure 7a displays two generations of calcite spar rims. One possibility is that the rims indicate an annual influx of fresh water. But the control for the continuous rhythmic deposition of thin lamina of calcite cementation alternating with loose sand is still speculative.

Construction Uses

Excellent examples of the Kurkar being used as a building stone can be seen in the ancient city of Caesarea on the Mediterranean coast. Caesarea was first built by Herod the Great in

25-13 B.C. Subsequently inhabited by Romans, Byzantines, Arab, Crusader, and Mameluke and Turks, the city was abandoned in the thirteenth century to the vagaries of nature. Archeological excavations renewed interest in this ancient city. Now, Caesarea is a major tourist attraction.

The city as recovered from archeological work consists of many structures including the walls composed of Kurkar Sandstone. One of the greatest attractions is the Roman aqueduct built by Herod. In order to supply Caesarea with fresh water, he constructed a great aqueduct that extended from the city to the cisterns and springs of the southern foothills of the Carmel Mountains. Figures 8 and 9 show remnants of the aqueduct near Caesarea.

Although the Kurkar is extant only along the Levantine coast of Israel, it is a marvelous geologic feature that still contains mysteries. To me, the most intriguing are the thin calcite cemented sandstones separated by slightly thicker unconsolidated sand as developed near Caesarea, whereas in other locations it is completely calcite cemented.

Acknowledgements

I would like to thank Zion Oil & Gas for permitting me to use part of seismic line ZI-5074.



Figure 8. The Roman aqueduct at Caesarea constructed using the Kurkar Sandstone. Author is shown for scale.



Figure 9. Portal in aqueduct above showing close-up of Kurkar Sandstone.

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Stephen Pierce, CPG-08726, (pierce@ectisp.net) is a consulting geologist with over 35 years exploration experience worldwide. When working with Superior Oil Co. and exploring for oil in Israel in 1980 he wrote a basin analysis for the state of Israel at the government's request. From 2006 to 2012 he explored Israel for Zion Oil & Gas. He taught geology at Navarro College Corsicana, Texas. He has a BS degree in geology from Long Beach State University and a Master's in geology from San Diego State University.

Annual Meeting Photos



Field Trips and Fun!!!

AIPG 2014 Honors and Awards Program

The American Institute of Professional Geologists (AIPG) has a history of effective and outstanding service to the profession of geology. From its beginning in 1963, the Institute has emphasized the role that professional geologists play in this fascinating, changing, and highly complex world in which we live.

In an Institute such as this, there are so many highly motivated geologists contributing to the profession, the Institute, the public, and the nations in which we live and work that the identification of a select few for particular awards is a monumental task. The continued success of the Honors and Awards Program is dependent on an accessible nominating process and a diligent screening of those nominated. This is done by the Honors and Awards Committee.

Currently, there are six honors bestowed by the Institute: Ben H. Parker Memorial Medal, Martin Van Couvering Memorial Award, John T. Galey, Sr. Memorial Public Service Award, Award of Honorary Membership, Outstanding Achievement Award, and Presidential Certificate of Merit.

AIPG MISSION STATEMENT

The Mission of the American Institute of Professional Geologists (AIPG) is to be an effective advocate for the profession of geology and to serve its members through activities and programs that support continuing professional development and promote high standard of ethical conduct.

Please find the 2015 Honors and Awards nomination form on page 44 of this issue. The deadline for the 2015 nominations are due to the AIPG Headquarters by January 20, 2015.



**William J. Siok CPG 4773
2014 Recipient of the AIPG
Ben H. Parker Memorial Award**

Bill's career in geology spans more than four decades. He holds a BS Geology from Rensselaer Polytechnic Institute, Troy, NY, and an MS Geology from the South Dakota School of Mines and Technology, Rapid City, SD. His professional experience includes earth science teacher, state government regulator, consultant in hydrogeology, and AIPG executive director. Bill has been an active member of AIPG since 1980, and maintains memberships in other sister societies.

Bill's tenure as AIPG Executive Director was 15 years. He was honored at the AIPG 51st Anniversary Annual Meeting with the Ben H. Parker Memorial Medal, the Institute's most distinguished award. He was also surprised and honored to be recognized by the Institute by the establishment of the William J. Siok Graduate Scholarship supporting advanced education in the geosciences and hydrogeology. Bill was honored and humbled by the extraordinary tribute.

Bill has served on various AIPG ad hoc committees, as a member of the national executive committee, and a trustee for the Foundation of AIPG. He serves, as of 2015, on the AGI Executive Committee as Secretary.

Response

AIPG has, since 1980, been the critical professional association of my career. As soon as I had the requisite qualifications to achieve AIPG certification, my appli-

cation was on its way to the Executive Committee. There was also membership in numerous sister societies, but AIPG was the one I selected for more than casual participation and it led to my appointment as Executive Director in 1999.

My time as AIPG Executive Director has been the highlight of my professional career. Beginning with Tom Fails (may he rest in peace), I have served with 16 AIPG Presidents. My tenure as Executive Director ends now during the Presidency of Ray Talkington, a true friend and mentor.

My service to AIPG has been a privilege and a most rewarding experience. But the fact of the matter is that whatever I may have achieved during the past 15 years which contributed to AIPG's increased visibility, credibility, stature, influence, and especially service to members, is fundamentally attributable to the immense support from AIPG members, Executive Committee, headquarters staff, and my wife, Gail.

I am tempted to name individuals, particularly AIPG presidents with whom I have worked closely and who have become friends as we worked together to strengthen AIPG as a professional organization representing practitioners and the profession overall. Since good sense and the constraints of space dictate against doing this, I must simply acknowledge those who helped me by thanking them publicly. You know who you are, and I am forever grateful for your time, friendship, and genuine support.

I am particularly proud of my role with particular AIPG presidents and the AIPG staff in furthering the AIPG professional relationships with sister societies with which cooperative programs have been established. These societies include the American Geosciences Institute, Association of American State Geologists, Geosciences Canada, the European Federation of Geologists, The Institute of Geologists of Ireland, the Geological Society of America, and the American Association of Petroleum

Geologists. We have also established a regular program of topical technical seminars throughout the USA which contributes to AIPG's excellent reputation in the applied geosciences and also augments AIPG revenue. There are so many aspects of AIPG worthy of mention, and I know that active members are cognizant of them all.

This is a very auspicious time for me. Because it is so, and because I truly value this Institute as a sterling example and a premier representative of the geosciences profession, I wish the Institute the very best future. I wish my successor, Bob Stewart, every success in the continuing effort to carry AIPG to the next level in its place among the numerous member societies of the American Geosciences Institute.

I will of course maintain my membership with AIPG and hope to continue my service to the Institute for many years. It is not altogether clear that this wonderful honor is deserved, but I accept it with gratitude and utmost humility. Thank you each and all for this singular recognition.

I also wish to publicly acknowledge every one of the AIPG Headquarters staff individually. Wendy Davidson, Assistant Director, without whose competent loyal support AIPG would make significantly less progress; Cathy Duran, Professional Services Manager, who has so successfully built the AIPG seminars program and who continues energetically to promote it; Vickie Hill, Membership Services Manager, who almost single handedly recruits and retains so many enthusiastic Student Members as well as produces TPG; Cristie Valero, AIPG Bookkeeper; Dorothy Combs and Ramona Scott, Administrative Assistants.

I will always remain appreciative of their efforts in support of the AIPG mission and for their support of me.

William (Bill) J. Siok



Lawrence C. Weber, CPG 7120
2014 Recipient of the AIPG
Martin Van Couvering
Memorial Award

Larry Weber was born in St. Louis, MO and at a young age moved to Nashville, TN, where he attended public schools graduating in 1966 from Donelson High School located in the suburbs of Nashville. In 1970 he married his high school sweetheart, Kathy, and they continue to reside in their home community while maintaining close friendships with many of their former classmates. He attended Tennessee Technological University, earning a B.S. degree in Secondary Education with an emphasis in Science and Geography. During later years at TTU, geology became his primary academic pursuit. Part time jobs with various consulting engineering companies and the Corps of Engineers provided funds for college as well as leading to acquisition of technical experience in the fields of civil engineering, surveying and drafting. Before beginning graduate studies at Eastern Kentucky University, he worked a year for a major civil engineering firm in Nashville where his duties involved various engineering calculations, surveying, drafting and field inspections of construction. This exposure to the design and construction industry combined with a passion for geology molded an appreciation for the role of the engineering geologist. After receiving his Masters of Science Degree in Geology, Larry started his professional career in 1974 as a staff geologist with Geologic Associates, Inc., a small but highly respected geotechnical consulting and exploration company. A steady progression of responsibility and broadened experience resulted in election to the company's board and promotion to Vice President. During this time Larry participated as project geologist and/or project manager for

hundreds of geotechnical investigations for a vast array of projects across the nation. Principal among these were numerous studies for the healthcare industry, the automotive industry and the mining industry. Additionally, Larry became prominent as an expert in colluvial soil slope stability and karst issues and has authored several technical papers regarding investigation and repair of landslides and sinkholes. In 1995, he started with his own company Geosciences Design Group, which he sold in 2007 to TTL, Inc. Larry still serves as Principal Geologist with TTL.

At the urging of professional colleagues, Larry joined AIPG in 1986. He served as the Tennessee section president in 1990 and at that time assumed a role of general chairman for the AIPG annual meeting held in Gatlinburg in 1991. From that time on, Larry has worked at the local and national level to advance the AIPG and to promote the ideals of the organization to all practicing geologists. He has served on numerous committees, as national treasurer and national president. He was an early advocate of the Member category of membership in AIPG, which he feels allowed for a broader representation of professionals within the institute and streamlined the membership approval process for those not seeking certification. Most recently he has served on the committee to identify the new Executive Director of the Institute following Bill Siok's retirement. His involvement within other civic and professional groups extends to serving as section officer with AEG, being an active member in GSA and he was part of the first organizing efforts to establish ASBOG as that group began meetings in Arizona. He successfully spearheaded early effort to pass the first geologist licensing act in Tennessee and worked within AIPG in subsequent years to see the law improved. For the past several years he has served on a state committee to help direct the Tennessee Geological Survey's cooperative geologic mapping program. His primary activity within civic organizations is with the national Exchange Club, whose central mission is the prevention of child abuse. After 40 years serving as a consultant to individuals, companies, governments and institutions ranging from the small to large, Larry now finds the most pleasure and reward from consulting with his seven grandkids on matters of rocks and the meaning of life.

**AIPG Graduate
Scholarship
information on
page 53.**

Response

Thank you for this special recognition. I am honored to be a recipient of this award particularly because of the tremendous respect I have for those listed as previous recipients and knowing the tireless efforts they have put forth on behalf of our profession and our institute.

AIPG has been my professional association of choice for many years. I belong to other wonderful groups; but AIPG holds a special place among all those organizations, primarily because I believe in what AIPG stands for. If you look at the AIPG seal, you see three words: Competence, Integrity, Ethics. As I consider this, I am reminded that at the time I was about to assume the role of president of the institute, there was a notion going around that maybe AIPG had out lived its purpose—that maybe it was just not relevant anymore. This was at the time when so much information was coming out in headlines about fraudulent business practices, corruption in government and employees losing faith in large employers such as Enron and WorldCom. So it made me think, how could Competence, Integrity and Ethics lose relevance in a society and economic system where Competence, Integrity and Ethic seemed to be in such short supply and desperately needed. I believed then, and still do, that the purpose and relevance of AIPG will continue for as long as we hold on to those ideals. Current events would have me question whether such qualities are considered universally important. Certainly, they are not being made evident at some of the highest levels of leadership affecting our country and our society. We can make a difference, however, by using every opportunity to demonstrate our commitment to these qualities of professionalism.

I am grateful to the leadership of AIPG for this special honor, and my gratitude extends to the many members, associates and friends that I have been so fortunate to meet and know through my involvement with this institute. A special thank you goes to my wife and family for understanding and helping me throughout my professional career. Thank you to all who serve and contribute to AIPG. You are a great bunch of folks. It has been my sincere pleasure and honor to work with, to learn with, and to enjoy geology with you, my friends. Thank you.

Lawrence (Larry) C. Weber



Richard L. Nielsen, CPG 11459
2014 Recipient of the AIPG
Honorary Membership

Richard was born and raised in Los Angeles, California and grew up with a keen interest in natural science. High school science courses agreed with him and when it came time for college, he chose a nearby school that had a good reputation: Caltech. He received BS and MS Degrees in Geology from Caltech (1955 and 1957 respectively), and a PhD in Geology from University of California, Berkeley (1964). His thesis research was a field study of a complexly deformed and mineralized region in western Nevada. The focus of academic studies was Economic Geology. He worked at several temporary jobs searching for iron ore and coal in Alaska and for gold in Nevada, and taught geology courses for one year at University of Nevada, Reno.

Richard was employed by Kennecott Copper Corporation from 1957 to 1977 and held positions in mineral exploration, ore deposit research and management. Areas of exploration include western North America, Australia and the southwest Pacific region. He was part of a team that made discoveries in Papua New Guinea and Indonesia. Principal fields of research and expertise at Kennecott were geologic and geochemical development of porphyry copper deposits and the tectonic setting of mineral deposits in western North America. Upon returning to Salt Lake City from Australasia he became Chief of Kennecott's Geologic Research Division, part of the Exploration Services Group. They were responsible for technical training of their exploration geologists and carrying out research to improve quality and efficiency of exploration technologies.

Richard joined the uranium exploration team of ARCO from 1977 to 1980 and was Rocky Mountain District Manager and responsible for overseeing

uranium exploration project in the Rocky Mountain region of the US including projects at Grants, New Mexico and in the Wyoming basins, including drilling out the large uranium discovery at Green Mountain, WY.

In 1980 he organized a consulting firm, Geocon, Inc., and was principally engaged by clients to assist in mineral exploration for deposits of gold silver, copper, uranium and other metals. These assignments kept Richard active in western North America and on projects in the Andes of South America. Clients included Hecla Mining Co., Chevron, Homestake Mining, Billiton Minerals, Noranda and many smaller mining firms. His geologic activities at Kennecott and Geocon generated 16 technical publications.

Richard says that he was fortunate to have had the best geologic educational preparation imaginable and a host of mentors in his industrial and consulting experience. He feels it is important to give back to the profession that provided an interesting and rewarding career. Richard is active in professional organizations and served as Councilor and President of the Society of Economic Geologists and was president of SEG Foundation. He helped organize a student research grant program, and was chair of the 1993 SEG meeting. He is a Senior Fellow of the Geologic Society of America and member of numerous other organizations. Richard presently serves on the Board and as Treasurer of the AIPG Colorado Section. He also volunteer at the Denver Museum of Nature and Science letting folks know interesting things about dinosaurs, plate tectonics and geology of the planets.

Response

Thank you members and leaders of AIPG for this honor. This is very special to me as it is recognition from fellow working professional geologists.

Growing up in Los Angeles I was keenly interested in nature and science. Encouraged by my family I did pretty well in high school and when it came time for college I was fortunate to be accepted by a nearby college with a pretty good reputation: Caltech.

I intended to study chemistry, but this all changed when I took physical geology from Robert Sharp. Geology became a passion, especially the field aspects of geology which were a particular focus at Caltech. In those days we were bombarded by stories that the world was running out of resources. That hype

encouraged me to specialize in economic geology and mineral exploration as a means of aiding society while enjoying an interesting profession.

I continued with advanced studies at UC Berkeley and my research had a very strong field component.

How extremely fortunate to begin my career in the mid-1960's, equipped with arguably the best geologic training possible at Caltech and Berkeley, and turned loose into one of the most exciting periods in geology during our life time.

Introduction of plate tectonics in the 1960's helped us understand the regional and world-wide distribution of ore deposits and recognize promising areas for exploration and discovery.

Development of radiometric age dating and stable Isotope geochemistry aided us in understanding the sequential evolution and development of ore systems and interaction with surrounding environment.

Exploration geophysics and advanced drilling technologies allowed us to document the three-dimensional anatomies of ore systems.

Later in the 1970's NASA delivered imaging systems into space and that revolutionized exploration.

The 60's and 70's was a great time to be an exploration geologist and our research on ore deposits helped us to better understand development of ore systems and research at Kennecott helped develop more effective and efficient exploration technology

I think it interesting to note that the Truman administration believing copper companies were realizing obscene profits from the Korean war in the 1950's, introduced a 90 percent excess profit tax on copper production. This policy helped kick-start large and ambitious exploration and research programs. These were business expenses so it turns out that the government was subsidizing ninety cents of each dollar spent on exploration. Results were exploration successes through the years even up to recent discoveries of huge deposits in Arizona, Alaska, Mongolia and the Congo.

My achievements and professional accomplishments in copper companies and as an independent consultant in large part was the direct result of interaction with smart people I worked with.

I had a good share of mentors at Caltech, Berkeley, Kennecott, Anaconda and ARCO. They taught me how to solve problems, and their wisdom provided

guidance and encouraged development of my career. Folks I worked with and/or led were interesting and challenging, and many are life time friends.

Eventually the time comes to give back to the profession that provided an interesting and comfortable life. I became very much involved in affairs of SEG and more recently have helped out with the CO section of AIPG.

Basically, I am an optimist and believe that most people can achieve great things and love what they are doing if they have passion for their chosen craft. Perhaps one of the most enjoyable volunteer opportunities I have been involved with has been to interact with young visitors at the Denver Museum of Nature and Science, talk to them about dinosaurs and help them to understand the history of the earth and the geology of other planets, and perhaps to inject a little passion for science into their lives.

Once again I thank the members and leaders of AIPG of this award and the honor it represents.

Richard (Dick) L. Nielsen



**Simon Winchester,
2014 Recipient of the AIPG
Outstanding Achievement Award**

Simon Winchester studied geology at Oxford and has written for many books which focus the reader's attention on geologists and the study of earth science. *The Map that Changed the World* is a terribly sobering book and best seller about the early English geologist William Smith and his map of Great Britain. *Krakatoa* was a best seller about the famous volcano and *A Crack in the Edge of the World* describes the San Andreas fault and earth movements in San Francisco and along the California coast. Each of these have both been New York Times bestsellers and appeared on numerous best and notable lists, bring-

ing positive attention to geologists and the study of the earth. The books have been accessible to geologists and layman alike, as the author writes in a smooth and easy to read style. Mr. Winchester was made Officer of the Order of the British Empire (OBE) by HM The Queen in 2006. He lives in Massachusetts and in the Western Isles of Scotland. He is currently on tour for his newest book, *The Men Who United the States*.

AIPG Section Leadership Award

The purpose of the AIPG Section Leadership Award is to recognize one or more of our members who have demonstrated a long-term commitment and have been long-term contributors to AIPG at the section level. AIPG has many sections where one or more individuals have demonstrated exceptional leadership for their section and in many instances kept the section together and moving forward. These individuals are commonly not known at the National level or by AIPG members outside of their sections, however, their contributions have been vital to their sections and they perform this work because of their commitment to our profession and AIPG.

Recipients of the 2014 AIPG Section Leadership Award



**Dave A. Sadoff, CPG-9933
California Section**

Dave Sadoff, a CPG, has been either vice president or president or other advisor to the California Section for the past 10 to 15 years. During that time, he has been a delegate at the national meetings, and served two terms on the National AIPG Advisory Board, giving up his time freely for the organization. He has participated in several of the Sacramento Drive-In meetings over the years. Of great value for the California

Section, Dave has been a science fair judge. He has taken care of attending and arranging for additional judges and the awards for the annual California State Science Fair in the California State Science Center in southern California. This has been an annual event. He has been going to these fairs, taking a day off of work each year, and participating as a judge and encouraging students in the earth sciences. This effort is important, and he usually writes up the event for *The Professional Geologist* magazine. He has also helped mentor students at the UC Davis AIPG Student Chapter section meeting a few years ago by leading a round-table discussion about his career as a geologist with a major insurance company and some of his projects. Dave exemplifies the conscientious professional geologist in California, and he is deserving of a Section Leadership Award.

**Nominated by
James A. Jacobs, CPG-7760**



***Douglas C. Peters, CPG-8274
Colorado Section***

I am nominating Douglas C. Peters, CPG-8274, for the Section Leadership Award. Doug has been a key member of the Colorado Section for many years. He has served on the Section Executive Committee in almost every position including Section President. He is currently the Section Editor responsible for compiling the quarterly Colorado Professional Geologist. For many years Doug has maintained a Section email list and sends out messages on upcoming meetings for local geological groups, field trips, short courses, posts job information, and other section news. These emails come out every other week or so and are a very useful means of keeping track of what is going on in Colorado's geoscience community.

**Nominated by
David M. Abbott, Jr., CPG-4570**



***Glen L. Faulkner, CPG-635
Georgia Section***

Glen is a charter member of AIPG. He moved to Atlanta in 1990 and since 1994 he has been an office of the Georgia Section as Treasurer. He recently retired this year as Treasurer after 20 years. Glen would help in organizing all of our field trips and meetings. He is a regular that would attend and assist in any way. Glen always was the member the other officers would go to when asking about what we should spend limited funds on or if we had questions on activities we should undertake. Glen has never been active at the national level and is well deserving of this recognition.

**Nominated by
Ronald J. Wallace, CPG-8153.**



***Martin J. Hamper, CPG-10250
Illinois/Indiana Section***

I submit my full support of Martin (Marty) Hamper for consideration to receive the AIPG Section Leadership Award. I currently serve as President of the Illinois/Indiana Section of AIPG, where Marty's influence and dedication spans over 16 years and has helped create a thriving organization that allows us to increase our offerings to students, young professionals, and our core of practicing professional geologists.

While many of our section members contribute to the success of AIPG at the

section level, only a small portion move on to seek positions within the national organization. In addition, some of these contributors prefer to operate at a local level where they can operate in a more personal way that is closer to their clients and peers. This award provides a mechanism for AIPG national to recognize the high-performing contributors at the Section level. Marty Hamper embodies the spirit of this award and is my nominee for the inaugural award. Following are some of Marty's key contributions to the Illinois/Indiana Section.

- Martin J. Hamper (CPG-10250) became a Certified Professional Geologist in 1998.
- To assist in development and promulgation of new laws in Illinois that regulate the practice of geologists, the Illinois Chapter of the IL/IN Section of AIPG was created. Marty was a founding member of this Chapter and successfully navigated the bureaucracy and aligned multiple stakeholders in the push to establish Geology as an Illinois licensed profession.
- In 2002, Marty became president of the Illinois Chapter of the IL/ IN Section of AIPG. At that time he was appointed to serve as the registered lobbyist and continued to serve in this important role promoting the interests of Illinois geologists until 2009. In 2009, new lobbying laws established new reporting requirements that made it too difficult to maintain a lobbyist within our section.
- Over the years as a lobbyist for the Chapter, Marty worked to get state regulations and state legislation passed on behalf of Illinois Professional Geologists and student geologists.
- Marty had a significant contribution to the passing of Senate Bill 1968 that included Geologist in the laws for the Site Remediation Program and the Underground Storage Tank Program for the Illinois Environmental Protection Agency, and House Bill 3158 that extended the sunset for the Professional Geologists Licensing Act through 2016. He helped promote House Bill 4762 allowing Geology students to take the fundamentals exam in their senior year at college, and supporting increasing funding for the Central Great lakes Geologic Mapping

Coalition in the House Interior and Environment Appropriations Bill to \$5 million in FY2008 and FY2009.

- He has served the IL/IN Section for a number of years in several offices, including President in 2007. Under Marty's leadership, the Section flourished and gained new leaders and new members. The Section has become a vibrant organization with networking and business opportunities for its members.
- Marty's work for AIPG has focused on local issues affecting professional geologists and geology students. Marty received a Service Award from the AIPG IL/IN Section in 2007 in recognition of exemplary service to the profession of geology.
- Marty is a frequent contributor to the AIPG IL/IN Section newsletter on regulatory, legislative, and geological issues.
- Marty continues to serve as an AIPG IL/IN Section advisory board member and is spearheading a fund-raising campaign to establish capital that can be used to support the lobbying campaign needed to make sure that the Professional Geologist Licensing Act does not get repealed, as scheduled, on January 2016.

In summary, Marty has a 16 year record of contributions to the success of AIPG and the profession of Geology at the section level. I believe that Marty personifies the spirit of the AIPG Section Leadership Award and is a perfect candidate for this award in its inaugural year. His contributions and achievements have been critical to the success of the AIPG IL/IN Section.

**Nominated by
Jeffrey M. Groncki, CPG-11118**



Adam W. Heft, CPG-10265
Michigan Section

The AIPG Michigan Section Executive Committee, supports the nomination of Adam Heft, CPG-10265 for the AIPG Section Leadership Award.

Adam has shown outstanding dedication to AIPG and, in particular, the Michigan Section and has the unanimous support of the executive committee for this award. Adam has continuously held leadership positions in the Michigan Section and has ongoing involvement with the executive committee is highly appreciated. Adam doesn't advertise his achievements; however, over the years, his efforts have directly and indirectly led to significant improvement in the Section's finances, achieved, in part by as dedication to presenting cutting edge information at well attended annual workshops. It was Adam's leadership that was instrumental in executing the successful 2007 AIPG National Meeting in Traverse City.

Adam has also provided leadership in the day-to-day operation of the Michigan section, volunteering for numerous committees, organizing many section field trips, and volunteering to man registration tables and assist in numerous ways during our many member events. Somehow, Adam has also found time to demonstrate his love of geology by assembling and proudly displaying a collection of rock cores for the entire Michigan Stratigraphic Sequence.

As the Michigan Section newsletter editor, Adam has acquired a great deal of historical knowledge of past AIPG events and issues, and is a very important resource and point of continuity that helps anchor the section as executive committees change over the years.

As a fourth year executive committee member, and this year's president, I have come to realize how much of a key role Adam plays within our section, and I would personally be at a loss to smoothly maintain Section operations without his help and selfless service.

If anyone represents the spirit behind the intent of this award, it is Adam Heft, and I, along with the rest of the executive committee, whole-heartedly endorse his nomination.

Nominated by
Craig A. Savage, CPG-8052
Dawn L. Prell, CPG-11222
Brian F. Burke, CPG-10546
Linda M. Hensel, CPG-9867



Gary H. Haag, CPG-7667
South Dakota Section

It is my pleasure to nominate Gary H. Haag, CPG-7667 for the AIPG Section Leadership Award. Mr. Haag is a longtime member and leader of the South Dakota Section of AIPG, and he exemplifies the qualities and activities that are recognized through this award.

The AIPG South Dakota Section has had a long and varied history which reflects many of the challenges that commonly confront Sections in geographically large states with relatively low populations. At one point following a steady decline in membership participation, there were only a handful of members keeping the Section active, of which Gary Haag was one. For many years Gary served in a variety of officer positions for the Section including President, Secretary/Treasurer, and Chair of several Section committees. His efforts were critical in keeping the South Dakota Section from becoming dormant, and through the efforts of Mr. Haag and a few other active members, the decline in membership and participation was reversed. Since that low point in Section activity, thanks in part to the perseverance and contributions of Mr. Haag, the AIPG South Dakota Section has recently surpassed 75 participants including CPGs, Members, Young Professional Members and Student Members. Remarkably, Gary still serves as Secretary/Treasurer for the South Dakota Section, and he continues to contribute his time and efforts for the growth and benefit of the Section. As an example, he recently participated in a multi-agency effort to design, construct, and install a geologic roadside display along the route to Mount Rushmore in the Black Hills, and he is an active participant in almost every Section field trip, activity and meeting.

In short, Gary Haag has been a pillar of the AIPG South Dakota Section for many years, providing support and leadership under any circumstance, and he is a large factor in the success that

the Section is experiencing at present. Mr. Haag embodies the ideals that are intended for recognition through this award.

**Nominated by
J. Foster Sawyer, CPG-10000**



**Andrew B. Graham, CPG-9035
Wisconsin Section**

On behalf of the Wisconsin Section of the AIPG, I would like to formally nominate Andrew Graham, Past Section President for the AIPG Section Leadership Award.

Andy has been active in the Wisconsin Section since the 1990s! He's helped the Section: organize field trips, Geology Day at the capitol, the National AIPG conference in 2000, licensing geologists in Wisconsin, creating power point presentation for college geology students and annual dinners and presentations to our members.

He taught me the ropes of being the Section President three years ago, and he still calls into our monthly meetings to provide advice and support. He participates in Section events enthusiastically and encourages all of us to try new things. We would not be an active section anymore, if it would not have been for Andy's continued help.

**Nominated by
Christine F. Lilek, CPG-10195**

AIPG Honors and Awards nomination form can be found on page 44.

Presidential Certificate of Merit

Each year, the AIPG President may award one or more certificates of merit to individuals who, through dedicated and meritorious service, have made an outstanding contribution to the Institute.

Recipients of the 2014 AIPG Presidential Certificate of Merit

Dorothy K. Combs-For exemplary service to AIPG as the first point of member contact and dedicated support to the Foundation of AIPG.

Wendy J. Davidson-For her unwavering dedication and service through excellence in management and organization of AIPG and office staff.

Cathy L. Duran-For exemplary service to AIPG coordinating AIPG conferences and seminars.

Vickie L. Hill-For exemplary service to AIPG in the advancement of building membership, student chapters, and section activities.

Mona J. Scott-For her dedicated administrative support to AWG and assistance to AIPG.

Cristie J. Valero-For exemplary service to AIPG in maintaining fiscal responsibility, integrity, and efficiency throughout AIPG.

Student Chapter of the Year Award

The purpose of the AIPG Student Chapter of the Year Award is to recognize the most outstanding student chapter for their participation in, and contribution to, the American Institute of Professional Geologists.

Recipient of the 2014 AIPG Student Chapter of the Award

Columbus State University,
Columbus Georgia, Founded in 2011

AIPG Honors and Awards Committee

Brent E. Huntsman, Chairman
John L. Bognar
Richard M. Powers
Daniel J. St. Germain

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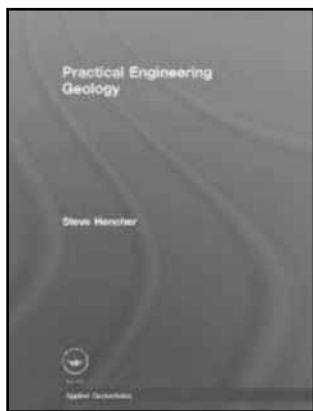
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Phone: 1-800-365-3246
Fax: 303-488-3636

The Reading Geologist

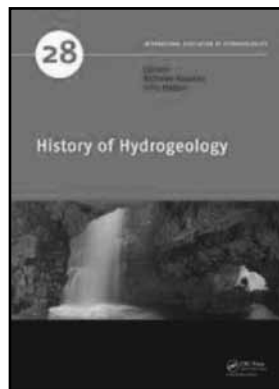
Jim Jacobs, CPG-7760

Part of being a professional geologist is keeping up with the latest technical literature. This article is a series of five brief reviews of books published over the past year or so that geologists might find useful in their practice. The books range from practical applications for practicing professionals (*Practical Engineering Geology, Hydrogeological Conceptual Site Models: Data Analysis and Visualization and Urban Storm Water Management*) to historical and introspective (*History of Hydrogeology*) to eco-philosophical (*Sustainable Development as a Civilizational Revolution: A Multidisciplinary Approach to the Challenges of the 21st Century*). Please email me if there are books that you would like to be reviewed, jjacobs@clearwatergroup.com.



Practical Engineering Geology (part of the Applied Geotechnics Series) by Steve Hencher promotes the concept that to be on top of one's game, one must have practical and varied professional experience enhanced by learning through the experience and lessons learned from others. After a career as an engineering geologist, international consultant, Research Professor of Engineering Geology at the University of Leeds in the U.K., Hencher has penned a book that provides insights for students, young professionals and seasoned pros working in engineering geology. He describes many project management issues, including subsurface sampling methods, geologic materials and other topics common in engineering geology.

Few equations exist in this book, which is acceptable for its purpose, as there already are many analytical textbooks and that is not the author's focus. However, this book might be appropriate for a college course as recommended additional reading. The value for North American geologists in particular, is that examples from locations such as Hong Kong, UK, Portugal, Korea, Australia, and South Africa provide international engineering insights. Practical solutions and example methodologies are provided to address engineering geology challenges that practitioners can apply elsewhere. This book offers innovative solutions and is highly recommended for engineering geologists who would like to gain an understanding of geo-engineering challenges encountered in many parts of the world. (*CRC Press; 2012, 450 p.; hard cover*).

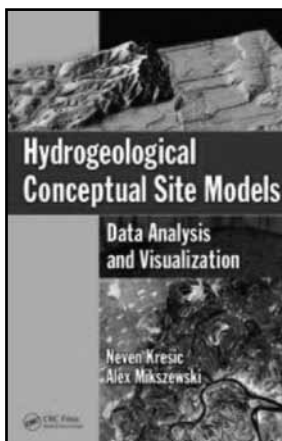


History of Hydrogeology, edited by Nicholas Howden and John Mather provides the historical perspective of the science back to the early practice of hydrogeology. The book is organized in a series of 21 chapters relating to country of origin, written by practitioners in those locations. The information is presented in three parts for each of countries covered: Part 1: The pre-1800 portion examines the early development of hydrogeology on a unified historical basis; Part 2: 1800-1980 evaluates key hydrogeology ideas and how these concepts developed in the various countries in response to local and political pressures on a country-wide or regional basis. Part 3 highlights some

of the crucial developments in various sub-disciplines within hydrogeology. Descriptions include numerous European nations, most notably UK, France and Germany. Asian countries with varied groundwater use and sophistication levels also are described, including Japan, China and India, each chapter with a slightly different focus. With the exception of South Africa, the history of hydrogeology does not cover Africa, the Middle East, and South America. Australia's rich hydrogeology heritage is described in detail, starting from the influx of European settlers in 1788 who quickly recognized that water was, and is, a key resource on that dry continent. The island hydrogeology of Bermuda and West Indies also is included. The American hydrogeology experience is captured in the chapter "A history of hydrogeology in the United States Geological Survey 1850-1990," written by Joseph S. Rosenhein and John E. Moore. Among the other notable U.S. scientists described in the article include such names as Chamberlin, Gilbert, Meinzer, Theis, Jacob and Todd. In addition to hydrogeologists, science historians may enjoy the range of stories of hydrogeology as it evolved and developed in a country or region. For those interested in the history of hydrogeology in specific countries, this book provides insights for specific countries and would be useful for those traveling overseas or working on a project in one of the featured countries. (*CRC Press; 2013, 406 p.; hard cover*).

Hydrogeological Conceptual Site Models: Data Analysis and Visualization by Neven Kresic and Alex Mikszewski provides a roadmap with over 500 color illustrations to demonstrate how to prepare accurate, comprehensive conceptual site models and how best to convey the associated hydrogeological data. Dr. Kresic is a hydrogeology practice leader at an engineering and consulting firm and Mr. Mikszewski is a licensed professional engineer at an engineering contracting firm. The objective of conceptual site models is to convert volumes of data and create useful geologic information to convey complex hydrogeological

processes in a simple and straight forward manner. The authors acknowledge that the process of data analysis, data visualization and development and refinement of the conceptual model is iterative. The conceptual site model development process starts with understanding the subsurface and conditions, which are described in the book using numerous examples and case studies from actual projects. The book includes instructive, step-by-step techniques for data visualization with GIS, geospatial data analysis and processing, and contouring (kriging) using commercially available software. Groundwater modeling, 3D graphics and animations are

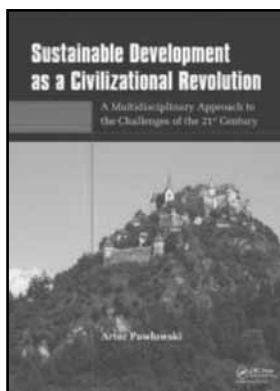


described, and the book includes a companion DVD containing 3D animations, extensive reference materials, example problems, and modeling software. The book, a practical reference for generating informative graphics for applications in hydrogeology and groundwater remediation, contains hundreds of maps, cross-sections, and other subsurface imagery that comprise a virtual atlas of conceptual graphics and visualization tools for application in regulatory negotiations, policy evaluations, public meetings, or litigation support. (CRC Press; 2013, 600 p.; hard cover).

Multidisciplinary teams are needed to overcome the challenges of urban environments. The field of urban stormwater management continues to provide opportunities where geologists can contribute their knowledge and experience in liquid flow, drainage, percolation, recharge basins and water treatment, as part of that team. *Urban Storm Water Management*, by Hormoz Pazwash, Ph.D., is a practical guide for addressing stormwater management. For various reasons, many urban centers are



being inundated by stormwater due to improperly sized drainage systems, retention basins and percolation ponds. This book describes the issues of urban development and the natural processes of storm water runoff, and includes dozens of design procedures, real-world problems and case studies. Containing 280 black and white illustrations, the book contains several case studies to illustrate extended detention basins, infiltration basins, and underground retention/infiltration basins. Intended as text book or reference for practicing professionals, the book discusses stormwater management in practice and in regulation, and includes identifying shortcomings and providing suggestions for improvement. Recent methods of managing urban stormwater include porous pavements, rain gardens, green roofs and other systems which are becoming increasingly popular and are forming the future of stormwater management and green architecture. This volume also promotes a rethinking of stormwater; not simply as a design element to manage, but as an effective, cost-efficient, conservable and reusable source of water. Web-based downloads from the publisher offer additional appendices associated with the book. (CRC Press; 2011, 534 p.; hard cover).



Some geologists are involved with sustainable development issues such as land use, resource allocation, ecosystem restoration, water conservation, energy and mineral extraction, waste disposal and recycling. These are professional practice areas where some earth scientists have the knowledge and training to contribute to the solutions of these large-scale challenges. *Sustainable Development as a Civilizational Revolution: A Multidisciplinary Approach to the Challenges of the 21st Century* represents a bold concept in which author Artur Pawlowski, Ph.D., D.Sc., argues that sustainable development is the fourth major human revolution after the agricultural, scientific and industrial revolutions. Enthusiastic in his writing, Dr. Pawlowski is a faculty member in the Environmental Engineering Department at Lublin University of Technology in Lublin, Poland. Owing to his cultural background and experiences in Europe, U.S. readers likely will find his views on eco-philosophy interesting and possibly phrased differently than would be expressed on this side of the Atlantic. The idiosyncratic book focuses on sustainable development, which the author presents as being in conflict with traditional development that is based on economic growth. Dr. Pawlowski describes the international initiatives developed for sustainable development and the protection of the environment. He reviews the modern history of sustainable development starting in the early 19th century to more recent initiatives for encouraging a sustainable world-wide human relationship with the environment through the founding of the United Nations and UNESCO in 1945. The author argues that many environmental and ecosystem restoration issues cannot be solved solely by technical means, without considering the economic, social, ethical, political or environmental aspects and costs. The process of sustainable development attempts to formulate a program that integrates these related values, which usually were/are considered separately and frequently are not factored during the remedy selection of environmental projects. The author suggests creating the vision of a sustainable future, and working backwards to achieve that goal. This book would be interesting to those exploring the concept, history, and various aspects of sustainable development. (CRC Press; 2011, 229 p.; hard cover).

Mines Receives Gift of Gulf of Mexico Seismic, Geophysical Data

RAPID CITY, S.D. (Aug. 7, 2014) – The Department of Geology & Geological Engineering at the South Dakota School of Mines & Technology has received a gift of digital seismic and well log data from TGS, a global multi-client geoscience data provider.

The 2D and 3D seismic data and digital well log information covers over 3,000 square miles in the Gulf of Mexico and will be used to develop training exercises for students preparing to enter the petroleum industry. Students and faculty will analyze the data through a \$49 million gift of Petrel software received from Schlumberger in 2012.

Analysis of the data and development of training exercises are expected to take six to nine months, although students can begin using the data immediately in their petroleum-related coursework.

“When we explore for oil, the most powerful method is evaluation and interpretation of seismic and geophysical well log data. This area in the Gulf of Mexico is geologically complex, and it will give our students excellent experience in processing and interpreting raw data,” said Foster Sawyer, CPG-10000, Ph.D., associate professor in the Department of Geology & Geological Engineering, who will manage the use of the data and software.

“Students will be able to make interpretations regarding subsurface structures and to develop models regarding oil migration and accumulation in that portion of the Gulf. This is state-of-the-art data in an extremely interesting area, and the experience of working with these data will put our students in a different league when it comes to landing industry jobs,” Sawyer said.

The South Dakota School of Mines & Technology also has launched an Energy Resources Initiative, which includes a new minor in Petroleum Systems and expanded research in the fields of petroleum exploration and production.

Editor’s note: Dr. Foster Sawyer is the 2015 AIPG National President.

Arizonan Steven Maslansky receives NGWA’s Life Member Award

(WESTERVILLE, OH — September 22, 2014) Steven P. Maslansky, PG, CPG-4431, of Maslansky GeoEnvironmental in Prescott, Arizona, has received a Life Member Award from the National Ground Water Association for his special service in the furtherance of the groundwater industry.

The award will be presented in December at the 2014 NGWA Groundwater Expo and Annual Meeting in Las Vegas.

Maslansky has been a pioneer in the area of health and safety in segments of the groundwater industry ranging from groundwater scientists and engineers to drilling contractors at both environmental and water supply drilling sites. He was among the first to conduct intensive 40-hour hazmat training programs designed specifically for those in the groundwater industry while meeting the federal statutory requirements.

Within NGWA, Maslansky was actively involved in the drilling demonstrations and related presentations at the Association’s Outdoor Action Conferences as well as the eight-hour HAZWOPER refresher classes conducted at NGWA’s Groundwater Expo and Annual Meeting.

A long-time NGWA member, Maslansky has served on the NGWA Safety Subcommittee and Professional Development Committee. He has assisted in the production and editing of many of NGWA’s safe-practice products including the Model Environmental Health and Safety (EHS) Manual and Safety Meetings for the Groundwater Industry.

Maslansky has taught more than 70 courses, including 60 week-long health and safety at hazardous waste site courses.

NGWA Announces 2014 Award Winners

(WESTERVILLE, OH -- August 7, 2014) The National Ground Water Association congratulates the recipients of its 2014 Awards of Excellence, Outstanding Groundwater Project Award, and Divisional Awards, which will be presented this December during the NGWA Groundwater Expo and Annual Meeting in Las Vegas, Nevada.

Long-time NGWA member W. Richard Laton, Ph.D., PG, CHG, CPG-10544, has received the Association’s top honor as the recipient of the Ross L. Oliver Award for outstanding contributions to the groundwater industry. Laton is an associate professor of hydrogeology at California State University, Fullerton.

The other 2014 NGWA award recipients follow.

Awards of Excellence

- Fred Molz, Ph.D., research professor and distinguished scientist emeritus at Clemson University, Anderson, South Carolina -- M. King Hubbert Award for major contributions to groundwater science
- Henry Baski, Baski Inc., Englewood, Colorado; Richard Henkle, Garden City, Kansas; Steven P. Maslansky, CPG-4431, Maslansky GeoEnvironmental, Prescott, Arizona -- Life Member Awards
- James Rumbaugh, Environmental Simulations Inc., Reinholds, Pennsylvania -- Technology Award
- The late Ralph Cadwallader, Loop Tech International Inc., Crabbs Prairie, Texas; Miami Conservancy District, Dayton, Ohio -- Special Recognition Awards
- U.S. Senator Rob Portman (R-Ohio) -- Groundwater Protector Award
- Beverly L. Herzog, Flower, Illinois -- Standard Bearer Award

Outstanding Groundwater Project Award

- Essential Management Solutions LLC, former Herington, Kansas, Army Air Base Project -- Groundwater Remediation Award

Divisional Awards

- Paul Barlow, Ph.D., U.S. Geological Survey, Northborough, Massachusetts, and Stanley Leake, U.S. Geological Survey, Tucson, Arizona -- John Hem Award for significant scientific or engineering contributions to the understanding of groundwater
- W. Richard Laton, Ph.D., PG, CHG, CPG-10544, California State University, Fullerton, Santa Ana, California -- Keith E. Anderson Award for outstanding contributions to NGWA’s Scientists and Engineers Division
- Kris Jackson, Pentair, Delevan, Wisconsin -- Manufacturers Division Special Recognition Award

- Mark Durham, Gicon Pumps & Equipment Ltd., Abernathy, Texas -- Supplier of the Year Award

Groundwater Industry's Emerging Leaders Awarded NGWREF Honors

(Westerville, OH — August 26, 2014) The National Ground Water Research and Educational Foundation congratulates those chosen to attend the Emerging Leaders Alliance Conference taking place November 10-12, 2014 in Reston, Virginia.

The Foundation believes continuing education in leadership skills will enhance the future effectiveness of the groundwater professions and will maximize the impact of groundwater for society. Emerging Leaders Alliance Conference attendees will experience a week of tuition-free presentations such as those on global and virtual team leadership, managing change, and powerful practices for leading innovation, among others — all important aspects to help move the groundwater industry forward.

The winning National Ground Water Association members were selected based on their commitment to the groundwater industry and their potential to lead the industry into the future. Those chosen are:

- Mark E. Chandler, PE, CRS Engineers, Salt Lake City, Utah
- Dustin Kinder, Andrews & Foster Drilling Co., Athens, Texas
- Michael J. Schnieders, PG, PH-GW, Water Systems Engineering, Ottawa, Kansas
- Molly Sherwood, SA-3800, Kent County Department of Public Works, Grand Rapids, Michigan
- Brian M. Snelten, PG, Layne Christensen Co., Aurora, Illinois
- Eric Swanson, LAKOS Separators and Filtration Systems, Fresno, California.

“The Foundation’s initial class is indicative of the quality of the industry’s professionals early in their careers,” said NGWA and NGWREF CEO Kevin McCray, CAE. “These Foundation awards are an investment in making people better so they will advance the professions and continue to make other people better, as well.”

These individuals, their companies, and the groundwater industry as a whole will benefit from the skills gained from this conference.

Dr. David R. Wunsch Recognized by The American Geosciences Institute For Outstanding Contributions to the Understanding of Geoscience

Alexandria, VA - This year the American Geosciences Institute is recognizing David R. Wunsch, MEM-0147, Ph.D. with its Outstanding Contribution to the Understanding of Geoscience award. Through numerous outreach efforts, such as helping New Hampshire residents understand the collapse of the “Old Man on the Mountain,” educating the U.S. public on the importance of groundwater and helping support the authorizing of the SECURE Water Act, his accomplishments have been numerous and valuable to the U.S. public interest.

Wunsch became the State Geologist of New Hampshire in 2000, and over the next decade he grew the survey tenfold both in personnel and in budget.

His implementation of the state geological mapping program led to many partnerships that brought critical local geologic information to residents. He turned events such as the devastating loss of a state’s natural symbol, the Old Man on the Mountain, and an avulsion brought on by an extreme rain event, into opportunities to educate and bring government officials, and the general public, into the field. His efforts working with the state legislature led to increased public support to protect New Hampshire’s unique geological features from defacing and vandalism.

His major effort has been helping the U.S. public understand the important role groundwater plays in supporting U.S. society. He helped found a federal-level committee on the subject, and served as the Director of Science and Technology for the National Groundwater Association (NGWA), a then-AGI federation member.

His efforts supporting the SECURE Water Act, signed into law by President Obama, resulted in the initial phase of the National Ground Water Monitoring Network which currently has network of 2806 wells from 29 states representing 49 principal aquifers.

This award is presented to a person, organization, or institution in recognition of an outstanding contribution to the public understanding of geoscience. The contribution may be in geoscience or how geoscience relates to economic or environmental aspects of modern civilization. The award may be given to a geoscientist, non-geoscientist, or to an organization or an institution that is geoscientific or non-geoscientific in character.

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AIPG and The Professional Geologist – Purpose and Peer Review Procedure

On September 12, 2014, at this year's annual meeting in Prescott, Arizona, AIPG's Executive Committee approved the following policy concerning the peer review process for *The Professional Geologist (TPG)*. The policy was issued in draft form on April 21, 2014, and was written by:

Robert A. Stewart, Ph.D., AIPG National Editor
Raymond W. Talkington, Ph.D., AIPG President, 2014
J. Foster Sawyer, Ph.D., AIPG President-Elect, 2015
William J. Siok, AIPG Executive Director

This written policy formalizes the process that has been in place since 1996 for technical articles. We have also posted the policy to www.aipg.org.

AIPG and *The Professional Geologist* – Purpose and Peer Review Procedure

The American Institute of Professional Geologists (AIPG) was formed in 1963 by professional geologists mainly in the petroleum and mining industries. The unifying purpose of AIPG was, and continues to be the strengthening of geology as a profession. The principal credential of AIPG is Certified Professional Geologist (CPG), which is granted after thorough peer review of (1) education; (2) professional experience; and (3) sponsors who attest to the applicant's professional conduct.

AIPG members are expected to comply with AIPG's code of ethics, which is enforced by formal disciplinary procedures.

There are presently over 6,000 members of AIPG in the United States and internationally.

AIPG has published a news magazine, *The Professional Geologist (TPG)*, since 1991, which incorporated a formal peer review process in 1996 for technical articles. The *TPG* peer review process is comparable to that used by academic geoscience journals. AIPG's national editor reviews each submittal, which is then forwarded for peer review by associate editors with appropriate subject matter expertise in respect to the submittal. Based on the peer review process, the articles are accepted following revision, or rejected, with a written statement for the decision. AIPG's associate editors include college and university professors, Ph.D. research geologists employed by state and federal agencies, and technical experts from private industry with qualifying skills obtained through professional practice.

AIPG invites submissions to *TPG* from students and professional geologists, and in this respect is the same as mainstream academic journals. *TPG's* target audience differs in that most readers are not academic practitioners, although the publication standards are equivalent to its academic counterparts.

Sneak Peek Student Issue of *TPG*

The Value of Professional Internships

Personal Opinion-Get the “Frac” Out of Here

A Study to Compare Hurricane Impact and Recovery, Santa Rosa Island, FL

What to Expect in Your Career

Getting Prepared for Life and Career- A Brief Memoir

Realistic Advice for the New Geologist

When Teaching Meets Learning: The Role of a Graduate TA

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AIPG National Scholarship Program

**Deadline
February 15th**

American Institute of Professional Geologists



**Awarded the month of
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Basis of Awards

Awards will be based on the cover letter, transcripts, and letter of recommendation as judged by the Education Committee.

The decisions of the Education Committee are final.

Purpose

To assist students with college education costs and to promote student participation in the American Institute of Professional Geologists (AIPG). Up to ten scholarships have been awarded to declared undergraduate geological sciences majors who are at least sophomores.

Scholarship Awards

Scholarships awards in the amount of \$1,000 each will be made to eligible students attending a college or university in the U.S. Scholarships are to be used to support tuition and/or room and board.

Eligibility Requirements

Any student who is majoring in geology (or earth science), is at least a sophomore, and is attending a four-year accredited college or university in the U.S. can also apply. Also, the student must be either a student member of AIPG or must have applied for student membership at the time the application for the scholarship is submitted.

Each student that is awarded a scholarship agrees, by accepting the scholarship, to prepare a 600 to 800 word article for publication in *The Professional Geologist*. The subject of the article must be related to a timely professional issue.

Application Process

Submit a cover letter introducing yourself and tell us what you have done outside of the class room such as research projects, officer in club, or outside activities within the community. Address your career goals in near term and longer term. Submit an essay on "Why I Want to be a Geologist." Submit a copy of your transcript (unofficial) and documentation that you are a current student. Requisite standards to apply are a minimum GPA of 2.8 (on a 4 point scale) and a minimum of 12 semester credits of geology/geoscience courses with a 3.0 GPA in these courses completed at time of application. Submit a letter of recommendation from a geology/geoscience professor that provides an emphasis on your performance and activities in the classroom, in the department, and your character in how you work and help other students.

AIPG
Attn: Education Committee Chr.
12000 Washington St., Suite 285
Thornton, CO 80241



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Competence... Integrity... Ethics

AGI Welcomes Dr. Eric Riggs as Executive Committee President

Alexandria, Va. - The American Geosciences Institute welcomes Dr. Eric M. Riggs as its President for the 2014-2015 year. With him, Riggs brings a passion for geoscience, geoscience education and the desire to create an inclusive and diverse geoscience community.

"One of the outcomes of my term as President, I hope, will be a renewed focus on the future of the Geoscience workforce, especially related to diversity and inclusion," Riggs said. "Given the large projected workforce shortages by AGI and others, we now more than ever need to refocus and redouble our efforts as a community to attract and retain talent from all segments of our society."

Riggs has had a distinguished career in geoscience education. As the President of AGI Member Organization the National Association of Geoscience Teachers (NAGT), Riggs worked with AGI for the first time by participating as a representative to the AGI Member Society Council. His research teams have brought in a combined total of \$10.3 million over his career trying to better understand the cognitive processes of how students learn geoscience concepts, and issues related to recruitment and retention of a diverse population within the geosciences. He has been invited to speak at events hosted by the AGI member organizations Geological Society of America, the American Geophysical Union, NAGT, and multiple universities.

Leadership roles and work within AGI member organizations have helped Riggs gain a robust knowledge of the organizations that make up the AGI federation; valuable information for his presidency. "Many member societies have outstanding programs moving in the direction of reaching out to ethnic and cultural minority communities, attracting and retaining women and broadening participation of individuals with disabilities. The role of AGI can and should be to coordinate the leaders of these programs to make sure that as a community we are doing everything we can; placing resources and effort where it will be most effective."

Riggs is currently the Assistant Dean at Texas A&M University, as well as a Research Associate Professor at the Department of Geology and Geophysics. He has previously been affiliated with

Purdue University, Indiana University, and San Diego State University.

AGI Welcomes New Leadership

Alexandria, VA - The American Geosciences Institute cordially welcomes new officers from the 2014-2015 year: Dr. Scott Tinker as AGI President-Elect, Mr. William Siok as Secretary and Dr. Paul M. Bertsch as the Member-At-Large.

Dr. Scott Tinker, CPG-10564, was the 2013 AGI Awardee for Outstanding Contributions to the Understanding of Geoscience, namely for his work on the documentary *Switch*, co-produced with Harry Lynch as part of the *Switch Energy Project*. Tinker is actively engaged in building bridges between academia, industry, and government.

In 2000, after 17 years in the oil and gas industry, Tinker joined the University of Texas at Austin, where he holds the Allday Endowed Chair in the Jackson School of Geosciences. He has given more than 500 invited and keynote lectures and visited nearly 50 countries. Dr. Tinker is the Director of the Bureau of Economic Geology and the State Geologist of Texas, and a past President of the American Association of Petroleum Geologists and the Association of American State Geologists.

Mr. William Siok, CPG-4773, recently retired as the Executive Director of the American Institute of Professional Geologists, a position he held since 1999. His role as Executive Director had him organizing, running and implementing the decisions of Executive Committee and Advisory Board.

Prior to being the executive director he was in hydrogeology, environmental engineering and waste management for over 40 years. Siok then pursued non-profit management which included fiduciary, personnel, technical, training, and regulatory responsibilities for the geosciences and the profession.

Dr. Paul Bertsch has experience with many AGI Member Organizations including the Clay Minerals Society, a Past-President of the Soil Science Society of America, the Geochemical Society, and the American Geophysical Union. He also has volunteered directly with the National Academy of Sciences, the National Science Foundation and the Department of Energy. He is a noted scholar in soil and environmental chemistry and is professor of environmental chemistry and toxicology at the

University of Kentucky. He also currently serves as the Deputy Director of Science for the Land and Water Flagship at the Australian national research agency, CSIRO.

The Geoscience Community Honors the Man Who Shook Up Earthquake Science

Alexandria, VA - The American Geosciences Institute is honoring one of the scientists who advanced earthquake hazards preparedness and mitigation in the U.S. by his superlative service to the earth sciences. This year's recipient of the Ian Campbell Medal, Dr. James "Jim" Davis, is one of the key scientists behind U.S. earthquake hazards and loss reduction policy as it is known today.

He also has helped to shape how geoscientists communicate with the public to help people better understand the seismic environment they live in.

Davis has been a State Geologist of not one, but two states, and has the distinction of being the longest serving State Geologist in California history; a tradition started in 1850.

His career started in New York with the New York State Geological Survey. There, he demonstrated the importance of using geology and seismology in siting of nuclear power plants and nuclear waste-disposal facilities, as well as publishing reports detailing mineral resources, developing geologic standards for a variety of environmental quality applications and creating the Northeastern US Seismic Monitoring Network.

Davis' successes made him a candidate for the California State Geologist position which was vacant. He has been a strong advocate for expanding modern seismic monitoring systems as a tool for assessing regional earthquake vulnerability enabling structural engineers to design structures that are more earthquake resistant. Emergency responders can also better evaluate post-earthquake needs. He oversaw the implementation of the Seismic Hazards Mapping Act in California which has resulted in high-resolution geologic mapping of faults, liquefaction, and land-hazard susceptibility maps. Following the Northridge Earthquake in 1994, he accelerated seismic safety reviews of new public school construction and hospital upgrade construction designs.

Davis has taken every opportunity in his career to apply a robust knowledge of geoscience to creating legislation to protect Americans, and his techniques have been replicated globally. He is a Past-President of AGI, and his work continues with leadership positions at AGI member organization, the Geological Society of America and his colleagues continue to laud him for “strength, good character, and a willingness to listen to others.” He has been recognized by AGI member organization the Association of American State Geologists, the Consortium of Strong-Motion Operating Systems (COSMOS) and was awarded the University of Wisconsin Geoscientist Distinguished Alumni Award in 2008. AGI thanks Davis for his monumental contributions to geoscience and public policy.

The Ian Campbell Medal is given in recognition of singular performance in and contribution to the profession of geology. Candidates are measured against the distinguished career of Ian Campbell, whose service to the profes-

sion touched virtually every facet of the geosciences. Campbell was a most uncommon man of remarkable accomplishment and widespread influence.

In his career as a geologist, educator, administrator, and public servant, he was noted for his candor and integrity. The title of the award was changed for the 2009 award to add “for Superlative Service to the Geosciences” in order to emphasize the importance of service shown by the recipient.

The American Geosciences Institute is a nonprofit federation of geoscientific and professional associations that represents more than 250,000 geologists, geophysicists and other earth scientists. Founded in 1948, AGI provides information services to geoscientists, serves as a voice of shared interests in the profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role the geosciences play in society’s use of resources, resiliency to natural hazards, and interaction with the environment.

Geoscience Online Learning Initiative (GOLI) - AGI/AIPG

You, as an AIPG Member, are invited and encouraged to submit a presentation to be given online for the Geoscience Online Learning Initiative (GOLI). AGI and AIPG have teamed up to build a portfolio of online learning opportunities to help support the professional development of prospective and early-career geoscientists as well as addressing topics of interest to the broader geoscience profession. GOLI courses support both synchronous and asynchronous online learning, and count toward continuing education units (CEUs).

A \$200 stipend and 10% share of registration fees are provided to the presenters (details on presenters guide).

If you are interested please read the GOLI - AGI/AIPG Presenters Guide and Guidelines and Suggestions for Webinar Presentations on the AIPG National website (www.aipg.org).

**AIPG, 303-412-6205
www.aipg.org**

AMERICAN GEOSCIENCES INSTITUTE

2015 - 2016

WILLIAM L. FISHER CONGRESSIONAL GEOSCIENCE FELLOWSHIP

The AGI Congressional Geoscience Fellowship represents a unique opportunity to gain first-hand experience with the legislative process on Capitol Hill. The successful candidate will spend 12 months (starting September 1, 2015) in Washington working as a staff member in the office of a member of Congress or a congressional committee. Fellows make practical



contributions to the effective and timely use of geoscientific knowledge on issues relating to the environment, resources, natural hazards, and federal science policy.

Prospective applicants should have a broad geoscience background and excellent written and oral communication skills. Minimum requirements are a Ph.D. or an engineering master's degree with three years of post-degree work experience. Although prior experience in public policy is not necessary, a demonstrable interest in applying science to the solution of public problems is desirable.

The fellowship carries an annual stipend of \$68,000 plus allowances for health insurance, relocation, and travel. Additionally, it may be possible to extend the fellowship for up to four months. Support for the fellowship is provided by an endowment through the AGI Foundation honoring William L. Fisher.

Interested candidates should submit a cover letter and curriculum vitae with three letters of reference through our online application. For further details, please visit our website at www.americangeosciences.org/policy/internships-and-fellowships, call (703) 379-2480, ext. 228, or email govt@agiweb.org. AGI is an equal opportunity employer.

All application materials must be submitted by February 1, 2015.

Several of AGI's Member Societies also sponsor Congressional Science Fellowships. For further information, contact the American Geophysical Union www.agu.org, Geological Society of America www.geosociety.org, Soil Science Society of America www.soils.org, or Society for Mining, Metallurgy, and Exploration, Inc. www.smenet.org. It is acceptable to apply to more than one society. Stipends, application procedures, timetables, and deadlines vary.

AIPG's Outreach Efforts at Dinosaur Ridge's "Girl Scout Day"

Tom Van Arsdale, CPG-11073

October 11th was an excellent opportunity for AIPG's Colorado Chapter to present itself to the public, and through the efforts of Metro State University's Denver Student Chapter, AIPG presented itself extremely well at the annual "Girl Scout Day" at Dinosaur Ridge.

Jessica Davey, SA-4424, Metro State's AIPG Student Chapter President, helped organize the booth and elicited the help of two other Metro State students: Jessica Olnhausen, SA-5264, and Brian Smith, SA-5837. These three students committed their time, energy, knowledge, and appreciation of geology to the effort, and were well received by the girl scouts and their parents. AIPG can be proud of these college students, and we are a better association because of their commitment to the organization, and their vitality in representing our Association.

Dinosaur Ridge estimated the turn-out at approximately 650 visitors, and all were treated to a wide range of science oriented exhibits and specialists. The enthusiasm of the visitors was refreshing, and their interest in the various booths was exceptional. No one seemed to be in a hurry...they were there to observe, listen and learn, and the themes of the various booths were fascinating. For instance, the booth on one side of AIPG's was, "Women in Mining," an organization founded in Denver during the 1970s. On the other side was the "Butterfly Pavilion" booth, with incredible exhibits and a terrarium filled with all sorts of "creepy-crawlies" (the black widow spider was a particular hit).

Dinosaur Ridge is a Colorado treasure, and an excellent venue for AIPG's outreach efforts. The visitors, especially the younger kids, are a target audience not only for geological education, but for the sciences across-the-board. AIPG's outreach effort can always use volunteers to help "man-the-booth," to contribute mineral specimens, rocks, and fossils, and to share their love of a truly enjoyable and challenging profession.

Hope to see you all next season, and specifically on the second Saturday of May, 2015 when 800-1,000 visitors are expected for Dinosaur Ridge's "Boy Scout Day."



Booth volunteers from left to right, are Brian Smith, SA-5837, Jessica Davey, SA-4424, and Jessica Olnhausen, SA-5264. All are members of the AIPG Metro State Student Chapter.



Positive Side Effects of Selfishly Volunteering (Yes, I meant selfish)

Jean M. Neubeck, CPG-11438

Every fall, the schedule of geological-related events seems to explode as colder weather heralds the end-of-summer vacation transition to back-to-business. The various Section newsletters all report scheduled or recent fall events such as field trips, meetings, and seminars, among others.

I was fortunate to attend the National AIPG Conference in Prescott this September. If you have never attended a national event, it is very rewarding and energizing to meet and network with many terrific geologists from throughout the country who volunteer to carry out the work of AIPG. Hundreds of people attended the multi-day event, which was packed with activities throughout each day.

Back home in NY, I attended the joint meeting between the Northeast Section and the NYS Council of Professional Geologists in mid-October. Almost 170 geologists descended on Albany to hear details concerning the recent legislative action to pass the bill to license geologists as professionals in New York. People traveled to Albany from Boston and New Hampshire to Buffalo (east to west), and from Plattsburgh to New Jersey and Pennsylvania (north to south). It was truly gratifying to see so many geologists respond to a regional event. (... Stay tuned for updates, as NYS Governor Cuomo has not yet signed the geologic bill into law.)

Many of these events are planned or carried out jointly with other professional or technical organizations. All these organizations have something in common; regardless of who manages the group or activity, it is the geologists who selflessly volunteer and participate that determine the success of the organization. You know their names because you see the same people carrying the load. These volunteers all have

something in common. They said "yes." As in, I will contact that person, I will write that article, I will find that out, I will send that information, I will attend that event. Yes, I will commit my time to that task or activity.

We all know that volunteering is the lifeblood of most organizations, and it can be time consuming depending on the task. So why do I think it selfish to volunteer? Hopefully, we volunteer to some extent for altruistic reasons but it is the positive side effects that really benefit both the individual and the organization. You will meet many people who are like-minded and you will be known to them. You will become associated with geologists of differing backgrounds and talents. You will broaden your base of knowledge and learn skills from others. Client needs environmental advice? Be glad to recommend a new associate. Need a mine dewatering expert? Pull out the business card from the geologist you met last month. Solve a complex geotechnical problem? You learned a good construction tip at a recent presentation.

You will be "in the loop" and aware of upcoming events, regulations, and new technical advances. You will receive notices and invitations, and learn about related organizations and interests. You will become a resource to others, including your friends and clients. Notify your client of the regulatory changes that affect their business. Let your colleagues know of a technical seminar in their practice area. Ask your manager to allow you to attend or sponsor an event. Attend a related organization's activity, and make yourself and your organization known.

Your opinions will be heard to help steer the organization. Got an idea to improve your organization? Want change? Be part of it. Are you a wallflower? It's okay, just attend and listen until you feel strongly about voicing your

opinion. Just enjoy the comradery and socializing? Check and check!

So what can you do? Help your officers. Attend a meeting or presentation. Forward notices to professional friends and colleagues. Recruit a friend to join your organization. Pay your dues and renew your membership. Update your contact information. Help your newsletter editor. Send a summary of an upcoming or recently attended event. Submit a photograph of an interesting rock you've collected. Ask a frequent vendor to advertise or sponsor your group. Submit a tidbit concerning a recent project, challenge, or amusing anecdote. Help a young geologist. Mentor a student. Introduce a young professional to others. Provide information and guidance. Help your community. Contact local schools to deliver a science demonstration. Provide clear information on a local geologic subject. Judge a science competition. Help your employer, including those of you who are self-employed. Be visible to the geologic community and to non-scientists. You already know your associates – meet someone new at each event. Wear a badge with your company name, and introduce yourself to new people.

You will be asked to volunteer. Just say yes. Pick something you're good at already or something you're interested in learning.

What's that you say? You aren't a member of a professional organization? What's your plan for success? Who will be your first contact if you lose your job or want to change? How will you distinguish yourself from the crowd of qualified geologists? Who can attest to your abilities and skills?

You say you don't have time, think you can't participate? Come on, you're doing a lot of these things anyway, so be selfish and share.



Robert G. Font, CPG-03953

1. Of the eight most abundant elements found in the Earth's crust, which are the top three?
 - a) Oxygen, calcium and iron
 - b) Oxygen, silicon and aluminum
 - c) Oxygen, potassium and sodium

2. To a first approximation and using the Richter scale, how much bigger is an earthquake of magnitude 8.3 than one of magnitude 5.2?
 - a) 4,825 times bigger
 - b) 2,912 times bigger
 - c) 1,259 times bigger
 - d) Wait, where is my crystal ball?

3. This clay mineral is defined by a 2:1 structure with two silica tetrahedra and one aluminum octahedron with potassium cations providing bonding between units:
 - a) Kaolinite
 - b) Illite
 - c) Goethite

4. In our studies of astrogeology, we wish to calculate the acceleration due to gravity (a_g) on planet Mars and the weight of a 200-pound person on its surface. Recall that the mass of Mars is 6.42×10^{23} kilograms and its radius is 3,397 kilometers. Also, remember that the "Gravitational Constant" (G) is $6.67 \times 10^{-11} \text{ m}^3\text{kg}^{-1}\text{sec}^{-2}$ and that the acceleration due to gravity on Earth is 9.81 msec^{-2} . Based on this information, please select the appropriate choice below:
 - a) $a_g = 3.71 \text{ m sec}^{-2}$ and $W = 75.6 \text{ lb}$
 - b) $a_g = 5.32 \text{ m sec}^{-2}$ and $W = 245.3 \text{ lb}$
 - c) $a_g = 7.43 \text{ m sec}^{-2}$ and $W = 531.2 \text{ lb}$
 - d) Man, this is absolutely horrible!

5. "Extra Question" submitted by **David Abbott**, CPG-4570:
 You encounter a thick, layered sequence of rocks. The odd outcrop shows cross bedding. The rock types include dunites, pyroxenites, norites, troctolites, and anorthosites. What type of geologic phenomenon are you looking at? Please select the "best answer":
 - a) Bowen's Reaction Series
 - b) A layered igneous complex
 - c) A lopolith
 - d) A magmatic sequence changing from ultramafic to mafic



Thank You

Raymond W. Talkington, CPG-07935
 rtalkington@geospherenh.com

I have just returned from our Annual Meeting in Prescott, Arizona where we had a great meeting with great field trips. Thank you to all who organized this meeting and made it a success. There were so many events that were part of this meeting. Of note, for me, were the Young Professionals Technical Session, the Foundation Silent Auction, attendance by Student Chapters, and the roll out of the William J. Siok Graduate Scholarship. Wow! There was not a lot of down time and the weather really cooperated.

I am especially thankful to the Young Professionals who participated in the Technical Session. It was well attended with really great papers and overall a great success! These folks represent the new leaders of AIPG and our profession. ***For next year, I would like to challenge each AIPG Section to identify and help support at least one Young Professional in their Section so that they can attend the 2015 Annual Meeting in Anchorage.*** This should not be a lofty task with positive results for the Section and AIPG. It is my hope that this will gain traction as an annual sponsored event for each Section. I thank you and hope you accept this challenge. Please contact me with any questions you may have with this challenge.

The Foundation of AIPG is special to me. It is the vehicle through which the members support many AIPG programs such as Student Scholarships, AGI Fellowships, the Young Professionals Program, and the William J. Siok Graduate Scholarship. Currently, support for the Foundation is from members who contribute annually by checking off a box on the annual dues statement. The other source of donations is from the annual silent auction. Thank you to all who made this a success this year. ***I offer you another challenge – When you send in your donation to the Foundation go to your employer and ask if they will match your dona-***

tion. Many do this and I am happy to answer any questions you may have with this type of matching donation. ***The Foundation needs your support.***

When AIPG was founded over 50 years ago, students were not part of the equation. Fast forward to today and we have approximately 3,000 student members! Students are an integral part of AIPG. They along with the Young Professionals are shaping both the present and future of AIPG. How do we know this? I began this year with a goal of having 25 Student Chapters. Although we have not officially reached this number as of today, we are on target of achieving this by the end of the year! Thank you to the enormous effort of the Sections and Headquarters to help make this lofty goal a reality. ***Let's not stop here but set a goal to have at least one Student Chapter in each AIPG Section*** or take the lead from Georgia and have at least four Student Chapters. I am always happy to help support you in this challenge.

It was not too many years ago that AIPG was not financially strong. A new Executive Director was hired by the members with a vision to strengthen AIPG. Bill Siok took over and transformed AIPG. He has retired but has left us financially strong and well respected among other professional scientific organizations. Although Bill is no longer steering the ship, we did not want his commitment to be forgotten. As a tribute, the Executive Committee established the William J. Siok Graduate Scholarship. This is the first AIPG scholarship that is solely for graduate students. I had the honor to introduce this new scholarship for Bill at the Annual Meeting. As a note, this may have been the first time that Bill did not know about something in AIPG. Thank you to all that made this a fitting honor for Bill.

Wow, where do I start? There are so many people that make AIPG a great

professional organization. As President, you are putting on the boots from the prior President and hope that you can fill them with the same vigor and passion. This is really a great experience. What makes the transition so seamless is the National Headquarters staff. They are the most extreme professionals and are always there to give guidance and support whenever needed. Thank you! 2014 was also a different year than many Past Presidents have experienced. We had a transition in mid-year to a new Executive Director. As such, there was a lot more to do, more meetings and communication. The great thing here is that it has been a seamless transition. As I move on and welcome Foster Sawyer as our President for 2015 I will miss the almost daily brainstorming and problem solving but know that AIPG is in good hands because of the dedication and commitment of all of our members.

Thank you for allowing me the honor and privilege of serving as President in 2014.

GeoRef Custom Searches

For those who need only an occasional search of the GeoRef database, it is easy to request a GeoRef custom search. A member of the GeoRef staff will conduct the search according to your specifications. The search results will be delivered by email.

To order a Custom Search, contact Jim Mehl at jmp@agiweb.org, (703) 379-2480 ext 236 or Monika Long at ml@agiweb.org.

The cost of a custom search is \$225.00 plus \$.45 per reference.

Please mention **AIPG** when ordering your custom search.

Answers:

1. The answer is choice “b” or “Oxygen, silicon and aluminum”.
The ten most abundant elements in the Earth’s crust are listed below:

Element	Abundance [percent (%) by weight]
Oxygen	46.1
Silicon	28.2
Aluminum	8.2
Iron	5.6
Calcium	4.2
Sodium	2.4
Magnesium	2.3
Potassium	2.1
Titanium	0.6
Hydrogen	0.1

2. The answer is choice “c” or “1,259 times bigger”. Recall that the magnitude scale is logarithmic. Thus, $S_1 = 10^{8.3} / 10^{5.2} = 1,259$
3. The answer is choice “b” or “Illite”.
Kaolinite is characterized by a 1:1 structure with a silicon tetrahedron and an aluminum octahedron with units bound by hydrogen. Goethite is not a clay mineral, but a hydrated iron oxide.

4. The answer is choice “a” or “ $a_g = 3.71 \text{ m sec}^{-2}$ and $W = 75.6 \text{ lb}$ ”. The proof follows:

We are given:

- Mass of Mars = $6.42 \times 10^{23} \text{ kg}$ (1)
- Radius of Mars = 3,397 km (2)
- Gravitational Constant (G) = $6.67 \times 10^{-11} \text{ m}^3\text{kg}^{-1}\text{sec}^{-2}$ (3)
- On Earth, $a_g = 9.81 \text{ msec}^{-2}$ (4)

From Newton’s work, we know that acceleration due to gravity is given by the formula:

$$a_g = GM/R^2 \tag{5}$$

For equation (5) and in the equations to follow, let “ a_g ” = acceleration due to gravity, “G” = Gravitational Constant, “M” = mass, “R” = distance and “W” = weight.

For Mars, substituting values in equations (1), (2) and (3) into equation (5):

$$a_g = (6.67 \times 10^{-11} \text{ m}^3\text{kg}^{-1}\text{sec}^{-2})(6.42 \times 10^{23} \text{ kg}) / (3.397 \times 10^6 \text{ m})^2 = 3.71 \text{ msec}^{-2} \tag{6}$$

Equation (6) is, thus, the acceleration due to gravity on Mars!

To calculate the weight of a 200-lb individual on its surface:

$$W = (M)(a_g) \tag{7}$$

$$1\text{kg} = 2.2 \text{ lb} \tag{8}$$

$$200 \text{ lb} = 90.9 \text{ kg} \tag{9}$$

Thus, on Earth, from (4), (7) and (9):

$$M = (W/a_g) = (90.9 \text{ kg}) / (9.81 \text{ msec}^{-2}) = 9.26 \text{ kgsec}^2\text{m}^{-1} \tag{10}$$

Equation (10) represents the “mass” of our 200-lb individual. It remains constant regardless of location. Then, on Mars, from (6), (7), (8) and (10):

$$W = (M)(a_g) = (9.26 \text{ kgsec}^2\text{m}^{-1})(3.71 \text{ msec}^{-2}) = 34.36 \text{ kg} = 75.6 \text{ lb}. \tag{11}$$

Equation (11) is the weight of our 200-lb person on Mars (e.g., 75.6 lb), or just about 38% of the corresponding weight on Earth! Well, this would be one way of losing weight without dieting!

5. The answer (submitted by **David Abbott**, CPG-4570), is choice “b” or “a layered igneous complex”.
The description specifically fits the Stillwater Layered Igneous Complex of south-central Montana on the Beartooth Mountain front. The sequence does reflect Bowen’s reaction series (a) and an evolving magma series (d) but these are incomplete answers. Likewise, “lopolith” is incomplete; the intrusive body containing the layered igneous complex is a lopolith but this is only part of the story. As expected, the dunites occur at the base of the sequence and the apparent “cross-bedding” results from flow in the magma chamber (it only really shows up on some weathered outcrops).



Geology - It's Never Too Early to Learn

Robert A. Stewart, CPG-08332

During the run-up to our move from Connecticut to Colorado last spring, my wife, Kimberly and I were able to significantly de-clutter our house of much ephemera, which, frankly, just didn't need to come with us. The cleanup extended to all the "leverites" scattered around the yard and in the flower beds, collected from various geology trips. Some specimens made the cut – the pink calcite gangue from the Ross Mine near Holtvre, Ontario – of course. The orbicular diabase from an extended trip to Finland – without question. Other specimens were left for the unwitting enjoyment of the new owners – a block of chert ballast from colonial shipping and cobble conglomerate from the coast of Maine, from a Friends of the Pleistocene trip – oh, well, I had to be ruthless. Colorado has plenty of attractive rocks for the new garden.

As part of the process, we enlisted our neighbors' 3rd-grade grandson to build his collection from ours. Kids are perceptive, and this young man surprised us with his observations of a specimen of copper ore from near Mass City, Michigan. The specimen was about the size of a hockey puck, and consisted of white, opaque calcite laced with nuggets of native copper. The boy asked me whether the copper nuggets went all the way through the calcite. I didn't know, but suggested that as copper conducts electricity, he could test the nuggets to see if they completed an electrical circuit, as with copper wire. No sooner had I finished the thought, he turned and disappeared, returning after five minutes or so with a bulb from a flashlight, some thin electrical wire, and a D-cell battery. He assembled the wires to the lightbulb, held the D-cell to a nugget on the specimen, and proceeded to test other nuggets by holding one wire to the other end of the battery, and the second wire to a copper nugget, and...there was light! He was thrilled, and his granddad

and I were astonished. Here's a bright kid – I suggested an experiment, and unprompted, he figured out how to test the hypothesis definitively.

Over the years I've provided demonstrations and exhibits to kids in primary school, middle school and high school, as well as our local Boy Scout troop. I usually prepared a script, but often the rocks and exhibits spoke for themselves as I asked the audience if they knew the source of the essential raw materials that society uses. From that starting point, the conversation was always lively. The gold sluice was always a good demonstration, using PVC drainpipe cut lengthwise, with half-circle riffles cut from the pipe and glued along the length to catch the heavy fraction from river sand. Two five-gallon buckets, carefully notched and cut, served as the supports and collection points. I used a horseshoe magnet to separate the magnetic fraction from the other heavy minerals.

Years ago Time-Life published two series of books – *Science* (ca. 1963 to 1967) and *Nature* (ca. 1961 to 1965). The books arrived monthly, by subscription. The collection accrued and became a favorite reference and a source of enjoyment as I grew older and understood more of the subject matter. I found these books to be utterly fascinating, and still read them. Not until university did I appreciate the stature of the principal authors, which included Arthur C. Clarke, Luna Leopold and Carl Sagan.

Both series introduced me to many fundamental concepts of geology – the fossil record and evolution, sources of energy and raw materials, and how humans affect Planet Earth.

The *Science* library included the volume "*Matter*," which reviewed each of the known elements, giving a picture or description of each, the common source areas, and the uses. Although out of print, both series are still available through online or brick-and-mortar

booksellers. Although dated, much of the basic science hasn't changed, and the explanations of complex subjects are superb. One of the drawbacks of the original books is that they don't lend themselves to show-and-tell presentations. Happily, advances in graphic imagery since the 1960s provide alternatives and supplements. For the elements, one of the best depictions is the Ultimate Periodic Chart, published by the Mineral Information Institute, now a part of the Minerals Education Coalition, and available through the Society for Mining, Metallurgy & Exploration (www.smenet.org).

SME was also instrumental in creating and launching the Boy Scouts' Mining and Society Merit Badge in 2014. From my own experience, as a merit badge counselor you'll learn as much as the kids.

Although I've highlighted a number of SME contributions to K-12 education, there are many opportunities through other organizations affiliated with AIPG to showcase the science of geology in all its forms, and to kids of all ages.

Do you need an idea for a section talk, field trip, meeting?

Have you read the AIPG section newsletters on the AIPG website?

- Alpha River/Cody Scarp Field Trip-Florida
- Frac Sand Mining Environmental Research Webinar-Wisconsin
- Geologic Drilling in Antarctica Drilling Back to the Future-Ohio
- Geoprobe Drilling Demo-Georgia

Important Fire Prevention Lessons

By Michael Rudeen

Fire is one of the most serious dangers in the home, and the kitchen presents the greatest risk. But wherever a fire starts, there are steps you can take to reduce the danger and help keep your family safe.

- **Stay in the kitchen.** If you are frying, grilling, or broiling food, stay in the kitchen. If you're simmering, baking, roasting, or boiling, check the kitchen regularly. Keep things that can catch fire away from the stovetop, and have a lid handy to smother small grease fires.
- **Install smoke alarms.** Smoke alarms are advisable in every bedroom, outside the sleeping area, and on every level of the home. Test smoke alarms monthly and replace them after 10 years.
- **Smoke safely.** If you smoke, go outside. Keep smoking materials out of the reach of children and use a deep, sturdy ashtray away from anything that can burn. Don't discard cigarettes in vegetation that could ignite easily.
- **Extinguish candles.** Make sure candles are always extinguished when you leave the room or go to bed. Keep them at least a foot from anything that can burn, and never leave children alone with a burning candle. If you use candleholders, make sure they won't tip easily.
- **Maintain safe distances.** Keep anything that can burn at least three feet from your furnace or any other heating unit. Maintain a three-foot kid-free zone around open fires and space heaters, and never use your oven to heat your home.
- **Practice your escape plan.** Make a home escape plan and practice it regularly. Know at least two ways out of every room and specify an outside meeting place. If you have a fire, leave immediately, closing doors behind you to contain it.

As a member of AIPG, you are also eligible to receive exclusive group savings on auto, home, condo and renters insurance. For more information and to get a free, no-obligation quote, call 800-524-9400, visit www.LibertyMutual.com/AIPG or contact your local agent.

Discounts and savings available where state laws and regulations allow, and may vary by state. To the extent

permitted by law, applicants are individually underwritten; not all applicants may qualify.

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A message from Liberty Mutual Insurance.-By Dennis Goebel, Vice President, Liberty Mutual Insurance Company



Timothy John Schmidt, CPG-07802, of Queenstown, MD died on September 14, 2014 at Anne Arundel Medical Center with his family at his side. He was 66.

Tim was born July 23, 1948 in Barberton, Ohio to the late Peter J. and Cecilia Curran Schmidt. A child of an enlisted Navy father, Tim and his family lived in Barberton, OH, Annapolis, MD, Grosse Ile MI, and Washington, DC during his childhood. After graduating from St. Mary's High School in Annapolis, Tim went on to the University of Akron in Ohio, where he met Linda Kovach. They were married on May 20, 1972 and later moved to Maryland. Tim then earned a Master's degree in Environmental Engineering from the University of Maryland. They resided in Queenstown.

Tim was a loving husband, father, grandfather and uncle. He was well known for his analytical thinking and ceaseless search for the solution to every puzzle. An athlete in his younger days, he taught his children the value not only in sportsmanship, but in character and respect for others. A quiet but devoted supporter of everyone he loved and believed in, Tim was loyal and trustworthy friend. He was also very protective of those who were close to him and refused to burden anyone with any difficulty he faced. He often sought careful and quiet counsel of himself and enjoyed arriving at solutions for problems through relaxing hobbies, especially gardening. One of his favorite sayings remained "When the world wearies and society ceases to satisfy, there is always the garden." His sudden passing will leave many people missing his friendly teasing and silly jokes.

Tim was a member of the American Institute of Professional Geologists.

Otto J. Buis
CPG-03074
Member Since 1976
June 2014
Ft. Worth, Texas

Walter H. Howe
CPG-02140
Member Since 1970
2014
Mesa, Arizona

Morris W. Leighton
CPG-03572
Member Since 1976
April 11, 2014
Urbana, Illinois

Edward T. Ruppel
CPG-06066
Member Since 1982
June 27, 2014
Twin Bridges,
Montana

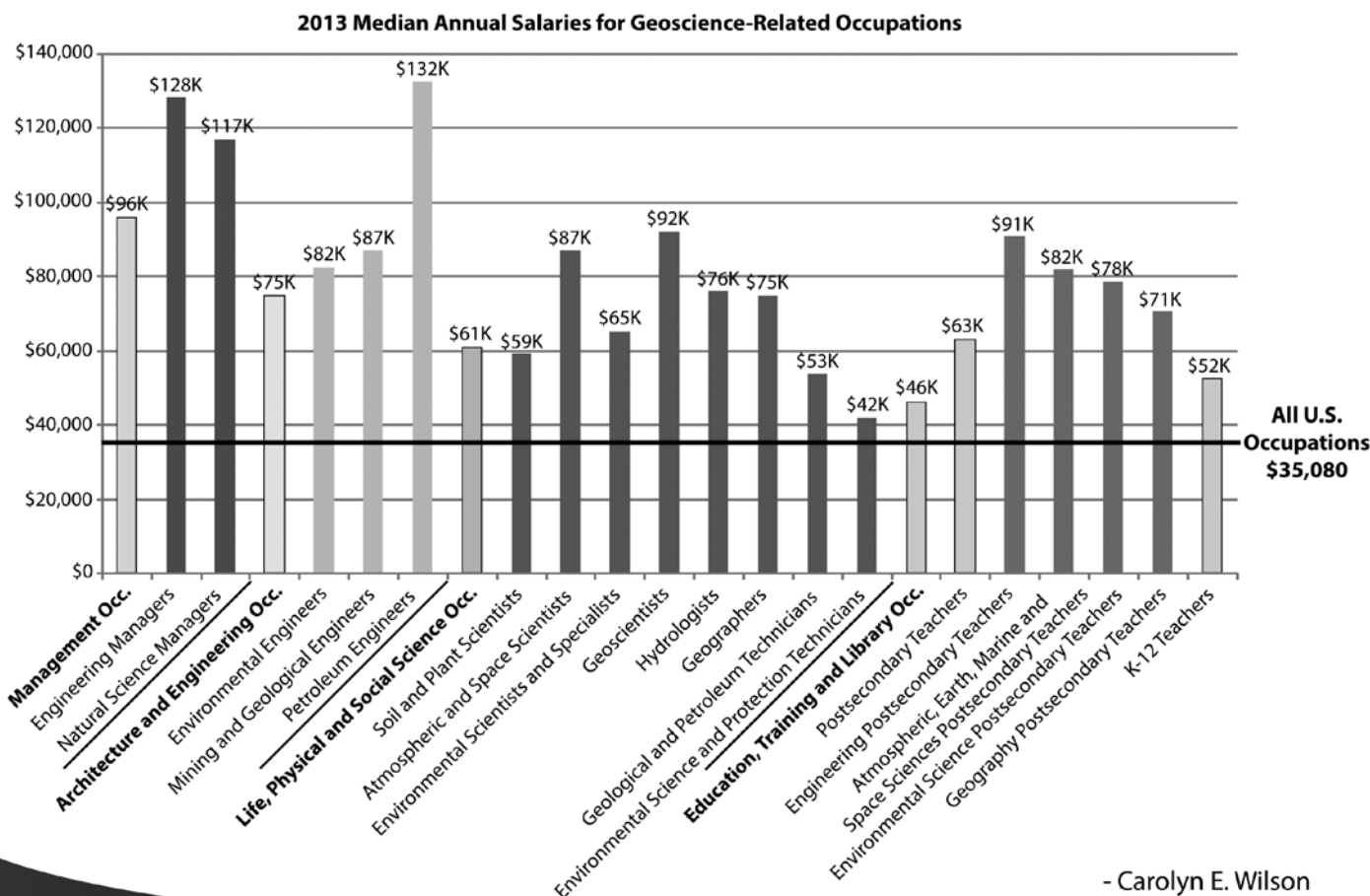
Timothy J. Schmidt
CPG-07802
Member Since 1990
September 14, 2014
Queenstown,
Maryland

2013 Median Salaries for Geoscience-Related Occupations

The graph shows the 2013 median annual salaries for geoscience-related occupations in the United States as reported by the U.S. Bureau of Labor Statistics. The colors represent a different occupational category. The columns in the lighter colors display the annual median salary for a broad occupational grouping. The darker colors are specific geoscience occupations within the broad occupational groups. Except for soil and plant scientists and technician occupations, the median salaries for the geoscience occupations are higher than the median salaries for the broader occupation groups. The average median annual salary for geoscience-related occupations in 2013 was \$83,311.

Since 2011 (*Currents #62*), all but five (atmospheric and space scientists, geographers, environmental science and protection technicians, engineering postsecondary teachers, and atmospheric, earth, marine and space sciences postsecondary teachers) of the geoscience occupations saw increases in their median annual salaries, and the decreases ranged only from \$10-\$2760 per year. Petroleum engineers had the highest increase in median annual salary since 2011 jumping by over \$10,000.

The geosciences continue to be a lucrative employment option within the current workforce.



- Carolyn E. Wilson

Mercury's Hidden Water-Ice Revealed

It might seem curious that the closest planet to the Sun - where temperatures soar above 400C - could host water-ice.

But some of the craters on this hot-house world are always shadowed from the Sun, turning them into cold traps.

Using very low levels of light scattered off crater walls, scientists were able to build up a picture of what these frozen deposits look like.

The work, by researchers involved with Nasa's Mercury Messenger mission, has been published in the journal *Geology*.

Scientists suggested decades ago that water ice might be trapped in shadowed areas near the planet's poles. Then, in the 1990s, data from the Arecibo radio telescope in Puerto Rico revealed areas that strongly reflect radar - a characteristic of ice.

Many of these corresponded to the locations of large impact craters mapped by the US spacecraft Mariner 10 in the 1970s.

After the Messenger probe entered orbit around the planet in March 2011, it deployed a range of techniques to show that there are probably several billion tonnes of water ice locked up at the north pole.

In the latest study, Dr Nancy Chabot and colleagues studied an impact crater called Prokofiev, the largest such depression at the planet's north pole.

The uniform surface texture of presumed water-ice areas in Prokofiev crater suggest the deposits arrived relatively recently.

In other areas, water-ice is covered by a thin layer of dark material rich in organic molecules. These dark deposits display sharp boundaries.

"This result was a little surprising, because sharp boundaries indicate that

the volatile deposits at Mercury's poles are geologically young," said Dr Chabot.

She added: "One of the big questions we've been grappling with is 'When did Mercury's water ice deposits show up?' Are they billions of years old, or were they emplaced only recently?"

"Understanding the age of these deposits has implications for understanding the delivery of water to all the terrestrial planets, including Earth."

Overall, the images indicate that Mercury's polar deposits either were delivered to the planet recently or are regularly restored at the surface through an ongoing process.

Distinctions between the features of shadowed craters on the Moon and those on Mercury may also be instructive about the history of water in the Solar System.

The Moon is also believed to host deposits of water-ice, also being home to areas of permanent shadow. They are also colder than those on Mercury. But there are significant differences in the properties of the surface as measured from orbit.

One explanation could be that the deposits on Mercury are more recent.

"If Mercury's currently substantial polar volatile inventory is the product of the most recent portion of a longer process, then a considerable mass of volatiles may have been delivered to the inner Solar System throughout its history," the paper in *Geology* says.

"That's a key question," said Dr Chabot.

"Because if you can understand why one body looks one way and another looks different, you gain insight into the process that's behind it, which in turn is tied to the age and distribution of water-ice in the Solar System.

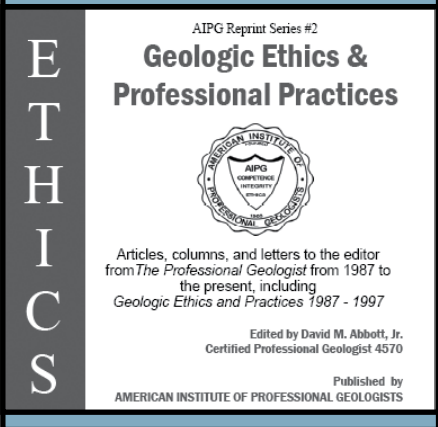
"This will be a very interesting line of inquiry going forward."

To read more: <http://www.bbc.com/news/science-environment-29644406>

Geologic Ethics & Professional Practices is now available on CD

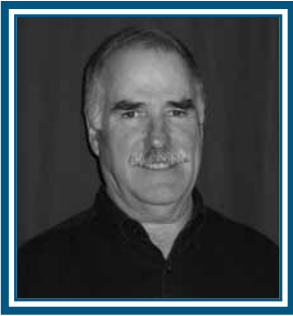
This CD is a collection of articles, columns, letters to the editor, and other material addressing professional ethics and general issues of professional geologic practice that were printed in *The Professional Geologist*. It includes an electronic version of the now out-of-print *Geologic Ethics and Professional Practices 1987-1997*, AIPG Reprint Series #1. The intent of this CD is collection of this material in a single place so that the issues and questions raised by the material may be more conveniently studied. The intended 'students' of this CD include everyone interested in the topic, from the new student of geology to professors emeritus, working geologists, retired geologists, and those interested in the geologic profession.

AIPG members will be able to update their copy of this CD by regularly downloading the pe&p index.xls file from the www.aipg.org under "Ethics" and by downloading the electronic version of *The Professional Geologist* from the members only area of the AIPG website. The cost of the CD is \$25 for members, \$35 for non-members, \$15 for student members and \$18 for non-member students, plus shipping and handling. To order go to www.aipg.org.



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Surface-Water Fix Becomes Ground-Water Problem

William J. Stone, MEM-2164

In the first HYDROTHINK column, *First Characterize the Setting* (Jan/Feb '09), I described how local geology had been ignored in designing a settling pond behind a porous low-head weir. In scraping alluvium in an ephemeral stream channel to make the pond floor level, mounds of basalt were discovered. The adjacent Indian Pueblo objected to blasting to level the mounds. The point of that column was, do your homework (basalt was well known to occur in the area). This column focuses on another point that can be made from that foul-up.

Contaminant-laden sediment and water trapped in the area upstream of the weir would be in contact with highly fractured basalt, now pocked with intact blast holes, rather than alluvium. Any contaminants separated from the sediment could move rapidly downward to perched water in the basalt and potentially to the deeper regional zone of saturation, the local drinking-water source. Thus, the original surface-water problem was replaced by a new ground-water problem.

To investigate the impact of the pond on water quality in the shallow perched water, I drilled three holes: one vertical hole beside the pond to serve as a ground-water monitoring well (281.5 ft deep), and two inclined holes (one at 34 degrees from horizontal for a length of 137 ft and one at 43 degrees from horizontal for a length of 157 ft) extending out under the pond to monitor soil water and contaminant movement toward shallow perched ground water in the basalt.

Observations confirmed that movement through the fractured basalt is rapid. One runoff event caused wetting to a depth of 89 ft in the vadose zone *within about 3 days*, suggesting a rough rate of movement of about *30 ft/d!* A tracer test involving potassium bromide was also conducted. Bromide (applied to

the surface of the pond behind the weir when dry) showed up in the vertical well within 10 days, for a rate of movement to that more distant location of *18 ft/d*. The difference in the rates is probably due to the location of the wells relative to the orientation of prominent fractures.

As noted previously, the setting should have been researched before building the structure. Lacking that, the project should have been abandoned when the fractured basalt was discovered in the pond area. However, the weir was built before the basalt was encountered. In view of the time and money already committed to construction, they went ahead. Tip: If it becomes apparent that because you didn't do your homework your efforts are only making things worse, **STOP!** It's never too late to wise up and re-group.

Dr. Stone has more than 30 years of experience in hydroscience and is the author of numerous professional papers as well as the book, *Hydrogeology in Practice – a Guide to Characterizing Ground-Water Systems* (Prentice Hall). Feel free to argue or agree with him by email at wstone04@gmail.com.

Have You Paid Your 2015 Dues?

In accordance with Article 8, Section 8.2.1, of the Bylaws, Annual Membership dues are due and payable January 1, 2015. Those members whose dues are not paid by February 15, 2015, will be suspended.

A late fee will be required for dues paid after February 15, 2015.

Login to the AIPG website to pay. You will receive a receipt by email when your payment is processed.

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Invitation from AIPG to Submit Articles

You are invited to submit an article, paper, or guest column based upon your geological experiences or activities to the American Institute of Professional Geologists to be included in "The Professional Geologist" (TPG) quarterly journal. The article can address a professional subject, be technical in nature, or comment on a state or national issue affecting the profession of geology.

Article submissions for TPG should be 800 to 3200 words in length (Word format). Photos, figures, tables, etc. are always welcome! Author instructions are available on the AIPG website at www.aipg.org.

Please contact AIPG headquarters if you have any questions. AIPG email is aipg@aipg.org or phone (303) 412-6205.



What is a Sabbatical?

Michael J. Urban, MEM-1910

One of the supreme benefits of holding a university professorship is being afforded the advantage of the academy's capacity to facilitate continuous professional growth in its constituency. For just under a decade now I have been immersed in higher education, and despite all of the political posturing, agenda-wielding, and narcissism I have encountered, I can honestly say I have enjoyed much of my time in academia. As a now tenured university faculty member, I have had the opportunity to request a sabbatical during the 2014-15 academic year. At my institution, a sabbatical involves a salary reduction, release from all teaching and administrative duties, and the expectation of pursuing research and/or professional development activities that would otherwise not be possible given normal load responsibilities. It also carries with it an understanding that the faculty member will learn new and useful knowledge or skills that can be brought back and applied, either directly or indirectly, to the college classroom. Through formal channels (i.e., via college dean and provost), early last year, I submitted a written plan of my proposed activities and requested a year-long sabbatical. As I write this today – just a few weeks into the academic year – I am happy to report my sabbatical request was granted. I must admit to enjoying it thus far!

Some people think a sabbatical is a year off for a professor, in which he or she catches up on digital video recordings (DVRs) of television programs, scopes out contemporary Netflix movies, takes care of chores around the house, picks up a few new hobbies, or sleeps in late in the mornings. However, if my experience is typical, nothing could be further from the truth; for example, I still have a storehouse of unwatched DVRs cluttering the limited space on my satellite box, a long list of unrealized "hobbies" (e.g., learning Python programming, learning to play guitar, and

taking up photographing nature), and no Netflix account. [Admittedly, though, I did sand and stain my deck – but, truth be told, I would have much rather been writing lectures and reading student papers.] The Merriam-Webster dictionary defines sabbatical as "a period of time during which someone does not work at his or her regular job and is able to rest, travel, and do research, etc." While it seems that some take a sabbatical as a way to escape from the rigor of the academy or to convalesce from student- or institution-induced maladies (I jest, of course), most of us "academics" are life-long learners and relish the chance to read, take classes, attend conferences, and write. Given a little free time, such as during a sabbatical, we busy ourselves with pursuits such as these.

What have I been up to while on sabbatical?

The sabbatical proposal I submitted consisted of four parts: 1) renew my science teaching license with the state; 2) revisit a book deal that went by the wayside years ago, for lack of available time; 3) conduct some research to culminate in journal submissions; 4) take graduate coursework. I will discuss a little about each of these endeavors below.

Given the bureaucratic nature of state government, particularly as it relates to K-12 public education, I expected the process of renewing my lapsed science teaching license to be time-consuming at best, and perhaps painstaking, if not impossible, at worst. Much to my surprise, and elation, it took only a couple of emails and the sending of continuing education transcripts to resolve the issue and reinstate another 5-year teaching license. I was able to cross that off the list relatively quickly, thankfully. I have contemplated substitute teaching at the middle or high school level in order to stay current on what is happening in the classroom – and, of course, to share

my passion for science with kids again. [I was a middle school earth science teacher in the late 90's and early 2000's before going to graduate school.]

I have yet to revisit the previous book deal I had, opting instead, to submit a new book proposal, which has already been accepted by IGI publishing. For this book, dealing with technology integration in STEM (Science, Technology, Engineering, and Mathematics) for K-12 education, I have teamed up with my former doctoral advisor to co-edit a collection of solicited chapters. Prior to this experience, I have never been an editor, and am finding the process fascinating. This project has consumed the bulk of my sabbatical time so far (a few weeks), as it has required disseminating a vast number of personal initiations to potential authors who might be interested in submitting research-based chapters.

As for research, over the past six or seven years I have compiled a list of perhaps a dozen research project ideas, which I am planning to turn into papers and publish. With each passing year, the list of ideas grows, but the time to complete them in diminishes. I am using the sabbatical as an opportunity to catch up on this mounting pile of potential research before it slips into obsolescence or is displaced by newer ideas, and do some serious writing that will lead to publications in peer-reviewed journals. Several of them involve collaboration with colleagues and in-service teachers, and fortunately, with my additional available time, I can hound said partners as necessary. One of the projects I am currently involved in is high altitude ballooning (HAB). In addition to a submitted conference abstract, I have been spending one morning a week the past month at a local charter school, working with fifth-graders who will tag along as we launch and track our fall HAB. Actually, the kids are a bit more involved than that, they are including some experiments/investigations in one

of the payloads. [For more on high altitude ballooning, see the *Educator's Page* in TPG Jul/Aug, 2013.]

Finally, I am taking graduate coursework through a couple of universities this year. I am finishing up a graduate physics teaching certificate through one university. I will be completing the final course in the certificate during the upcoming spring semester. I am also picking up a couple of courses in space studies. Back in 2007, as I was finishing my doctorate at the University of Northern Colorado, I held a fellowship that was covering my tuition. I utilized the available funds to take additional graduate courses outside my home institution. At the time, I was teaching astronomy and geology as an adjunct instructor for a couple of local community colleges. Although my master's degree is in earth sciences, I did not feel well-equipped to teach astronomy (as I had only taken a couple of credits in astronomy). So, I elected to take what sounded like a hokey little graduate course on "asteroids, meteorites, and comets" to learn more concerning a subject I knew very little about – taught, no less (it turned out), by one of the foremost asteroid experts in the field. To my surprise there was (and still is) far more detailed information about asteroids and comets than I could have ever imagined. [I am not sure why it surprised me since all specific fields have considerable depth to them.] In fact, and to this day, it remains one of the most challenging courses I have ever taken! The interdisciplinary nature of the course was fantastic – coaxing me to combine principles from geology, physics, chemistry, and astronomy. I am pleased to say I did well in the course and that I enjoyed every second of it. Before I digress any further, my point is that I am taking another course, about the "planet Mars," from the same professor (and loving every second of it). Once again, the course is allowing me to think and apply geology, in addition to other base sciences. The graduate coursework is keeping me busier than I had anticipated, but it is certainly time well spent.

To close, I am excited about this – my first – sabbatical, and the opportunity for rekindling my academic interests and honing new knowledge and skills. I plan on bringing whatever I can back to the classroom and to my teaching, especially a reinvigorated passion for science!¹

1. Deviating slightly from the typical format, no featured resource is included with this article.

Reference

Merriam-Webster online dictionary. (2014). Springfield, MA: Merriam-Webster, Incorporated. Retrieved at <http://www.merriam-webster.com/>

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Have you been thinking about upgrading your membership to CPG? If the answer is yes, What are you waiting for? To find out if you have the qualifications go to Article 2.3.1 of the AIPG Bylaws. The AIPG Bylaws can be found on the AIPG website or the directory.

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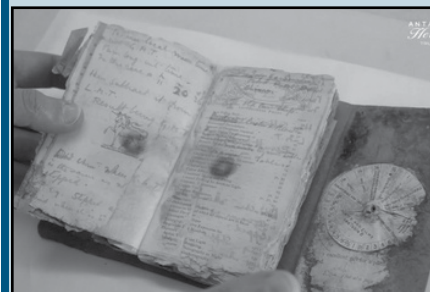
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SIGMA XI Smart Brief-
October 28, 2014
The Scientific Research Society

Century-Old Notebook from Legendary Antarctic Expedition Found



Hidden in ice for more than 100 years, the photography notebook of a British explorer on Captain Robert Falcon Scott's ill-fated expedition to Antarctica has been found.

The book belonged to George Murray Levick, a surgeon, zoologist and photographer on Scott's 1910-1913 voyage. Levick might be best remembered for his observations of Cape Adare's Adélie penguins (and his scandalized descriptions of the birds' "depraved" sex lives). The newly discovered book also shows he kept fastidious notes, scrawled in pencil, about the photographs he took at Cape Adare.

Levick's "Wellcome Photographic Exposure Record and Dairy 1910" had been left behind at Captain Scott's last expedition base at Cape Evans. Conservationists discovered the notebook outside the hut during last year's summer melt.

To read more: <http://www.livescience.com/48418-antarctic-expedition-notebook-discovered.html>

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Award winners and Field Trips.

Photos on this page taken by Wendy Davidson and Adam Heft.



Zombies and Sunspots

Stephanie Jarvis, SA-1495,
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We avoided a zombie apocalypse this past October. At least, that was my very un-informed take on finding out that the massive sunspot AR 12192 (also reported as AR 2192) had passed across the sun's surface without the world ending. My knowledge of solar weather, until the writing of this column, was limited to the not-completely-serious fretting of apocalyptic-minded friends about solar flares and zombies. Upon reflecting on the pathetically un-scientific nature of my analysis, I decided it was time for a little self-edification.

I found the basics that I was looking for in a great article on Space.com:¹ Sunspots form when the sun's magnetic field causes the plasma on the surface to flow in currents. These currents create "ropes of magnetism" that, when visible at the surface, create a pair of sunspots. The number of sunspots at any given time ebbs and flows with the solar cycle, which is approximately 11 years long. Solar flares happen when those magnetic ropes cross each other, resulting in an explosion. X-class flares are the largest and are of the most concern to us Earth-dwellers as they can cause radio blackouts. When the magnetic ropes snap, and then reconnect elsewhere, gaps are formed in the sun's surface that frees plasma, which then explodes in what is called a coronal mass ejection (Star Trek flashbacks, anyone?). These coronal mass ejections (CMEs) are responsible for auroras here on Earth. They can also cause power blackouts and disrupt GPS signals. Not quite zombies, though the average American suddenly smartphone-less might be close.

AR 12192, at about 80,000 miles across, was the largest "active region", defined as "an area of intense and complex magnetic fields", in 24 years.² While it sent off 10 strong (X-class and M-class) solar flares, it did not produce any CMEs, indicating that there is not always a correlation between size of active region and size of solar events.² It rotated into view on October 18, making it visible during the partial solar eclipse on the 23rd. It was out of view, with a chance of an encore, by the 30th.² For a really neat video of some of those flares, I strongly recommend checking out the NASA article referenced.

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 2. Fox, K.C., 2014, "Tracking a Gigantic Sunspot Across the Sun". URL: <http://www.nasa.gov/content/goddard/tracking-a-gigantic-sunspot-across-the-sun/#.VFmfPig77Ib>. October 31, updated November 4. Accessed November 4, 2014.



Mineral Identification Basics: The Lost Art of Optical Mineralogy

Kristina Pourtabib, SA-3410
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In my opinion, mineralogy is one of the most important geology courses you can take as an undergraduate major. Mineralogy underlies many of the fundamental relationships in geology and holds a part in every sub-discipline of the geological sciences, from geophysics to paleontology. By becoming familiar with how to properly identify some of the common (and not so common) minerals and understanding their occurrences, geologists can have solid evidence to back up their interpretations and findings. Having started a graduate program at a larger university, compared to the size of my undergrad university, I have recently been exposed to many different analytical tools that can help aid in the identification of an unknown material, tools that I was previously unfamiliar with. Many students with access to equipment like EMPA, TEM, Powder XRD, XRF, Single Crystal XRD, and Raman Spectroscopy, just to name a few, are getting better and better at being able to accurately identify an unknown material. Though, with the technological advance and accessibility this begs the question, are these incoming students really getting better at rock/mineral identification, or are they solely getting better at learning how to operate the equipment to identify these materials for them?

Just for clarification, I am not entirely opposed to the idea of utilizing this analytical equipment to help better understand a materials intrinsic property, properties that can't be quantified with the use of a basic polarizing light microscope. After all, we didn't make these technologically advanced machines for them to not be used. The only problem I have is when the first thing people go to for mineral identification is an analytical machine, instead of using the basics of mineral identification as the primary means to figure out what they're looking at, such as hand sample i.d. or the use of the light microscope, specifically implementing optical mineralogy.

When I first took my undergraduate mineralogy course, optical mineralogy was barely mentioned. Fortunately for me, optical mineralogy was offered as an elective course just one time during my four years as an undergrad and I decided to take it. During the first few weeks of class, I will admit that I was pretty lost, and judging by the glazed over looks on the other students' faces, (and by students, I mean the "whopping" five people that we had in our class, including the teacher) I assumed they felt the same way as myself. Since I was never given a detailed explanation of optical mineralogy prior to enrolling in the elective, I was completely unaware of how useful it was in furthering the identification and understanding of a material of interest. After the first few weeks of being exposed to new concepts, terminology and a new perspective on mineral identification, I started to really enjoy learning about crystal optics. To me, optical mineralogy was similar to a big puzzle in that you were given an unknown mineral, and by using a combination of the Bertrand lens, wave plates,

refractive index oils, etc. you could determine crystal system (among other things) and eventually narrow it down to a particular mineral. Optical mineralogy not only provides an effective way to identify minerals, but also offers more information about the structure and arrangement of atoms within a mineral. Even basic properties of minerals like prominent cleavage directions can be determined easily just by observing how the grains land when making a grain mount. In my opinion, optical mineralogy is one of the most useful and easy methods of making quick mineral identifications.

Say for instance, you are trying to identify minerals within a rock taken from a dried out playa, you easily scrape off a few grains into some immersion oil, put on a cover slip and check out your findings under the microscope. Immediately you notice very high order interference colors, and a prominent rhombohedral cleavage on many of the grains. Immediately, you can assume that your mineral of interest could be a carbonate, and more specifically might be calcite. In plane polarized light you can double check your first findings and next try to get a close match of the refractive index of your crystal compared to the surrounding oil by using the Becke Line Test. In order to triple check your findings you could switch to conoscopic view and see if you can get any sort of uniaxial interference figure to confirm your findings and finally check for the optic sign of the mineral by inserting one of your wave plates and noticing the color change. If everything checks out, then you are left with a positive mineral i.d. using only your microscope and some refractive index oils. Making grain mounts and looking at crystal optics is simpler and more time effective than performing any other analysis, although sometimes making a grain mount can lead to inconclusive results (it is also difficult at times to orient crystal), and in that case, another analytical method can be employed for help in identification.

I personally believe that optical mineralogy is an integral part of learning how to identify minerals and understand the properties of various crystal structures. Optical mineralogy is, as the title states, "a lost art", and needs to become more of a focus in mineralogy courses. Although at times crystal optics can be a difficult concept to introduce to students, by incorporating these ideas throughout mineralogy and further building upon them in petrology, students will gain a better understanding this topic. Not only is optical mineralogy an important part of mineralogy, but it also offers a unique perspective on how to use the polarizing light microscope to your advantage. The polarizing light microscope is a reliable tool to both mineralogists and geologists alike. For the amount of time and money spent maintaining and operating the more advanced analytical equipment, important information can still be gained from the more affordable and accessible polarizing light microscope.

Shale Gas Production and Seismic Activity in North Texas – An Opinion Statement

Robert Font, CPG 3953

Recent controversy has arisen concerning shale gas production and its possible relation to seismic activity in the north Texas region. Simply blaming the petroleum industry for these events will not solve the problem; these gas resources are essential to our energy independence and needs. Yet, it is entirely our duty to ensure that operational methods are done with public safety in mind and as a top priority.

What is causing these local earthquakes? As geologists, we must seek the truth with no predetermined outcome in mind. As scientists we are compelled to attempt to prove a theory just as hard as we are trying to disprove it. In this case, the need for independent studies is essential to find the real answers and for us to implement workable and effective mitigation methods.

In my experience in studies of rock and soil mechanics, several preliminary observations and speculative statements can be made for this particular case, at this stage. If the frequency of local seismic events has increased since the shale-gas production efforts proliferated, a possible correlation between the two may well be suspected. Without doubt, extraction of large fluid volumes can lead to a degree of consolidation not previously experienced in the area. It is possible that fluids used in operations and specifically injected into disposal wells may be finding their way into smaller and perhaps unmapped faults, lubricating these and resulting in ensuing slippage. (Technically speaking, the faults may move due to an increase in the pore-water pressure and the resulting decrease in the effective stress).

The events in north Texas remind me of the seismic activity experienced in the Denver, Colorado area in the 1960s, when a series of earthquakes were

widely felt throughout. Studies by the USGS traced the cause of these tremors to the injection of nerve gas at the Army's Rocky Mountain Arsenal. When the practice was stopped at the deep (12,000+ foot) injection well, the seismic events ceased. Based on the Denver case history, subsequent studies in a faulted oil field in the Rangeley, Colorado region demonstrated that earthquake activity could be started and stopped, almost at will, by controlling the fluid pressure within the fractured zone. Something similar may be occurring in the north Texas area. Recent works by Dr. Cliff Frolich of the "Institute of Geophysics" at the University of Texas at Austin support this idea. However, further detailed local studies are needed since directly linking all fluid disposal activity to fault activation and seismic events is by no means a foregone conclusion.

I affirm my conviction that shale gas production is a necessary component to fulfill our country's energy needs and that it must be coupled with our best technology to realize our responsibility to public safety. I am confident that we have the scientific knowledge and ability to accomplish both. Thorough and critically-timed independent studies are needed to establish the proper interpretations and conclusions. This constitutes a great opportunity for targeted scientific research (including university student involvement) to contribute to better industry practices and environmental safety efforts. In any event, at the very least, an initial step should include developing detailed structural maps on various key horizons to determine fault locations. Every tool should be used for this purpose, including remote sensing evidence, well data, all-available geophysical records (gravity, magnetic and, hopefully, seismic), etc. Superposition of these structural maps with producing

and injection well spots and epicenter positions for the recorded tremors should prove revealing. Depending on the results obtained from the studies, isolating fault surfaces from injected fluid in disposal wells may be recommended in future practice.

Robert Font is a Certified Professional and Petroleum Geologist and a Licensed Geologist in multiple states. He also holds the title of "European Geologist" as awarded by the EFG and the title of "Chartered Geologist" in the UK. He earned a Bachelor of Science Degree and a Master of Science Degree in geology from Baylor University and a Ph.D., specializing in engineering geology and geomechanics, from Texas A&M University. Font has over 43 years of professional experience in both academia and industry. He is a Past National President and National Vice President of the AIPG, Past President of the Texas Section of AIPG and Past President of the Dallas Geological Society. Font is the author of more than 100 professional papers and multiple courses and the author of the "Test your Knowledge" column in AIPG's *TPG* magazine.

Note to Readers:

Look in the Spring 2015 *TPG* for a summary of "Sustainable Water Management in the Texas Oil and Gas Industry," which surveys the issues of hydrofracturing and petroleum extraction related to water sourcing, disposal, and the regulatory framework in Texas.

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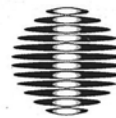
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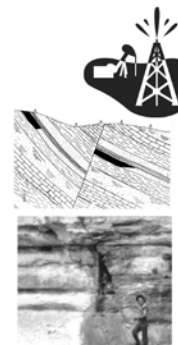
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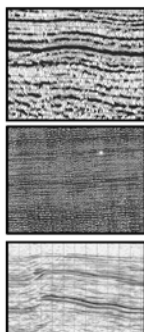
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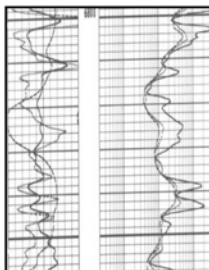
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	As of 11/19/13	As of 10/30/2014
CPG / Active	3,403	3,331
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Associate Member	48	46
Young Professional	67	71
Student Adjunct	2,413	2,983
Corporate Member	1	1
TOTALS	7,314	7,782

New Applicants and Members can now be found on the AIPG website at <http://aipg.org/membership/newapps-mems.html>

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Request For Nominations

The 2015 AIPG Awards Committee is seeking nominations for future recipients of the Ben H. Parker Memorial Medal, the Martin VanCouvering Memorial Award, the John T. Galey, Sr. Memorial Public Service Award, and Honorary Membership. The qualifications for these awards can be found below. Nominations for these awards, accompanied by supporting statement, should be sent to AIPG Headquarters, c/o Honors and Awards Chr., 12000 Washington St., Ste. 285, Thornton, Colorado 80241-3134.

BEN H. PARKER MEMORIAL MEDAL

The Ben H. Parker Memorial Medal is the Institute's most distinguished award. It was established by the Executive Committee in 1969 in posthumous honor of a truly great leader, who devoted much of his life to improve the quality of geology and geologists and the services they provide. The medal is awarded to individuals who have long records of distinguished and outstanding service to the profession.

The most important criterion for this medal is a continual record of contribution to the profession of geology. A wide variety of contributions can be considered, such as (a) the education and training of geologists, (b) professional development of geologists, (c) service to the Institute, (d) leadership in the surveillance of laws, rules, and regulations affecting geology, geologists, and the public, and (e) activity in local and regional affairs of geologists.

MARTIN VAN COUVERING MEMORIAL AWARD

The Martin Van Couvering Memorial Award was established by the Executive Committee in 1979 in posthumous honor of the first president of the Institute. Martin Van Couvering made the presidency a full-time occupation for the first two years of the Institute's history. His dynamic leadership, diplomacy, and organizational abilities established the solid foundation from which the Institute has grown. Few, if any, have given so much to the Institute.

The most important criterion for the Martin Van Couvering Memorial Award is service to the Institute. As in other awards, a wide variety of contributions to the Institute may be considered. By far the most important contribution a geologist can make to the Institute is that of time. It is the contributions by individuals to the Sections, the committees, and special projects that enable the Institute to enhance the practice of geology.

AWARD OF HONORARY MEMBERSHIP

Since 1984, AIPG has conferred Honorary Membership to those who have an exemplary record of distinguished service to the profession and to the Institute.

JOHN T. GALEY, SR., MEMORIAL PUBLIC SERVICE AWARD

The American Institute of Professional Geologists' Public Service Award was established by the Executive Committee in 1982 in recognition of one of its primary purposes: service to the public. In 1992, it was renamed the John T. Galey, Sr., Memorial Public Service Award, in posthumous honor of our fourth President, whose long professional career was a continuum of service to both the geological and the general public.

Recognition of public service is important because so many Members have distinguished themselves and the Institute by giving expert testimony to governmental commissions and committees, and by providing geological expertise where it was needed by the public at large.

The application of geology to the needs of the general public may be in many different forms. Recipients of this award have outstanding records of public service on the national, state, or local level well beyond their normal professional responsibilities.

OUTSTANDING ACHIEVEMENT AWARD

The Outstanding Achievement Award was established by the 1989 Executive Committee to honor a non-member of AIPG who is widely recognized as a major contributor to the profession of geology. The award is not necessarily given annually, but only when the Awards Committee recommends an outstanding candidate to the Executive Committee for their consideration.

In 2013, the Executive Committee voted to expand the scope of the award to include candidates engaged in all types of media that inform or enlighten the public on the roles of professional geologists and the geosciences in society. This award may be for work in any media such as visual (television, film, webcasts), auditory (radio, pod casts), or printed (books, articles, websites). The work must have been completed within five years preceding the award nomination and the nominee may be an individual, a group, or company.

American Institute of Professional Geologists Nomination form for 2015 AIPG Awards

(Please check one)

- Ben H. Parker Memorial Medal John T. Galey, Memorial Public Service Award
 Martin Van Couvering Memorial Award Award of Honorary Membership Outstanding Achievement Award

NAME OF CANDIDATE:

Address:
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NAME OF PERSON MAKING THE NOMINATION:

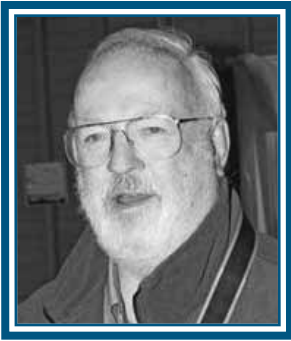
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Supporting Statement (In brief here, please submit detailed letter of support):

RETURN TO: AIPG, Attn: Awards, 12000 Washington St., #285, Thornton, CO 80241. Ph. 303-412-6205 Fax: 303-253-9220

DEADLINE: Completed nominations must be received by January 20, 2015.



Compiled by David M. Abbott, Jr., CPG-04570,
5055 Tamarac Street, Denver, CO 80238,
303-394-0321, fax 303-394-0543, dimageol@msn.com

Topical Index-Table of Contents to the Professional Ethics and Practices Columns

A topically based Index-Table of Contents, "pe&p index.xls" covering columns, articles, and letters to the editor that have been referred to in the PE&P columns in Excel format is on the AIPG web site in the Ethics section. This Index-Table of Contents is updated as each issue of the TPG is published. You can use it to find those items addressing a particular area of concern. Suggestions for improvements should be sent to David Abbott, dimageol@msn.com

Mentoring

"Mentoring" was a popular topic in the Apr/May/June '14 TPG. It was discussed in columns by **William Stone**, MEM-2164, **Stephanie Jarvis**, SA-1495, and **Ray Talkington**, CPG-7935. Stone relates a specific example of mentoring he did. Jarvis is "envisioning a process (formal or not) by which graduating/recently graduated students could be connected to established members in the area they plan on moving to. Such connections could establish the mentor/mentee relationships that are arguably the lifeblood of a professional organization."

Jarvis got me thinking about how I received mentoring in my career and how I've provided mentoring to others. The classic mentor/mentee relationship occurs when both parties are employed by the same firm over a period of time during which the mentor can guide, support, and promote the mentee's career. I've not had such a relationship in my career because there was no senior geologist to guide me during my tenure at the SEC and I've been self-employed since then. But I have benefitted from the guidance and advice of senior geologists in the Denver area.

Because I'm self-employed, I do not have a regular employment relationship with younger colleagues. But I have had mentor/mentee relationships with several younger colleagues over the years. Our contacts have been irregularly spaced in time, sometimes have been in person, but often have been via email. My purpose in describing these relationships is to encourage other self-employed geoscientists to recognize that they can mentor younger colleagues in a similar manner. What is required is that one of the pair reaches out to the other in some way that is potentially helpful and that the other of the pair responds.

Students and young professionals seek out older colleagues whom they admire for one reason or another. We do welcome your inquiries and enthusiasm. Let us know how we can help you. Volunteer to help with professional society activities. This is a way to become known and to demonstrate your skills and interests. Mentor/mentee relationships require attention just like any other relationship. Stephanie Jarvis recognizes that developing such relationships will be informally organized. But she took advantage of opportunities that came her way from a number of older AIPG colleagues and it helped her start her professional career. Do likewise.

Bridge Repairs after Floods

Vic Ridgley, CPG-5138, wrote, "Your column 150 in TPG on the difficulties of ameliorating and preparing for 100–1000-year floods brought back to mind an anecdotal account recounted in James Michener's novel, *Caravans*, of how Afghanis contended with the same issue. Read from p 101 to the bottom of p 108; I think you'll find the remedy entertaining." Briefly, Afghan rivers are normally trickles but become wide-ranging torrents during spring run-off. In the early 1900s, Germany built a number of wonderful bridges between Kabul and Kandahar. While the bridges remained intact, they are useless because spring floods washed away the approaches to them. The Afghan way of making bridges involves a series of up-and-down structures of wood, rather like a rollercoaster that allow the spring run-off to go through the low spots. During the spring floods, the rivers cannot be crossed, but this condition occurs only briefly each year and the bridges remain from year to year. The lesson being that one should pay careful attention to how the natives of an area do things. They may be unconventional, but they are likely to work.

Column 150 (Apr/May/June '14) contained **Peter Dohms'**, CPG-7141, comment on my remarks in column 148 on the catastrophic flooding along several of the rivers along Colorado's Front Range in mid-September 2013. An unusually high snow pack and a cool spring followed by very warm weather resulted in extremely high run-off and re-flooding of some areas along several of these rivers in late May and early June 2014. While the damage was not nearly as extensive this spring, flooding did occur and sometimes in different areas as a result of riparian changes made during the previous flood event.

Michael Urban's, MEM-1910, article, "Natural hazards and disasters: mini-case reviews 2010-2014" in the July-August-September TPG described some of the results of the September 2013 flooding in Colorado accompanied by dramatic pictures of the flood's results in Jamestown, Colorado and downstream in Left Hand Canyon. GoogleEarth™ pictures of the area taken in October 2013 show the extensive damages to homes and the access highways resulting from cutbank erosion, landslides, and debris flows from adjacent drainages. GoogleEarth™ pictures of the Lyons, Colorado area also show extensive flood damage. Repairs are still underway in these and other areas.

Effective and Ineffective Communication and Misinformation

Effective and ineffective communication and misinformation were common themes in **Ray Talkington's**, CPG-7935, "Communication," **William Stone's**, MEM-2164, "What are you trying to show again?," and **Stephanie Jarvis's**, SA-1495, "Siberian Monsters" articles in the July-August-September TPG. Talkington reflects on the changes in communication technology over the years. He describes the problems encountered with the rescue of a field party in northern Quebec a number of years ago, although with the exception of satellite phones, that situation would be the same today. Stone provides examples of poor communication in the graphics accompanying technical reports and their impact on the reader's impression of the author's competence. Jarvis reports on mysterious large sinkholes that appeared in the Yamal and Taymyr Peninsulas, Siberia and some of the crazy "theories" of their origin, which constitute downright misinformation. Combating misinformation can be a difficult task. The Colorado Geological Survey was faced with correcting misinformation this spring when a large landslide occurred on the north side of Colorado's Grand Mesa. The over 2.6 miles-long slide flowed next to an oil and gas well site near its toe (see GoogleEarth™ 39°12'N, 107°51'29"W).¹ Claims that "fracking" at the well site caused the slide had to be refuted.

Expect the Unexpected

Kristina Pourtabib's, SA-3410, Student's Voice column, "Expect the unexpected," describes her experiences in identifying her research topic and problems encountered in pursuing the topic. Her admonition, "expect the unexpected," and the need for adaptability applies in the professional world just as much as it does in the research world.

Tough Ethical Decision Case—the Brucejack deposit example

The events of November 2012 through November 2013 involving what became radically differing professional opinions about the estimates of mineralization at a Canadian gold deposit provide an interesting and real case history about two provisions of the AIPG Code of Ethics. These are the requirement to resign if professional opinions of a consultant and client conflict and cannot be reconciled and the related requirement that when conflicts of professional opinion occur, one should be respectful of those with differing opinions. The existence of conflicts of professional opinion does not necessarily mean that either side has been unprofessional when such opinions are based on logical and scientific principles. The following discussion starts with a review of the pertinent facts and events that form the basis for consideration of the ethical principles.

On November 20, 2012 Pretium Resources Inc. (Pretium) released an NI 43-101 Mineral Resources Update Technical Report by Snowden Mining Industry Consultants (Snowden)

on the Brucejack gold deposit in British Columbia. This report contained an estimate of indicated mineral resources in the Valley of the Kings (VOK) zone containing 16.1 million tonnes grading 16.4 grams of gold per tonne (g Au/t) and 14.1 g Ag/t with a 5 g/t cutoff. Open pit extraction is contemplated. While most of the 57,895 assays for the VOK zone are low grade, extremely high grade samples (9,383 g Au/t maximum assay) were encountered. The mean assay was 8.85 g Au/t and the variance was 3,172 g Au/t. The skewness was 93.4. Clearly, this is an unusual deposit that has extreme grade variations making mineral resource estimation difficult. The first recommendation for mineral resource estimation made in the November 2010 Technical Report was to undertake the mining and processing of a 10,000-tonne representative bulk sample to test the validity of the deposit model and mineral resource estimation approach used by Snowden.²

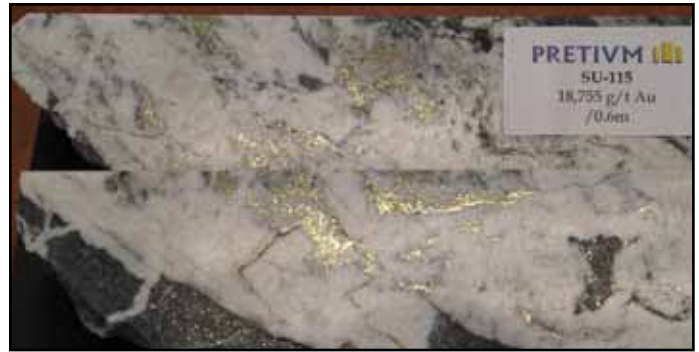
In late 2012 Pretium hired Strathcona Mineral Services (Strathcona) to help select the area to be mined for the bulk sample and to use a sample tower as part of the validation process. Strathcona personnel have used a sample tower on a number of remote mining projects to obtain grade verification of predicted grades from a bulk samples of deposits with a high "nugget" (very high grade samples) without having to ship the entire bulk sample from the remote location.³ The VOK zone is an example of an extremely high nugget deposit. Some electrum particles (the gold-silver proportion overall is 54% to 46% silver) are reported as being centimeters in size. Pretium posted the following pictures on its website <http://www.pretium.com/projects/photo-gallery/high-grade-gold/> accessed 9/4/14.

Work on the bulk sampling program began in the spring of 2013. On September 23, 2013 Pretium issued a press release stating that the entire 10,000-tonne bulk sample had been shipped to the processing mill in Montana and that 6,000 tonnes had arrived at the mill. This press release also reported on seven assays taken from drilling done in connection with the bulk sampling program that exceeded 1,000 g Au/t including one from the Cleopatra Vein, which was discovered in the bulk sample area, assaying 2,140 g Au/t over 0.5 meter and 195 g Au/t uncut over 9.29 meters.

On October 9, 2013 Pretium issued a press release stating that Strathcona had resigned from the project on October 8th. No details about the reason for Strathcona's resignation were included in this press release. On October 10th, Pretium released details of drilling results from 16 of 17 drill fans from the bulk sample area including 3½ pages of detailed assay results and also posted a series of maps and cross sections from this drilling on its website. No mention of the Strathcona resignation was included. Strathcona did not publicly release any information about its resignation. The price of Pretium's stock fell 50% in October 2013.

In an October 22, 2013 press release, Pretium announced preliminary results from the processing of the bulk sample by the mill. It also noted that prior to resigning, Strathcona provided Pretium with preliminary assay results from the sample

1. If you are a landslide fan, look at the over 4-miles long Slumgullion Slide south of Lake City, CO, 37°59'24"N, 107°15'34"W, that formed Lake San Cristobal, Colorado's second largest natural lake. A narrower but long (about 3 miles) debris flow slid off Mt. Meeker during the 2013 floods; see 40°14'45"N, 105°35'12"W (west end) to 40°14'53"N, 105°32'8"W (east end).
2. A maximum 10,000-tonne bulk sample size is specified by British Columbian regulations.
3. Thalenhort, H., and Dumka, D., 2010, Bulk sampling of mineral projects using a sample tower: lessons from the field: CIM Journal, v. 1, no. 1, p. 44-54.



Pretium posted these pictures on its website <http://www.pretium.com/projects/photo-gallery/high-grade-gold/> accessed 9/4/14.

tower, including the 426585 E cross-cut, which averaged 2.08 g/t. Based on the 2,167 tonnes extracted from the 426585 E cross-cut, an estimated 145 ounces would be recovered based on the sample tower results. Preliminary mill processing of the 2,167 tonnes extracted from the 426585 E cross-cut, recovered 281 ounces of gold. In the opinion of both Pretium and Snowden there is a significant difference in the contained gold estimated by the selective sampling of the 426585 E cross-cut by the sample tower and the actual contained gold determined by milling. This press release contained the first specific statements that there was an expert opinion dispute between Strathcona and Snowden, Pretium's independent expert consultants. Both Strathcona and Snowden are highly regarded mining consulting firms.

On November 25, 2013 the *Northern Miner* published an interview with Graham Farquharson, Strathcona's founder and president, responding to Pretium's announcements of its bulk sampling results. Strathcona's assessment contrasts starkly with Pretium and Snowden's mineralization model and mineral resource estimate. In its October 8th resignation letter to Pretium, Strathcona said, "there are no valid gold mineral resources for the VOK zone, and without mineral resources there can be no mineral reserves, and without mineral reserves there can be no basis for a feasibility study ... Statements included in all recent press releases about probable mineral reserves and future gold production [from the VOK zone] over a 22-year mine life are erroneous and misleading." Strathcona believed that the discovery of the high-grade Cleopatra Vein skewed the results.

The expert opinion dispute between Strathcona and Snowden centers on the estimation methodology and the interpolation method used—how far can the latent values of very high grade assays scattered throughout the deposit be projected. Farquharson also stated that there is gold in the VOK, that it is not a Bre-X-type fraud, but that Strathcona believes the project needs a very different geological model and changing the mining approach to small tonnage, high grade vein mining from bulk mining.⁴

In summary, two highly regarded mining consulting firms, Strathcona and Snowden, reached very different interpretations of the data available from the VOK zone in the Brucejack project. While none of the individuals involved in this dispute

are AIPG members, their actions comply with two important provisions of the AIPG Code of Ethics making this an important and real professional ethics case history. The first provision is Standard 3.5, "Members who find that obligations to an employer or client conflict with professional or ethical standards should have such objectionable conditions corrected or resign." Strathcona's evaluation of the data it had reviewed led it to believe that its client, Pretium and Snowden, were using an inappropriate geologic model and mineral resource estimation methodology. Having failed to convince Pretium of its position, Strathcona resigned. Strathcona did not release its reasons for the expert opinion dispute, apparently believing that was Pretium's responsibility to do so. When Graham Farquharson did comment on the dispute in the November 29th interview, he made clear his view that Pretium and Snowden were not engaging in a Bre-X-type fraud.

The second provision of the AIPG Ethics Code is Standard 4.2, "Members should be accurate, truthful, and candid in all communications with others regarding professional colleagues." And Rule 4.2.1, "A Member shall not issue (a) false statement(s), (a) misleading statement(s), or (a) sensational, exaggerated, defamatory, and or unwarranted statement(s) regarding a professional colleague. Differences of opinion occur and statements regarding opinions should be restricted to and based on logical and scientific principles and should be made in a respectful and professional manner." Both Strathcona and Snowden based their differing professional opinions on their interpretations of the data available at the time. Their statements about the dispute were respectful of each other. Strathcona had to know that its resignation would have significant negative impact on Pretium's stock price when disclosed. Pretium announced the resignation, albeit without detailing Strathcona's reasons, and its stock price fell 50% in the following month. In subsequent press releases Pretium and its consultant, Snowden, continued to stick with Snowden's professional opinion and backed these statements up with additional data summarized in press releases.

Which professional opinion, Strathcona's or Snowden's, will ultimately prove to be most correct has not yet been determined. Mining of the Brucejack deposit and the VOK zone and the resulting gold and silver recovery will, if undertaken, decide the question, but mining has not commenced and will not be completed for some years thereafter.

4. The 1997 exposure of the fraudulent salting of samples from Bre-X's Busang deposit in Indonesia, uncovered by Strathcona, led to the adoption of Canadian NI 43-101 as means of preventing such fraud in the future.

AIPG IL-IN Section Field Trip

“A Glance at the Kentland Quarry Geology”

Nahid Brown, PG



The 2014 annual AIPG IL-IN Section field trip to the Kentland Quarry in Indiana was a huge success. It was well attended and educational. There were 35 participants including 8 geology students from Illinois, Indiana, and Kentucky. AIPG had invited Dr. Nelson Shaffer, an expert in the area, to share his knowledge with the participants. Dr. Shaffer's enthusiasm and energy was inspirational. His presentation and knowledge of the area made the trip quite educational. His explanation of the sequence of events offered clarity and a greater sense of appreciation to the significance of this geologically unique location. This certainly was a memorable and thought provoking trip.



Photo 1. Dr. Shaffer on the right.

After the initial introduction given by Dr. Shaffer, participants scattered in search of perfect rock samples to show others and to take home. Often times we would stop and stare at the quarry walls in an attempt to gather more information about the complex structural features of the quarry.

As I walked inside the quarry, the rocks started telling their story of a violent past and displayed how the meteorite had impacted the area. I found myself surrounded by synclines and anticlines with limbs that were cut by faults.



Photo 2. Field trip participants admiring the awe-inspiring structures displayed along the quarry walls.

Folding and faulting are dominant features in the quarry. The south quarry wall outlines a continuous steeply plunging anticline-syncline-anticline structural trend. The dramatic changes in lithology and presence of prominent white patches of the pulverized St. Peter Sandstone along the southern wall were clear indication of a complex fault system in the quarry. The Kentland Quarry Fault (KQF) is a reverse fault. The white, fractured, granulate, St. Peter Sandstone forms the footwall, and the hanging wall consist of the hard, brittle Joachim Dolomite and the lowest part of the Platteville limestone in the KQF zone (Gutschick, 1987).



Photo 3. Shatter cones from Kentland Quarry.

A closer look at the rocks revealed even more intriguing and unique features such as breccias and shatter cones. Shatter cones are small, striated, cup and cone structures that are commonly associated with limestones and dolomites found in the meteorite impact sites. Formation of these features indicates that rocks in Kentland have experienced “mechanical shock” during the impact (Shaffer, 2014).

General Information

The Kentland Quarry of the Newton County Stone Company, a subsidiary of the Rogers Group, Inc., occupies ~100 acres of land located approximately 40 miles northwest of Lafayette. Quarrying targets Ordovician (Galena –Platteville Groups) and Silurian carbonates. These valuable commodities are mined, crushed, and used as construction and road building aggregate.

Physiographically, Kentland quarry is located at the extreme northeast margin of the Illinois Basin and the southwest flank of the Cincinnati and Kankakee Arches which separate the Illinois and Michigan Basins (Figure 1). Regional stratigraphy consists of a thin layer of Pleistocene glacial deposits overlying the fairly horizontal Paleozoic rocks. Paleozoic rocks consist of Devonian and Mississippian formations and some small Pennsylvanian outliers.



Figure 1. Kentland, Indiana.

Kentland Quarry is a very unique aggregate mine because the mining operation has revealed the location of the fourth largest meteorite impact site in the United States. According to Gutschick, a meteorite less than one kilometer (0.5 mile) in diameter struck the earth at this location and created a circular complex impact structure with a diameter of ~13 Kilometers (~8 miles) (Gutschick, 1987). However, a more recent empirical study based on the observed 600 meter (0.4 miles) uplift value suggests that the diameter of the Kentland structure may be half of the reported 13 Kilometers. The disturbance and uplifting of the Paleozoic strata indicates that impact must have happened after the formation of these rocks ~300 million years ago. Additional chemical analysis and paleomagnetic study of the samples collected from the quarry suggests a maximum age of 97 to 10 million years (Weber, et al. 2007).

The Kentland crater is a structural dome and the quarry is located in the northern flank of the central uplift of the structure. The central uplift is ~1 Km in diameter and contains intense structural dislocations consistent with the inward and upward displacement due to rebound of the impact-compressed material. The diameter of the Platteville Group perimeter is 10 percent shorter than the length of the segments at the stratigraphic level of the base of this group. This shortening of perimeter is an indication that inward movement as well as upward displacement has taken place in the central uplift (Laney, et al., 1978).

The structural deformation is exposed along the quarry walls, where the initially flat-lying layers of sedimentary rocks are completely overturned mak-

ing a huge irregular bull's eye pattern (Figure 2).

At Kentland Quarry, Paleozoic strata have been uplifted to form a structural dome whose south and west flanks are broken by faults. Subsequent to uplifting, approximately 300 million years of history recorded in the Paleozoic rocks were eroded away prior to deposition of the Pleistocene glacial deposits. Figure 3 shows a simplified stratigraphic column of principal rock types. The oldest rocks in the dome area consist of Lower Ordovician Shakopee Dolomite.



Figure 2. Bended and overturned limestone layers along the quarry walls.

Over time, the mining operation has exposed ~1000 feet of structurally modified stratigraphic section in the quarry. The complex structural geology of the impacted area is guaranteed to present a challenge to structural geology students and scholars alike.

Acknowledgements

Organizing field trips is a collaborative effort and needs a lot of work. Many thanks to the AIPG IL-IN section board members: Ramona Cornea, Jeff Groncki, and Craig McCammack who organized this field trip. It should be noted that the Kentland Quarry is not open to the public, and permission to visit the quarry must be made in advance. Special thanks to Rich Miller, quality control manager at the Kentland Quarry, for allowing us to visit the quarry.

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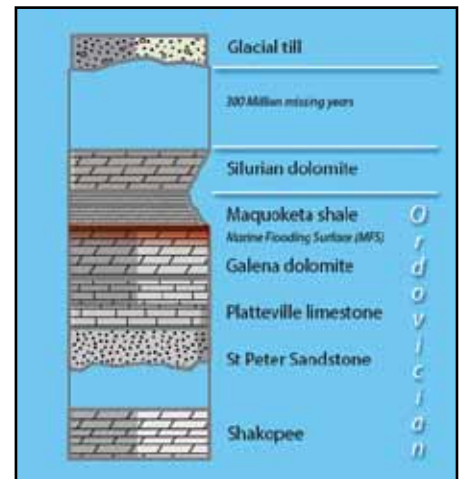


Figure 3. Simplified stratigraphic column for Kentland Quarry geology (Weber, et al, 2007).

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Exploring the Kentland Meteorite Impact Site

Chelsea Conduitt, SA-5802
Reina Hiramatsu, and Christa Phelps

Imagine 97 million years ago, a sudden impact to what is now the little town of Kentland, Indiana, that brings with it a few hundred gigapascals of pressure and twice the temperature of the Earth's core (Collins et al, 2012). Evidence of the force associated with the Kentland meteorite impact is manifested by the presence of shattercones, breccia dikes, multiple faults and unique disruption of strata in a 13 km diameter complex crater (Gutschick, 1987). The energy associated with an impact of this magnitude is hard to comprehend. On August 9, 2014, a group of students and geology professionals had the distinct privilege of attending a field excursion sponsored by AIPG to the aggregate Newton County Stone Rogers Group Rock Quarry that has been at the site since the late 1800's. Quarry representatives and AIPG members were very accommodating and not enough can be said to express our sincere appreciation for the rare opportunity to explore the site. Reading articles about the Kentland meteorite impact site pales in comparison to visiting this incredible geologic feature.



Photo by Chelsea Conduitt. Glauconite in vertically oriented strata.

The Kentland impact crater and quarry create a window into northern Indiana bedrock, unlike any other site in the state. Field trips to see southern Indiana geology are incorporated into the curriculum of several geology classes at Indiana University Purdue University Indianapolis (IUPUI). The

bedrock, commonly exposed at roadcuts, is generally oriented horizontally with the youngest strata on top, with some gentle dipping extending from the Cincinnati Arch toward the Illinois basin. Simply observing the bedrock of Northern Indiana, normally unexposed under a thick blanket of Pleistocene glacial deposits, seemed a bit surreal. The quarry walls were formed of stratigraphic layers that varied greatly in their orientation. Some strata were perpendicular to the horizon, some were curved, and some strata angled in one direction and were located adjacent to strata that were angled in another direction.

Faulting and folding could be seen along the quarry walls. Outcropping Ordovician age St. Peter Sandstone that had been uplifted over 600 m, was a towering reminder of the amount of displacement that had resulted from the impact (Gutschick, 1987). Evidence of catastrophic disruption was all around us.



Photo by Chelsea Conduitt.

Admittedly, the highlight of the trip was in adding a few amazing samples to our personal rock collections. Parts of the quarry had shattercones strewn about everywhere. Impact breccias were less common, but highly prized. Another area had piles of eroded shale that were ripe with pyrite cubes. The quarry walls echoed with animated discussion over new found treasures. For geology students and professionals, our field trip to

the Kentland quarry was a bit sweeter than being a kid in a candy store.

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Photo by Chelsea Conduitt.



Shattercone I collected. Photo by Christa Phelps.



Chelsea Conduitt in front of iron stained ~45 degree dipping strata. Photo by Christa Phelps



Reina Hiramatsu in front of vertical strata. Photo by Christa Phelps



Christa Phelps and others exploring the quarry. Photo by Chelsea Conduitt

Annual Meeting Photos



Business Meetings, and Award Winners



Business Meeting attendees.

Exhibitors and Posters



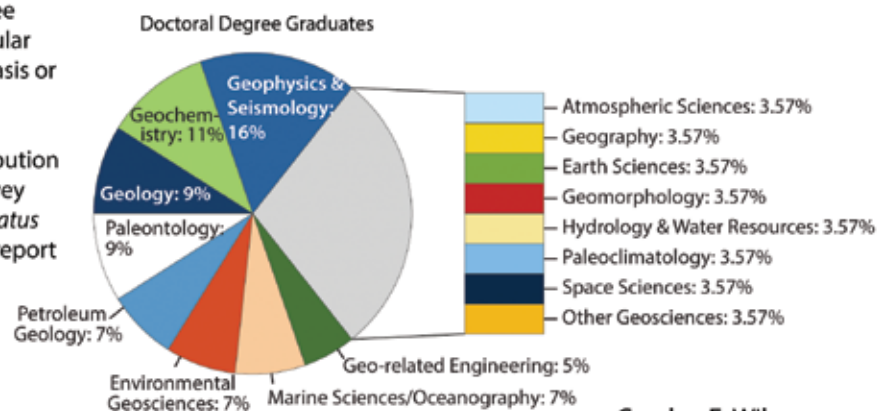
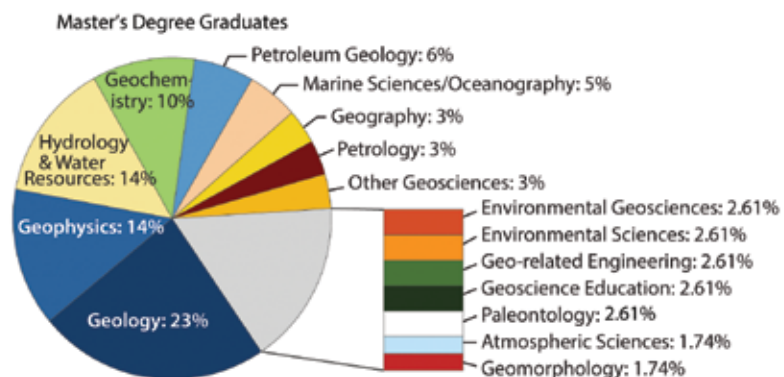
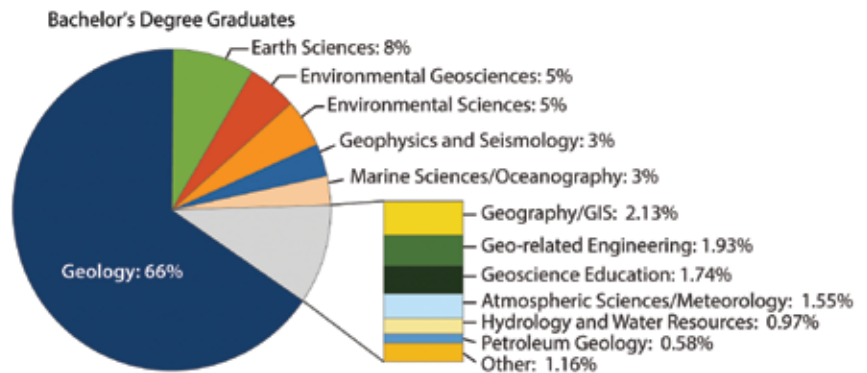
Field Trips

Chosen Degree Fields of Geoscience Graduates in the 2013-2014 Academic Year

In the fall, spring, and summer of Academic Year 2013-2014, AGI distributed AGI's Geoscience Student Exit Survey nationally to students graduating with a bachelor's, master's, or doctoral degree in a geoscience field. The survey generated 688 responses from 167 different departments. Out of the 688 responses, 517 came from bachelor's graduates, 115 came from master's graduates, and 56 came from doctoral graduates. Using AGI's graduation data from 2013, this sample size was determined as considerably large enough to represent the population of geoscience graduates.

The pie charts display the chosen degree fields of the geoscience graduates. Geology continues to be the most popular degree among undergraduates with students specializing in different fields more often in graduate school. The "Other Geosciences" categories represent degree fields such as economic geology, petrology, mineral physics, and paleomagnetism. For bachelor's graduates, the "Other" category also includes a few interdisciplinary degree fields created specifically for a particular department that allows for an emphasis or minor in a geoscience field.

More data from the 2013-2014 distribution of AGI's Geoscience Student Exit Survey will be published in the upcoming *Status of Recent Geoscience Graduates 2014* report due out in September.



- Carolyn E. Wilson

Figures created by Kathleen Cantner

FOUNDATION OF THE AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS

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Purpose

To assist graduate students with college education costs and to promote student participation in the American Institute of Professional Geologists (AIPG). One scholarship will be awarded to a declared graduate student in an accredited geoscience program with an emphasis in environmental geoscience and/or hydrogeology. Details for applying for this scholarship are provided below.

Scholarship Awards

Scholarship award is in the amount of \$1,000.00 to an eligible graduate student attending a college or university in the U.S. Scholarships are intended to be used to support tuition, room and board, and/or research.

Eligibility Requirements

Any graduate student who is majoring in the geosciences in the U.S. can apply. Also, the student must be either a student member of AIPG or must have applied for student membership at the time the application for the scholarship is submitted.

The student who is awarded the scholarship agrees, by accepting the scholarship, to prepare a 600 to 800 word article for publication in *The Professional Geologist*. The subject of the article must be related to a timely professional issue.

Application Process

1. Submit a cover letter introducing yourself and tell us what you have done outside of the class room such as research projects, officer in club, or outside activities within the community. Address your career goals in near term and longer term.
2. Submit an essay on "Why I Want to be a Geologist."
3. Submit a copy of your transcript (unofficial) and documentation that you are a current student. Requisite standards to apply are a minimum GPA of 2.8 (on a 4 point scale) and a minimum of 12 semester credits of geology/geoscience courses with a 3.0 GPA in these courses completed at time of application.
4. Submit a letter of recommendation from a geology/geoscience professor that provides an emphasis on your performance and activities in the classroom, in the department, and your character in how you work and help other students.

Basis of Award

The scholarship award will be based on the cover letter, recommendation, transcript and the content and creativity of the essay as judged by the Education Committee. The decision of the Education Committee is final.

Miscellaneous

Application requirements for student membership to AIPG: Student must be currently enrolled in a geological science degree program (as defined by the American Geological Institute).

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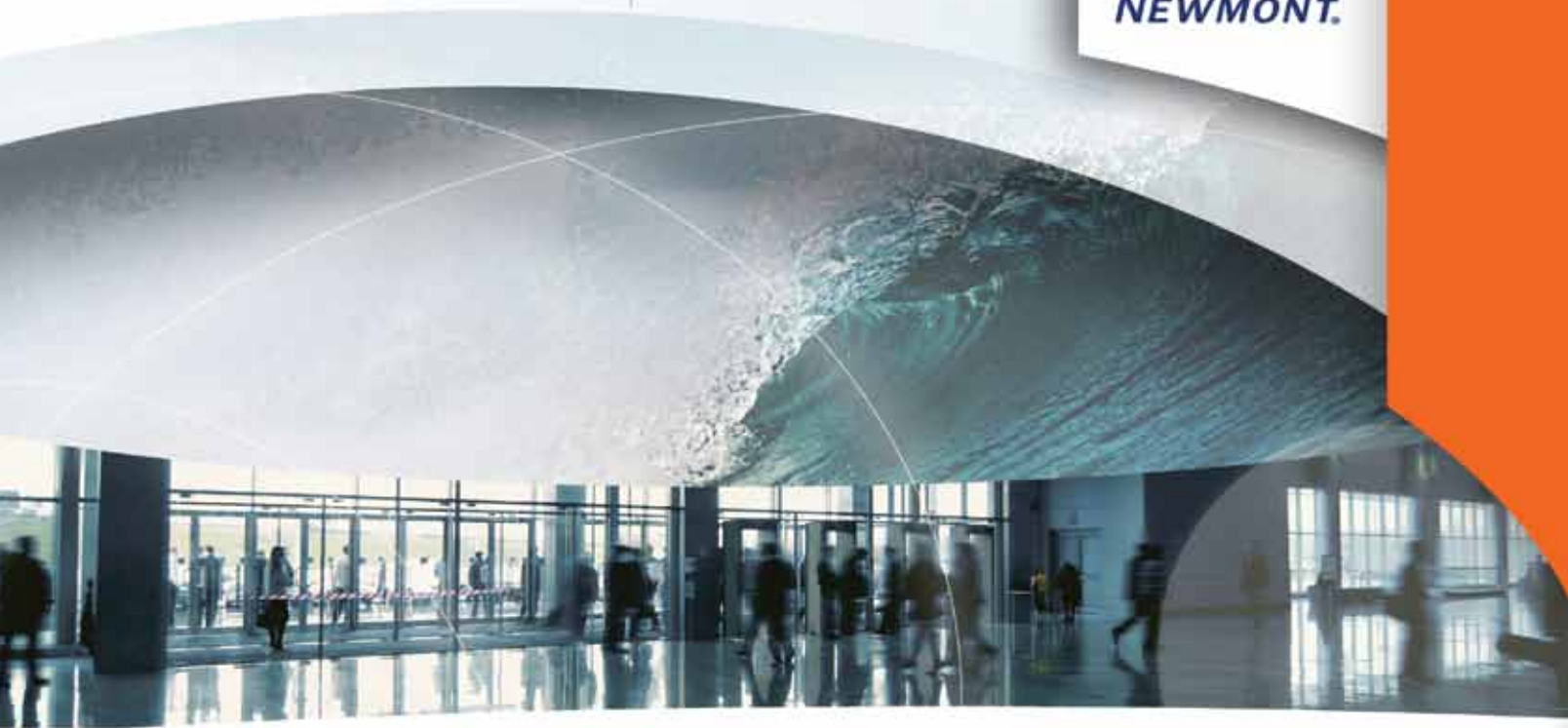
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