

austin geological society



bulletin

volume 8
2011-2012

Cover photograph: Alex S. Broun discusses his geologic work in the subsurface using geophysical logs and borehole cuttings during the November 2011 field trip.



note from the president

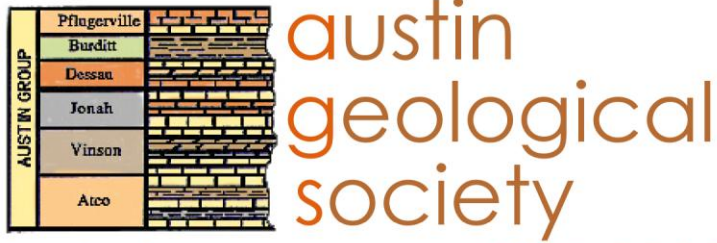
What a great year for the Austin Geological Society. There was a little external excitement with the concerns over changes to the Professional Geologist licensing rules but, after moving past it, we were able to turn our focus to providing an excellent program of speakers and special events. Much credit is due to the committee chairs and elected officers that give of their time, but it is the outstanding member participation that makes this society work. One special thanks we owe is to Brian Hunt for putting the AGS Bulletin together every year. The bulletin is a great publication and it is an exciting event to see each one come out.

Something we should be very proud of for the 2011-2012 season is AGS joined with several other groups to sponsor the publication of a much needed ‘Hydrologic Atlas of the Hill Country Trinity Aquifer’ by editors Al Broun, Doug Wierman, and Brian Hunt. The project was completed with the Atlas donated to many libraries and resources. This book, with many multipage illustrations and plates, was revealed to AGS on October 4th, 2011, and exceeded all expectations.

Finally, on a personal note, it was an honor to serve as President of AGS. The talks, field trips, and education outreach AGS hosts and participates in are important for supporting our community and exposing the next generation to the geological sciences. Thanks to all of you for efforts!

Sincerely,

Johnathan R. Bumgarner, P.G.



mission: The mission of the *Austin Geological Society Bulletin* is to (1) summarize the previous year's activities of the Society and (2) publish technical papers, comments, and notes concerning the natural sciences of Central Texas.

editors: Brian Hunt, Barton Springs/Edwards Aquifer Conservation District
John Mikels, GEOS Consulting
Dennis Trombatore, University of Texas at Austin

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contents

Note from the President	ii
AGS Bulletin information	iii
Table of contents	iv
Officers and committee chairs	1
News from the Society	2
Status Report to GCAGS	8
In Memorium	10
About the technical content	12
Abstracts of Presentations	
Panel Discussion on Ethics in Geoscience Across the Employment Spectrum <i>by Ann Ardis, Kirk Holland, Robert Kier, and Ernest Lundelius</i>	13
Evolution of the Marathon Basin: A Slide and Sound Presentation <i>by Earle F. McBride</i>	14
Developing Water Resources in Kenya: Technical, Sociological and Economic Challenges <i>by Bruce K. Darling</i>	15
Geology of the Jollyville Transmission Main <i>by Ray Brainard, Jim Sansom, and Alan Shield</i>	17
The Polar Troughs of Mars as Aeolian Cyclic Steps: A Framework for Understanding Surface Evolution on the North Polar Ice Cap <i>by Isaac Smith</i>	18
M. King Hubbert, The Myth of 'Peak Oil,' and U.S. Energy Policy <i>by Peter R. Rose</i>	19
Projecting the Impacts of Relative Sea-Level Rise and Erosion on Texas Barrier Islands and Planning for the Future <i>by James C. Gibeaut</i>	21
Poster titles and authors	23
Student science fair posters	24
Onion Creek vs. Barton Creek: Aquatic Macroinvertebrates Determine the Water Quality <i>by Hannah Hoffman</i>	25
Are Drugs in Our Streams?—Use of Asian Clams as an Indicator Species <i>by Frank Linam</i>	26

The Effect of Drought on the Water Quality of the Colorado River in Central Texas
by Shyam Sharma.....27

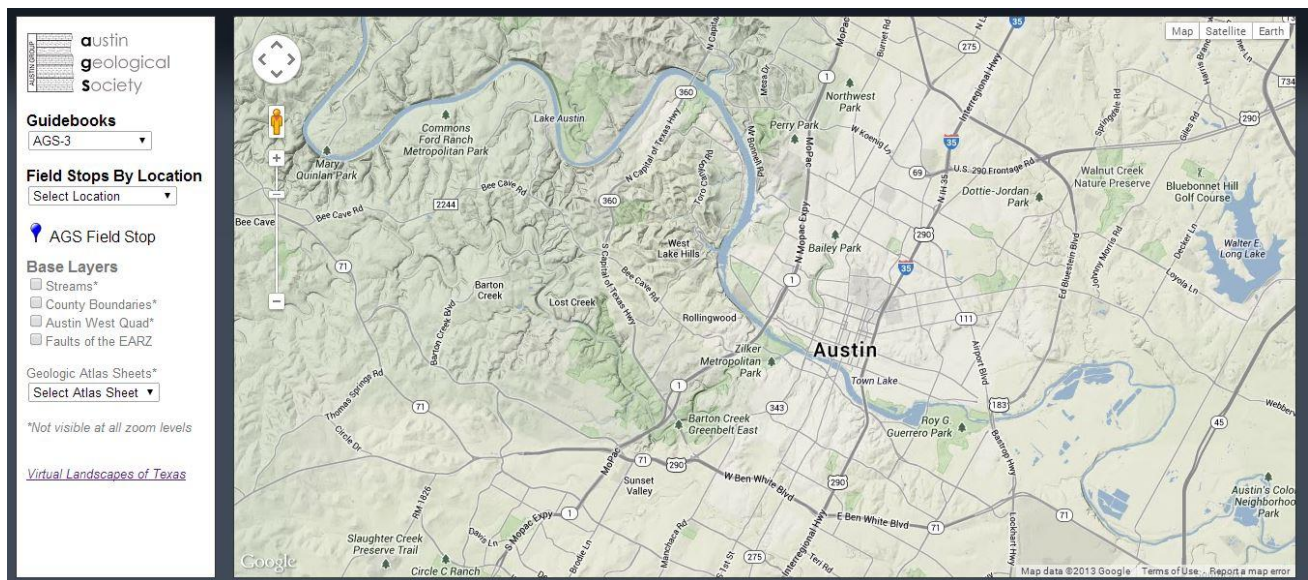
Do the Barton Springs Salamanders Have Enough Oxygen
by Clara Smith-Salgado.....28

Field trip

Surface to Subsurface Trinity Lithostratigraphy: Implications for Groundwater Availability in the Hill Country, Eastern Blanco and Northern Hays Counties, Texas
by Brian B. Hunt, Douglas A. Wierman, Alex S. Broun, C.M. Woodruff, Jr.,
and Ronald G. Fieseler.29

Note

1966 UT Tower Shooting: Memories and Vantage of a Tragic Day by a Geologist
by James W. Sansom, Jr.....32



Screen capture of the “AGS Mapper” that is available on the AGS website. The online application shows all stops from AGS field trips by selecting a guidebook. Base layers include geologic maps. The application was developed by Edward Ficker.



officers 2011–2012

President:

Johnathan R. Bumgarner —U.S. Geological Survey

President Elect:

Pete Rose —Rose & Associates, LLC.

Vice-President:

Becky Smyth—Bureau of Economic Geology

Secretary/Newsletter:

Katrina Patterson — Environmental Resource Management

Treasurer:

Jim Sansom—Consulting Geologist

Past President:

Dallas Dunlap—Bureau of Economic Geology

committee chairs

AAPG Relations:

Laura Zahm—Bureau of Economic Geology

Awards:

Pete Rose

Bulletin:

Brian B. Hunt—Barton Springs/Edwards Aquifer Conservation District

John Mikels—GEOS Consulting

Dennis Trombatore— University of Texas at Austin

Education:

John K. Mikels—GEOS Consulting

Endowed Scholarship:

Shane Valentine

Field Trip:

Chock Woodruff—Woodruff Geologic Consulting

Historical:

Dennis Trombatore—Walter Geology Library, The University of Texas at Austin

Membership:

Jim Sansom— Consulting Geologist

Publications:

Steve Ruppel—Bureau of Economic Geology

Student Liaison—Graduate:

vacant—The University of Texas at Austin

Student Liaison—Undergraduate:

Steve Gohlke —The University of Texas at Austin

vacant—Austin Community College

Website:

Edward Ficker

news from the society

First AGS Meeting: Annual Ethics Talk

August 29, 2011

AGS started the year with a very well attended panel discussion about ethics. The room was filled to capacity, which usually means >120 attended. Panelists gave a few minutes of overview about ethical situations from their professional experiences, and then questions were fielded from the audience. Panelists included:

- Ann F. Ardis, P.G. – USGS Texas Water Science Center, Austin
- Kirk Holland, P.G. – Barton Springs/Edwards Aquifer Conservation District
- Robert S. Kier, PhD, P.G. – Robert S. Kier Consulting, Austin, TX
- Ernest Lundelius, PhD, Emeritus Professor – UT Austin Department of Geological Sciences



Photograph of Ann Ardis giving her opening presentation.



Patricia Dickerson addresses one of the questions from the audience.

GCAGS 2011 convention cancelled in Veracruz, Mexico

September 2011

Regrettably, the first international meeting of GCAGS had to be cancelled in Veracruz, Mexico due to safety concerns over the drug-related violence in the region. The GCAGS 2011 Transactions were published, and a special session of invited papers was held at the GCAGS 2012 in Austin.

“The Organizing Committee wishes to thank all the stakeholders in this effort for their commitment and hard work to assemble the best possible technical program, field trips, short courses, exhibition offerings, student activities and social events. The GCAGS, the host society AMGP, their officers and volunteers are grateful to everyone for their support and efforts in connection with GCAGS 2011” (GCAGS 2011 website).

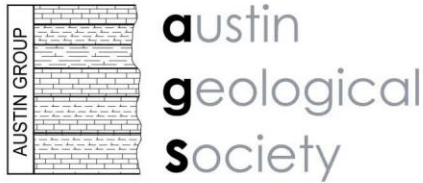
Distinguished Service Award to Eddie Collins and Doug Ratcliff

AGS recognized Eddie Collins for his numerous contributions to AGS field trip over the years. Doug Ratcliff was recognized for his efforts to educate our future leaders through the GeoFORCE program.

AGS Responds to the Texas Board of Professional Geoscientist Proposed Rule Changes

October 2011

AGS Executive Board wrote a letter in opposition to the proposed Texas Board of Professional Geologists (TBPG) rules changes for licensing. Among those practices impacted by the proposed changes are the private practice of oil and gas geologists and the independent research of academic institutions. Although these proposed changes have been pulled back by TBPG, AGS felt that the issue was not yet resolved, and we encouraged each of our members to communicate their opinions to the TBPG board members.



Austin Geological Society
P.O. Box 1302
Austin, Texas 78767-1302
<http://www.austingeosoc.org/index.php>

October 27, 2011

Mr. Charles Horton
Executive Director
Texas Board of Professional Geoscientists
P.O. Box 13225
Austin, Texas 78711

Dear Mr. Horton,

RE: TBPG Petition for Adoption of Rules
Texas Register, dated September 30, 2011

The purpose of this letter, sent on behalf of the Austin Geological Society's Executive Board with input from elected officers and active members, is to object to the Texas Board of Professional Geoscientists' (TBPG) recently proposed changes to rules posted in the September 30, 2011, *Texas Register*. We specifically and strongly object to language in Part 39, Texas Board of Professional Geoscientists 22 TAC §851.10, §851.33, and §851.34, and conclude that these sections should be rescinded in their entirety. The proposed rules misrepresent what is contained in the Texas Occupations Code; are not in the interest of public health, safety, or environmental or economic welfare; and are an apparent attempt to impose a political agenda on scientific research and teaching in the State of Texas, as well as to expand the regulatory authority of the TBPG.

The changes proposed to "identify and define non-exempted geoscientific work" (§851.33, §851.34) represent a complete reversal in the philosophy and intent of the Texas Geoscientists Practice Act (Act) as defined in the Texas Occupations Code (TOC). TOC authorizes TBPG to "adopt rules related to the public practice of geoscience by a firm or corporation." The Act clearly states that geoscientists in the private sector and academe are exempt from licensure. Even so, many of the geoscientists working in these areas choose to be registered out of respect for their public-sector colleagues and concern for good professional practice in our home state. A primary intention of the Act is to provide public-sector geoscientists with the means to compete fairly against registered engineers in Texas who, prior to formation of the TBPG, were attempting to control aspects of *geological* practices. We conclude that if the proposed rules are adopted, the public-sector geoscientists may lose their ability to practice within their own areas of expertise in Texas!

1

The apparent attempt to increase State revenue by requiring registration of private-sector geoscientists, particularly those working in oil and gas, ignores the possibly larger financial impact on discovery and development of oil and gas resources if the TBPG attempts to impose onerous requirements on these workers. An example of an onerous requirement is found in the definition of the term “workpiece.” In §851.10, workpiece “ is defined as any report, map, survey, data collection, interpretive workstation product, computer-generated product, or other document that is related to the practice of geoscience, regardless of the type of workpiece format, including hardcopy and electronic media.” TBPG is supposed to provide and enforce a Code of Conduct for public-sector geoscientific practices in Texas, not attempt to dictate permissive practices among geoscientific industrialists or micromanage how these professionals conduct their daily activities.

Not only does it appear that the TBPG is attempting to stifle oil and gas development in the State of Texas, it also seems that the TBPG wishes to control activities related to “subterranean storage or sequestration of gases, including CO₂ sequestration.” Again, parts of the proposed rule included in §851.33 could impact the supply of natural gas, excess quantities of which are injected and stored in the subsurface for possible use during energy shortages associated with national emergencies.

Subsurface geologists, working in both the petroleum industry and CO₂ sequestration, are familiar with the uncertainty surrounding estimates of capacity for geologic formations to retain fluids. For this and other reasons, it is unreasonable for TBPG to include in its proposed rules (e.g., §851.33) a requirement that statistical certainty be asserted for the retention of gas in the subsurface. The U.S. Environmental Protection Agency already regulates practices surrounding the injection of fluids into the subsurface through Underground Injection Control statutes in the Safe Drinking Water Act of 1974. The Railroad Commission of Texas (RRC) has primacy for injection of (1) natural gas for subsurface gas storage, (2) CO₂ for enhanced oil recovery, and is in the process of applying for primacy over injection of (3) CO₂ for pure subsurface CO₂ storage (also known as *brine sequestration*). It is unclear to us why the TBPG is trying to duplicate already well-established rules for subsurface injection of gas. For these reasons and others, we insist that §851.33 be rescinded.

One more area in which the TBPG appears to be overstepping its bounds through publication of the proposed rules is the study of climate science. Climate science is a rapidly advancing, multidisciplinary, academic field of study that has become a tool in political partisanship. In §851.33(b)(2), the TBPG is apparently attempting to overturn the exemption of academic geoscientists engaged in research, specifically those working on climate-science issues. For example, this rule states that geoscientists preparing a “workpiece” on the study of past, present, or future climatic conditions or climate science for use in any public primary educational institute, government agency, or quasi-government agency is subject to jurisdiction of the TBPG. By seeking to place ALL climate-related science under the regulation of the TBPG, and, thus, requiring larger swaths of the scientific community to operate as registered geoscientists, TBPG is negatively affecting the rights of scientists to work in this state. Under no

reasonable interpretation of existing enabling language does the TBPG have this right. Furthermore, in §851.33(d), the TBPG proposes to dictate how the scientific process should progress through description of what the TBPG apparently views as an approach to research. Again, existing regulations already provide for regulation of standards of practice; these added regulations are, therefore, duplicative and should be scrapped in their entirety.

In summary, we suggest that the TBPG may be attempting to impose a fiscal and political agenda on industrial and academic practices in the State of Texas. It is the conclusion of the AGS that the TBPG is seeking—to use additional funding from the expected influx of geoscientists working in the oil and gas industry, and the enforcement of existing geoscientists who would be investigated by the TBPG for operating under these onerous regulations, to increase state revenue. We further expect this approach to backfire because it is no more than an attempt to police activities related to subsurface gas storage and university research in climate-related sciences.

We think the primary objective of TBPG registration should be to allow geoscientists working in the public sector (i.e., primarily the fields of hydrogeology, environmental geology, and engineering geology) to have the respect and credentials they need to perform work in the interest of public health, safety, and general welfare of the State of Texas. The rules proposed in 22TAC §851.10, §851.33, and §851.34 are incongruous with this objective, are ill considered, and should be rescinded in their entirety.

Sincerely,



Rebecca C. Smyth, rebecca.smyth@beg.utexas.edu

on behalf of the Austin Geological Society's Executive Board:

Johnathan R. Bumgarner, 2011-2012 President
Peter R. Rose, 2011-2012 President Elect
Dallas B. Dunlap, 2010-2011 President
Rebecca C. Smyth, 2011-2012 Vice President
Bruce K. Darling, 2011-2012 Treasurer

cc: Ron Kitchens, TBPG Chair
Charles Knobloch, TBPG Vice-Chair
Kelly Krenz-Doe, TBPG Board Member
C. Thomas Hallmark, TBPG Board Member
Becky L. Johnson, TBPG Board Member
Justin McNamee, TBPG Board Member
Judy A. Reeves, TBPG Board Member
Barbara Roeling, TBPG Board Member
Gregory C. Ulmer, TBPG Board Member

AGS Education and Outreach

Sept. 2011 – May 2012

AGS members shared their time, talents, and experience by presenting at various earth science, education and outreach events over the 2011-2012 year. These events included:

- Earth Science Week Career Fair at UT-PRC, October 2011. Several AGS members gave presentations to Austin-area Middle School students on earth science topics (groundwater, everyday uses for rocks and minerals, environmental geology, etc.) and careers in the geosciences.
- Boy Scouts of America Geology Merit Badge, April 21, 2012. Joe Swift and John Mikels presented on a variety of geologic topics to Boy Scouts at the Lost Pines Boy Scout Camp on Lake Bastrop.
- As part of Science Day at Bridgepoint Elementary School (Eanes ISD), Dallas Dunlap and John Mikels gave presentations on earth science topics to the students (January 2012).
- 2012 Regional Science Fair, February 23, 2012. Many thanks to the AGS members who volunteered as judges including: Al Cherepon, Doug Wierman, Randy Williams, Scott Tiller, Diane Poteet, Kylara Martin, and John Mikels. For the past few years, AGS has done proxy judging on behalf of the Association of Women Geoscientists (AWG). This year, AGS member Diane Poteet judged for AWG. Also, two AWG members, Velita Cardenas and Elizabeth Montgomery, judged on behalf of AWG – and came up from San Antonio to do so.
- Students from the Eanes ISD schools were educated on groundwater resources and aquifers and on the everyday use of rocks and minerals as part of their fieldtrip to the KDBJ/Nehemiah limestone quarry in Hays County.
- Dallas Dunlap was the invited geo-speaker at Saegert Elementary School, in Killeen, on May 11, 2012.
- On May 11, 2012, Jim Sansom and John Mikels presented on geoscience topics and careers therein at the Career Fair Day at Taylor Middle School, Taylor, TX.

status report to GCAGS



P.O. Box 1302
Austin, Texas 78767-1302

April 2, 2012

Current Report to the Gulf Coast Association of Geological Societies (GCAGS)

Meetings:

AGS meets once each month August through May at 7PM at the Bureau of Economic Geology (BEG), part of the Jackson School of Geosciences at the University Texas at Austin. The BEG is located on the J.J. Pickle Research Campus. Lunch meetings have been rare during the last few years. Meetings attendance runs about 60-70. Our first meeting this year drew over 120 geologists including many new members and students.

Three meetings have traditional components:

1. August 29th was our ethics meeting and this year a panel of professional geologists from academia, the public sector, and the private sector gave short presentations and led a discussion of ethics in practice.
2. March is a poster session where professionals and students can present their work. This past year, thirteen posters were presented along with winning presentations from local Science Fair students.
3. Elections will be held 5/7/2012 at the final meeting of the year. New officers will take over July 15, 2012.

All meetings are posted on the AGS website.

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

Membership:

The AGS membership continues to grow. At the close of last year there were over 190 members. Big thanks to Jim Sansom who handled the membership roster. We continue to document meeting attendance and provide certificates for Professional Geologist development hours (PDH). We have introduced a new digital signup system this past year to reduce the time required to track attendance for the PG certificates of attendance thanks to Sigrid Clift. Sigrid sends a digital report to all members with their attendance and PDH credits.

Publications:

The monthly newsletter is almost entirely dispersed via email with very few members requesting mailed paper copies. Thanks go to Katrina Patterson who produces this vital document with such effectiveness. The Society has published about 28 guide books, originally created for field trips. These are available from the BEG, or, if out of print, from the UT Libraries Virtual Landscapes of Texas website. Steve Ruppel continues to monitor sales and stock of these publications and we appreciate his work. We are currently reprinting 4 commonly requested guide books ahead on the San Antonio GCGAS meeting. Volumes 6 and 7 of the Bulletin are being compiled by Robert Mace and Brian Hunt and will be distributed this Fall.

<http://www.austingeosoc.org/publications.html>

<http://www.lib.utexas.edu/books/landscapes/miscellaneous1.php>

Scholarships:

Two new undergraduate scholarships (\$500) will be presented in the May.

Sponsorship:

AGS joined with several other groups to sponsor (\$3000 from AGS) the publication of a much needed Hydrologic Atlas of the Hill Country Trinity Aquifer, by editors Doug Wierman, Al Broun, and Brian Hunt. Expanded development into the Hill Country is stressing groundwater supplies--the summer of 2011 saw many reports of dry wells and it was imperative that we publish what is known about the aquifer systems in this area. We are excited to be able to help this project. The project was completed with Atlas donated to many libraries including the UT digital repository <http://hdl.handle.net/2152/8977>. This book with countless multipage illustrations and plates was revealed to AGS on October 4th to very positive reviews. AGS is a sponsor of the University of Texas Earth Science week which brings schools students together on campus to promote the Earth sciences. Many Members also contribute greatly to the award winning "GeoForce" program to expose disadvantaged, but talented students to the Geological Sciences in a highly competitive environment.

Education:

AGS continues to help educators with their geological curriculum requests. John Mikels spearheads this activity. Many School science fair and elementary school request come in monthly.

Website:

AGS website continues to develop with the great help of new committee chairman Eddie Ficker. This summer we instituted a new graphical mapping tool that illustrates the locations of past field trips and the local geography/geology. More is planned over the next year with online membership renewals and member info.

Tax Exempt Status:

Newly elected Treasurer, Bruce Darling, and Financial Chair, Dallas Dunlap, continues to pursue the attempt to gain 5013C status for AGS. We are updating the current State of Texas status at this moment and making the final change of Federal status early next year.

Fieldtrip:

The fall field trip to investigate the Trinity lithostratigraphy in Blanco and Hays Counties, Texas is scheduled for November 12, 2012.

GCAGS 2012:

AGS is the host for this meeting and much progress has already been achieved. Dallas Dunlap, current AGS Past-President, is serving as the General Chair of this meeting. We nominated Scott Tinker to be the Chair of GCAGS. Allan Standen and Angela Ludolph have been nominated as Treasurer and Secretary, respectfully. Plans for the meeting are developing and Dallas Dunlap will present more details in his General Chairman Report.

Respectfully,

Johnathan R. Bumgarner
AGS President 2011-2012

in memoriam

Dr. William (Bill) Muehlberger



With the passing of Dr. Bill Muehlberger on September 14th, the geologic community lost a great scientist, teacher, and friend. Pat Dickerson led in memorializing Dr. Muehlberger and his legacy in our October 2011 meeting.

William (Bill) Rudolf Muehlberger, 87, died September 14, 2011. Bill Muehlberger was born in New York, New York on September 26, 1923, and grew up in Hollywood, California. He entered the California Institute of Technology in 1941, but the U.S. Marine Corps sent him to the University of California at Berkeley in civil engineering in 1943. He studied at UC until 1944, one semester shy of a degree. He returned to the California Institute of Technology and completed his B.S. (1949), M.S. (1949) and Ph.D. (1954) in structural geology. Bill married Sally J. Provine in 1949. Bill and Sally had a passion for traveling around the world. It was common for them to take multiple trips in a single year. They shared their passion for travel with their four grandchildren by traveling with them individually to a destination of each grandchild's choice. After Sally's death, he met Louise Reeser, with whom he enjoyed the remainder of his life. Bill felt incredibly lucky to have been able to share his life with these two wonderful women. Bill joined the faculty at the University of Texas at Austin in 1954 where he taught structural geology and tectonics and remained there until his retirement in 1992 when he became professor emeritus. He was director of the Crustal Studies Laboratory at the University of Texas from 1962 to 1966. He also served as chairman of the department from 1966 to 1970. Bill took a leave from the university from 1970 to 1973 to be NASA's Principal Investigator for the Apollo 16 and 17 missions to the Moon. He continued as an instructor/advisor to the astronauts on Earth observations from Skylab, Apollo-Soyuz, Space Shuttle, and the International Space Station. Two NASA medals attest to his contributions to astronaut and public instruction in geological and solar system exploration: the 1973 Medal for Exceptional Scientific Achievement and the 1999 Public Service Medal. A structural geologist by trade, Bill studied brittle fault zones and fracture systems worldwide, but especially in Texas, Turkey, Israel, New Zealand, and Guatemala. He also studied basement lineaments and correlated geophysical data with them. His work helped with the understanding of tectonics, focusing on the Western United States and Latin America. He compiled the most recent Tectonic Map of North America, grounded in plate tectonics concepts and for those efforts was given the Outstanding Paper Award of the GSA Structure and Tectonics Division. With his extensive observations of the character of the Earth's crust, he was the ideal person to help assemble large-scale geological maps and to help educate NASA astronauts. Bill held numerous endowed chairs at the University of Texas, including the Fred M. Bullard Professorship for excellence in teaching (1980-82), the Charles E. Yager Professorship (1982-83), the John E. ('Brick') Elliott Centennial Endowed Professorship in Geological Sciences (1983-85), the William Stamps Farish Chair in Geology (1985-89), and the Peter T. Flawn Centennial Chair in Geology (1989-92). Dedicated to his profession, he also served on the U.S. Geodynamics Committee and on several committees for the National Research Council, Geological Society of America, American Association of Petroleum Geologists, and the American Geophysical Union. He was an associate editor for Geological Society of America Bulletin and for Geophysical Research Letters. Above all, Bill valued time with his family, friends, and colleagues. He never missed an opportunity to learn or to teach. He taught every one he met about the world around them and encouraged them to experience and discover it for themselves. Those who knew him feel privileged to have been included in his life. Bill is survived by son Eric Muehlberger and his wife Edie of Austin, Texas; daughter Karen Erickson and her husband Paul of Albuquerque, New Mexico; grandchildren Hahna and Olivia Muehlberger of Austin and John and Kristen Erickson of Albuquerque; siblings Roy Muehlberger and wife Nancy, Eugene Muehlberger, Diana Muehlberger Ritmire and husband Ken; numerous nieces and nephews; and good friend and partner Louise Reeser. The family would like to thank all his caregivers, especially: Noel Chapi, Paul Alvarez, Britni Balfanz, and Eric Chou. In addition, we extend our heartfelt thanks to Hospice Austin for their support. A celebration of his life will be held at The Umlauf Sculpture Garden, 605 Robert E. Lee Road, on Monday, September 26, 2011 at 3:30 PM.

Published in Austin American-Statesman from September 17 to September 25, 2011

Kenneth Ira Owens



Kenneth Ira Owens, 81, passed away in Austin, TX on September 14, 2011. He was born in Ft. Worth, TX to Ira Moody Owens and Edna Booker Owens. Kayo attended Ft. Worth public schools. He was taught hunting-fishing- outdoor skills as a child. The happiest time of his life came in the Boy Scouts, Dec. 1942-1946, when he participated in paramilitary activities to support the war effort. Kayo attended North Texas Agricultural College (Arlington State College/UT Arlington) and transferred to UT Austin where he was active in the APO Service Fraternity and received a BS in Geology in 1954. In 1951, Ken joined the Masonic Lodge and was elevated to the sublime degree of Master Mason on Sept. 20, 1952. Ken went on active duty as an officer in the US Army in 1954, served in Virginia and Missouri and was assigned to the Engineer Battalion of the 9th Division in Furth, Bavaria, Germany, being Honorably Discharged in 1956. Kayo worked as a geologist for Humble Oil (Enco/Exxon) in Midland, Hobbs, McCamey, Snyder, Denver City and

Wichita Falls from 1956 until oil took a downward turn in 1966. In 1967/1968 he worked as an x-ray technician on the F-111 swing wing in Ft. Worth. In 1969, he moved to Austin to enter the real estate business. There he met the love of his life, Agnes Ptacek, whom he married in 1971. Ken earned his Broker's license in 1974 and worked as an Escrow/Closing Officer until 1976. From 1977 to 1982 Kayo worked as a geophysicist at Geotronics Corp. during the final domestic oil boom. From 1983 to 1986 he did consulting, and he and Agnes had several great geological adventures, culminating in the "Boot-heel" of S.W. New Mexico. Kayo took the mantle of "grandfather" as a tutor at the Creative Rapid Learning Center in 1986 and moved on to Austin Community College in 1992. Ken was a lifetime blood donor with 103 pints. He was a diehard UT baseball fan. Ken is survived by his wife, Agnes Owens; his sister, Ann Owens Gilliland and husband, Jim; his sister-in-law Lois Smith and husband Kenneth; nieces and nephews and cousins. He donated his body to The UT Medical School, Houston, TX.

Published in Austin American-Statesman on September 25, 2011

Dr. James Ross Underwood Jr.

Dr. James Ross Underwood, Jr., beloved husband, father, grandfather, geologist, professor, and friend to many, passed away on May 16, 2012. He loved his family, his friends, his students, and all the wonders and mysteries of the earth and heavens. He devoted his professional life to sharing his knowledge of geology and space with others. In addition to his academic contributions, "Granddaddy" was a dignified, gentle giant who loved being a father and grandfather. He had many gifts, one of the greatest being his ability to make everyone to whom he spoke feel like the most important person in the room. Jim was born May 15, 1927 in Austin, TX to James Ross and Marion Underwood and was raised in Corpus Christi. He joined the US Naval Reserve upon graduating high school in 1944 and served in the reserves during his tenure at Southwestern University in Georgetown, TX. He moved on to the University of Texas at Austin, where he was involved in many activities, serving as the Longhorn Band Drum Major and as a high jumper on the track team. He spent time in Korea with the Navy in the early 50's before returning to UT to teach and continue his studies. He earned his PhD. in Geology from UT Austin in 1962. Jim married Margaret Ann Sanderford on June 10, 1961. Jim's teaching career took them on many adventures, where they made many lifelong friends. Jim taught at The University of Baghdad 1962-1965, The University of Florida 1965-1967, West Texas State University in Canyon TX 1967-1974 with a two year leave to teach at the University of Libya, Tripoli 1969-1971, and at Kansas State University in Manhattan KS 1977-1996. Jim also worked for NASA's Planetary Geology and Geophysics Program beginning in 1972 until his retirement, and was among other things a member of the Viking Lander Imaging Team in 1976. Upon his retirement Jim and Margaret Ann moved to Austin, TX where they enjoyed close proximity to family, lifelong friends, and their deep Texas roots. Jim was a member of Covenant Presbyterian Church in Austin, and enjoyed many years of participation in LAMP (Learning Activities for Mature People) at the University of Texas. Jim is survived by his wife of almost 51 years Margaret Ann Sanderford Underwood, their three daughters and their families: Marion Underwood and Andrew Liles and their children Louisa and Sophie; Ann (Andy) and Steve McDowell and their children Emory, Marigrace and Eliza; Beth and Bobby Patterson and their children Joe and Claudia.

Published in Austin American-Statesman on May 20, 2012



about the technical content

The technical content in the Bulletin consists of abstracts or extended abstracts for presentations, summaries of the field trips, technical papers, and notes.

presentation

The Austin Geological Society hosts technical presentations from invited speakers concerning the natural sciences. We publish an abstract in the Society's newsletter and allow for an extended abstract in the Bulletin.

posters

The Austin Geological Society hosts a poster session each spring. Presenters can submit an abstract concerning their poster topic. Local middle and high school students, whose earth science projects were recognized by AGS at the Austin Regional Science Festival, are invited to present their projects at the AGS poster session. Student abstracts are published herein.

field trip

The Austin Geological Society tries to have at least one field trip per year. The summary included here provides an overview of this year's trip. Interested readers are encouraged to purchase the guide book for additional information and details.

technical paper

The Bulletin accepts technical papers for publication provided that the papers meet technical and editorial requirements.

note

The Bulletin also accepts notes, which may be technical or anecdotal.

presentation

august 29, 2011, bureau of economic geology

Panel Discussion on Ethics in Geoscience Across the Employment Spectrum

The Austin Geological Society's 2011 Ethics hour was in a panel format. Geologists from four professional employment categories, with a combined 100 years of professional experience, gave brief presentations of either an ethical dilemma in which they found themselves, or ethical issues encountered during their careers. The presenters accepted questions and comments from the audience. The four panelists were:

- Ann F. Ardis, P.G. – USGS Texas Water Science Center, Austin
- Kirk Holland, P.G. – Barton Springs/Edwards Aquifer Conservation District
- Robert S. Kier, PhD, P.G. – Robert S. Kier Consulting, Austin, TX
- Ernest Lundelius, PhD, Emeritus Professor – UT Austin Department of Geological Sciences

Ann Ardis received a BS in Geological Engineering and a BS in Geological Sciences, both from the University of Texas at Austin. She is currently a supervisory hydrologist for the US Geological Survey where she has spent the last 27 years working on a variety of hydrogeological projects, primarily involving groundwater monitoring and assessment.

Kirk Holland has Bachelor's and Master's degrees in the geological sciences, and almost 40 years of experience in environmental management services consulting, business management consulting, and organizational management and administration. For the last six years, he has been the General Manager of BSEACD, a leading groundwater conservation district in the state, serving portions of Travis, Hays, and Caldwell Counties.

Bob Kier began his post-student career at the UT Bureau of Economic Geology some 40 years ago. After a stint with CDM, beginning in 1979, Bob formed Robert S. Kier Consulting in 1986 through which he has been involved in private consulting for industry, government entities, municipalities, and special interest groups for the past 25 years.

Ernie Lundelius is a vertebrate paleontologist working on Plio-Pleistocene faunas of Texas and Australia. He received a BS in Geology from UT Austin in 1950 and PhD in Paleozoology from the University of Chicago in 1954. Ernie taught geology at UT Austin for 41 years.

presentation

October 3, 2011, bureau of economic geology

Evolution of the Marathon Basin: A Slide and Sound Presentation

Dr. Earle F. McBride

Professor Emeritus and J. Nalle Gregory Chair in Sedimentary Geology UT-Austin, Jackson School of Geosciences, Department of Geological Sciences

The Marathon Uplift is a broad, domal uplift 78 mi (125 km) in diameter, of early Tertiary age. Erosion of Cretaceous and younger strata from the crest of the uplift produced the topographic Marathon Basin where, in an area 31 by 47 mi (50 by 75 km), deformed pre-Permian Paleozoic rocks are exposed that have a composite stratigraphic thickness of 16,400 ft (5,000 m). These Paleozoic rocks are part of a belt of deformed rocks that were deposited along the southeastern margin of North America during Paleozoic time, and which make up the Ouachita orogen. The orogen extends from Arkansas across Oklahoma and Texas, and has been traced almost to Mexico. Source: McBride, E.F., 1988, Geology of the Marathon Uplift, west Texas in Geological Society of America Centennial Field Guidebook – South Central Section, p. 411-416. Note: The Marathon Basin is nearly centered on the town of Marathon, which is located in Trans-Pecos Texas approximately 400 miles due west of Austin, TX.

Biography:

Dr. Earle F. McBride, a native of Rock Island, Illinois came to UT in 1959 and retired as professor emeritus in 2005. He received a BA from Augustana College, where J. A. Udden devised the first grain size scale of sediments and did his work on the eolian origin of loess; an MA from Univ. of Missouri, where his thesis was on the geochemistry of clay minerals; and a PhD from John Hopkins University, where he worked under Francis Pettijohn. McBride became interested in geology of the Marathon Basin in 1960 and spent 10 years there fighting lechuguilla and catclaw. His chief geological interest is sandstone petrology and diagenesis. McBride has been fingerprinted by the UT Police twice, the State of Texas five times and the Federal Government three times; he spent a night in an Illinois jail; he has been arrested in Japan for illegal entry into the country; arrested in the UK for carrying a concealed weapon; and accosted by the Border Patrol in California as a suspected drug smuggler. He has had breakfast with Ms. Lillian Carter (mother of Jimmy Carter); discussed SALT TWO with Henry Kissinger; and shaken hands with President Eisenhower. He presently is working on the McBride Number, the total number of sand grains on earth. It will take its place along with pi, Avogadro's number, the acceleration of gravity, Planck's constant, and the DJIA.

presentation

November 7, 2011, bureau of economic geology

Developing Water Resources in Kenya: Technical, Sociological and Economic Challenges

Bruce K. Darling, Ph.D.

Well Aware and Hydrogeologists Without Borders

Water scarcity is a common problem throughout most of the African continent. While Americans and Europeans take for granted the ready availability of fresh and clean drinking water and water to support the agricultural and industrial sectors of their economies, many Africans deal everyday with shortages and water-borne illnesses that citizens of the western world would regard as intolerable. The extent to which the governments of many African nations are able to address the endemic problems of water scarcity and water-borne disease is constrained by limited economic resources, international/ inter-tribal conflicts, rapid population growth, and limited scientific and engineering expertise. The governments of all African nations recognize that water resources are drivers of economic development. With their limited resources, however, it will take decades to develop ground-water and surface-water resources in areas far removed from major cities. Many nonprofit organizations from the United States, Canada, and Europe are working to develop fresh, uncontaminated water in Africa. The success of their programs depends entirely on the generosity of donors and the expertise of business professionals, geologists and engineers who raise funds and who can volunteer time to travel to Africa to supervise development projects.

Well Aware (www.wellawareworld.org) and Hydrogeologists Without Borders (<http://hydrogeologistswithoutborders.org/wordpress/>) are two organizations with long-term commitments in the Republic of Kenya. Well Aware is located in Austin and Hydrogeologists Without Borders is based in Calgary, Alberta. Bruce Darling, a technical representative of both organizations, will make a PowerPoint presentation on several projects underway in Kenya. The presentation will include a) information on the many challenges that Kenyans contend with in their daily efforts to acquire water, and b) slides of a well drilled at the Watoto Wa Baraka orphanage at Mithini, rainwater collection projects at Bondeni and Mahiga, and a springwater development project in the East Marakwet District of The Great Rift Valley.

Biography:

Bruce K. Darling is a consulting hydrogeologist in Austin, Texas, and an adjunct lecturer in geology at Austin Community College. He earned his M.S. degree in geology from the University of Louisiana at Lafayette and his Ph.D. from The University of Texas at Austin. In a career covering more than 30 years, he has worked extensively with problems related to the development and management of groundwater in arid lands of the southwestern United States. East Africa is now a principal focus of his work. Dr. Darling is Technical Adviser to Well Aware and a Senior Project Manager with Hydrogeologists Without Borders. He has traveled to Kenya on behalf of both organizations, most recently in August 2011. He looks forward to mentoring young geologists and engineers who are interested in water-resource development in Kenya and to many return trips to a country that has become his adopted home.

presentation

December 5, 2011, bureau of economic geology

Geology of the Jollyville Transmission Main

Ray Brainard¹, Jim Sansom², and Alan Shield²

¹Black & Veatch, ²Independent Geologic Contractors

This presentation was a virtual tour of the Geology of the Jollyville Transmission Main. The Jollyville Transmission Main will be a treated water source from Lake Travis to Jollyville Subdivision reservoir in northwest Austin, Texas. After the presentation, core and geophysical logs were used to describe the geology of the tunnel track, and were made available for audience viewing.

presentation

February 6, 2012, bureau of economic geology

The polar troughs of Mars as aeolian cyclic steps: a framework for understanding surface evolution on the north polar ice cap

Isaac Smith

University of Texas at Austin, Jackson School of Geosciences

Mars' polar ice has excited the imagination since the first powerful telescopes were trained on the red planet over a century ago. Many decades later, in 1972, Mariner 9 made the first up close observations of the north pole. Early discoveries were intriguing spiral depressions that ubiquitously cover the Texas-sized-cap. The depressions, called spiral troughs, have puzzled planetary scientists for nearly forty years, leading to nearly a dozen hypotheses on their origin. In 2006 Mars Reconnaissance Orbiter arrived at Mars carrying high frequency radar, and for the first time we were able to look into the subsurface. The Shallow Radar, or SHARAD, revealed stratigraphic layers that could answer questions regarding trough formation. In 2010, we demonstrated with SHARAD data that ice transport by katabatic winds was the critical factor in shaping the troughs. We have now made another big step in understanding trough formation and recognize the troughs as cyclic steps, which are erosional features that are well characterized in terrestrial systems.

Biography

Isaac Smith is currently in the fourth year of his Ph.D. investigating curious surface features on the north polar ice cap of Mars. He works with Jackson School of Geosciences, Institute of Geophysics (UTIG) scientist, Jack Holt. Isaac earned a Masters of Physics from the University of Missouri - St. Louis in December 2007 and a Bachelors of Science in Physics from Southwestern University in Georgetown, TX in 2002. Ever interested in space and planets, Isaac became interested in studying Mars after applying at the Jackson School and learning that planetary science was an option at UT. Before joining the Mars group at UTIG, Isaac participated in field season 1 of the ICECAP, Eastern Antarctica geophysical surveys. In 2008, before enrolling at UT, he helped construct the Paleomagnetism Laboratory on UT campus under the direction of Dr. Holt and served as laboratory technician. He continues to serve as a volunteer for the lab now.

presentation

April 2, 2012, bureau of economic geology

M. King Hubbert, the myth of 'peak oil,' and U.S. energy policy

Dr. Peter R. Rose

Rose and Associates

Using innovative concepts related to U. S. crude oil production and reserves data, Marion King Hubbert generated prescient and unwelcome forecasts in 1956 and again in 1962, that annual U.S. crude oil production would peak in the late 1960s or early 1970s at around 3 billion bbl, and decline thereafter, implying growing American dependence on imported oil. Hubbert estimated that ultimate domestic crude oil production would total about 200 billion bbl.

These forecasts brought him into sharp conflict with the U. S. Geological Survey's Vincent E. McKelvey throughout the 1960s, and continuing well into the 1970s, even after McKelvey became Director of USGS in 1971. Under McKelvey's leadership, USGS had consistently estimated that domestic crude oil resources were as much as three times larger than Hubbert's forecasts -- as much as 590 billion bbl -- sufficient "to meet projected consumption through and beyond" the end of the 20th century. Their increasingly acrimonious dispute reached out well beyond the American scientific community, and spilled over into National energy policy.

When U. S. crude oil production peaked in 1970 at about 3.2 billion bbl, Hubbert's bold forecast seemed to be confirmed, and he was hailed as a prophet. McKelvey was fired in 1977 by the incoming Carter administration, and Hubbert's forecasts were used as a basis to deny government subsidies to domestic E&P companies ("if the resource endowment is not there, it's not worth paying companies to try and look for it"), and developing alternative energy sources , including U. S. oil shale deposits.

Working under the protection of U. S. Sen. Henry 'Scoop' Jackson, Hubbert then developed analogous estimates of future domestic natural gas production, as well as global crude oil production. He forecast that U. S. natural gas production would peak in 1975, at about 18 trillion ft³ per year, with a total production of about 1,050 TCF. Hubbert also predicted that global oil production would peak at an annual rate of about 40 billion bbl in about 1995, with ultimate production of about 2000 billion bbl. These forecasts have long since been eclipsed by actual production, and discovered reserves.

Examined from the vantage point of nearly 40 years, all of Hubbert's forecasts are clearly too pessimistic, primarily because he failed to anticipate that technological breakthroughs would make E&P in hostile environments possible, and that new drilling and stimulation technologies would allow reservoirs to be developed in rocks then thought to be incapable of production.

This experience bears naturally on formulation of U. S. energy policy, which has been absent for about 30 years, and is urgently needed if the U. S. is to continue as a global leader in the 21st century. Continued large trade deficits for imported oil threaten the still-fragile U. S. economy. Most Americans do not grasp how closely energy consumption correlates with economic prosperity. U. S. natural gas production and reserves have been increasing since 1986, projected to continue rising, and in 2009, U. S. crude oil production increased for the first time since 1971, with continued rising production forecast years into the future.

Secure supply of motor fuels is America's greatest short-term energy priority, whereas increasing electricity supply is the greatest long-term priority. Conservation offers the quickest, cheapest way to reduce our dependence on foreign oil, and would be in harmony with a badly needed national ethic of energy frugality.

presentation

May 7, 2011, bureau of economic geology

Projecting the Impacts of Relative Sea-Level Rise and Erosion on Texas Barrier Islands and Planning for the Future

James C. Gibeaut

Harte Research Institute, Texas A&M University – Corpus Christi

Fringing and interior salt- and fresh-water wetlands, interior ridges and swales, and the Gulf of Mexico beach and foredune system are habitats important to maintaining the ecological health of Texas barrier islands. These geomorphic features and habitats also act as buffers to the effects of hazardous geological processes such as flooding and storm surge. Rising sea level and ongoing shoreline retreat have caused and will continue to cause these features to migrate and change character. A principal challenge in barrier-island environmental management, therefore, is to anticipate these changes and to develop policy that will not only sustain or improve upon the current functions of natural environments, but will also allow them to maintain their effectiveness as sea-level rise and erosion continue in the future.

The Harte Research Institute, in conjunction with the Bureau of Economic Geology, is developing models of barrier islands for projecting changes in the distribution of geoenvironments caused by sea-level rise and erosion along the micro-tidal Texas coast. Research-quality lidar digital elevation models (DEMs) with 1-m grid-node spacing are combined with geoenvironmental maps derived from vertical aerial photography to quantify the geospatial relationships of geoenvironments. These relationships and the DEMs form the basis of inundation models. Relative sea-level rise along the Texas coast, as measured during the last 50 to 100 years by tide gauges, ranges from 3.5 to 6.8 mm/yr. Land subsidence accounts for as much as 65% of the relative sea-level rise rate and varies along portions of Texas barrier islands. A model component using information from re-leveling surveys, where available, and stratigraphy adjusts for the spatial variability of subsidence. Vertical sediment accretion in the wetlands at least partly offsets the inundating effects of relative sea-level rise. A sedimentation model that describes vertical accretion as a function of elevation, therefore, is contained in the barrier-island model. The sedimentation function is based on measured accretion rates using the Cesium 137 technique in the study areas or from similar settings in the Gulf of Mexico. Vertical accretion rates decrease with elevation and range from 0 to 6 mm/yr. Wetlands erode along the bayward fringes as a result of waves and tidal currents. Therefore, rates of shoreline change

computed by comparing historical shorelines since the 1930's are incorporated into the models. The position of the Gulf shoreline and foredune are also projected using historical shoreline change measurements. Overall, bay and Gulf shorelines are retreating, typically at 0.5 to 2 m/yr. The models are driven by mimicking the decadal-scale variability of annual mean water levels as measured at open-coast tide gauges for various scenarios of global sea-level rise projections.

Results from 60-year model projections are incorporated into geohazards maps. These maps show where upland areas are prone to become wetlands, beaches, or dunes. The maps may be used to (1) plan for future impacts to infrastructure, (2) plan restoration and mitigation projects, and (3) guide development away from areas prone to becoming future critical environments.

Biography:

Dr. James Gibeaut is the Endowed Chair for Geospatial Sciences at the Harte Research Institute at Texas A&M University – Corpus Christi. He is a coastal geologist who uses topographic lidar, remote sensing, GIS, and field surveys to measure and understand coastal change. Currently, a main research focus of his is modeling the effects of relative sea-level rise and storms on barrier islands and projecting future change. Dr. Gibeaut often provides scientific input and advice to those developing and applying coastal management rules and policies, and he is a Principal Investigator and active member in the Gulf of Mexico Alliance.

posters

March 5, 2012, bureau of economic geology

The March meeting of the Austin Geological Society was the annual poster session meeting with 13 member posters on display, and an additional 8 student science fair posters. Below are some photos and a list of poster titles and authors.

William A. Ambrose, UT BEG	Crisium Basin on the Moon
William A. Ambrose, UT BEG	Humorum Basin on the Moon
John L. Berry, independent remote sensing contractor	Minerals availability and our future
Renee De Hon and graduate student, Texas State University	Two posters on volcanic landforms in New Mexico
Kim Gilbert, UT Jackson School of Geosciences	Silicate dissolution in the presence of CO ₂
Brian Hunt, Barton Springs Edwards Aquifer Conservation District	Recent sinkhole development in a storm water pond
Mustafa Saribudak, Environmental Geophysics Associates	Do air-filled caves cause high-resistivity anomalies? A six-case study from the Edwards Aquifer Recharge Zone, San Antonio, Texas and
Mustafa Saribudak, Environmental Geophysics Associates	Front yard geophysics in urban Austin: Are the presence of karstic features underestimated in the Austin Chalk?
Peter VanMetre, USGS Water Resource Center	Reconstructing trends in water quality and atmospheric deposition using lake and reservoir sediment cores and
Peter VanMetre, USGS Water Resource Center	Pavement sealcoat, PAHs, and the environment

Student science festival posters

AGS volunteers judged at the annual Regional Science Festival on February 23, 2012. The following students were selected for recognition by AGS for their projects in the Earth & Planetary Science or Environmental Categories:

- Elizabeth Coon, Murchison MS, AISD, Cosmic Clouds.
- Hannah Hoffman, Bowie HS, AISD, Onion Creek vs. Barton Creek: Aquatic Macroinvertebrates Determine the Water Quality.
- Frank Linam, Linam Homeschool, Are Drugs in Our Streams? Use of Asian Clams as an Indicator Species.
- Victoria Lynn, Vista Ridge HS, LISD, Bone Decomposition by Different Soils.
- Shyam Sharma, Bowie HS, AISD, The Effect of Drought on the Water Quality of the Colorado River in Central Texas.
- Clara Smith-Salgado, Bowie HS, AISD, Do The Barton Springs Salamanders Have Enough Oxygen?

These students were invited to exhibit their projects at the Annual AGS Poster Session meeting on March 5. They were also given a tour of BEG research activities that evening.

Onion Creek vs. Barton Creek: Aquatic Macroinvertebrates Determine the Water Quality

Hannah Hoffman

James Bowie High School, Austin, TX

The purpose of this project is to compare the water quality of Barton Creek to the water quality of Onion Creek using macroinvertebrates as indicators. The procedures followed at both creeks to collect data were: first choosing an area in the creek that had ripples caused from rocks or plants, sweeping a net upstream against the ripples to collect macroinvertebrates, and recording the type, species, and pollution tolerance of each macroinvertebrate, then finally repeating all steps four more times in different areas of the same creek. There were two trials at each creek on December 15, 2011 and January 7, 2012. At Onion Creek there were 100 macroinvertebrates collected, representing nine different species and an average tolerance to pollution level of 1.51. At Barton Creek there were 154 macroinvertebrates collected, representing nine different species and an average tolerance to pollution level of 1.87. In conclusion Barton Creek had cleaner water quality according to macroinvertebrate testing.

Are Drugs in Our Streams?—Use of Asian Clams as an Indicator Species

Frank Linam

Linam Homeschool

In recent years there has been concern about pharmaceuticals showing up in rivers and streams. Pharmaceuticals enter rivers and streams through wastewater treatment plants, as a result of incomplete metabolization in the body and subsequent excretion in the urine, and through medications being flushed down the toilet. The pharmaceuticals, once in the river, can affect and change the normal behavior and biology of the organisms living there. Although dangers are not fully known, there are potential harmful effects of having pharmaceuticals released into the environment. My project was designed to determine if Asian clams (*Corbicula fluminea*) can be used to detect the presence of diphenhydramine, a common ingredient in over-the-counter allergy medications, in the San Marcos River. Sampling was stratified to determine whether diphenhydramine is entering the San Marcos River through the San Marcos Wastewater Treatment Plant. Results of tissue analysis using liquid chromatography-mass spectroscopy indicate that Asian clams do concentrate diphenhydramine; however, results did not indicate a significantly higher concentration downstream of the wastewater treatment plant. Results do suggest that Asian clams, a widespread introduced species, may be used as an in situ indicator of the presence of pharmaceuticals in other waterways, and thus may be used to identify areas where public education regarding pharmaceutical disposal is needed.

The Effect of Drought on the Water Quality of the Colorado River in Central Texas

Shyam Sharma

James Bowie High School, Austin, TX

This project was designed to determine the impact drought has on the water quality of a large body of water, such as the Colorado River in Central Texas. While previous studies showed mixed results, my hypothesis was that drought had a negative impact on water quality. To conduct this experiment, I used the LaMotte Water Test Kit in order to find the levels on pH, nitrate, phosphate, dissolved oxygen, coliform bacteria, temperature, and turbidity in the water. To collect the water samples, I went to Lake LBJ, Lake Marble Falls, Lake Austin, and Town Lake. All of these lakes had several boat ramps or parks near the water, making it easy to collect samples. Most of the tests required putting a tablet in the water and then observing the color change. For example, in the coliform bacteria test, if the water turned yellow it was positive for coliform bacteria (>25 bacteria colonies per 100 ml) and if it turned red it was negative (<25 bacteria colonies per 100 ml). This data was compared to LCRA (Lower Colorado River Authority)'s data from past decades that included other drought and non-drought years. Overall, I found that the data from this experiment differed greatly from LCRA's data. For example, the phosphate levels from this experiment were 4 ppm for all the lakes, but LCRA data from previous years showed most phosphate levels were less than 1. This is probably because LCRA's equipment was more advanced than the equipment used in this experiment. However, one major trend found between the different water quality factors was that when temperature increased, dissolved oxygen decreased and vice versa. In conclusion, the data from this experiment was not sufficient to determine what impact drought has on water quality. Samples need to be taken over a longer period of time with advanced equipment to develop a firm conclusion.

Do the Barton Springs Salamanders Have Enough Oxygen?

Clara Smith-Salgado
James Bowie High School, Austin, TX

The Barton Springs salamander is a member of the Plethodontidae Family and is known to live only in Barton Springs. These salamanders are endangered due to drought, poor water quality, pollution, and low dissolved oxygen levels. Lower dissolved oxygen levels are caused by low water flow, and low water flow is caused by drought. Dissolved oxygen levels below 4 mg/L will cause many of the salamanders to die. Measuring dissolved oxygen levels is a useful way to predict the health of the salamander habitat.

Dissolved oxygen levels were measured four times during the fall of 2011 using an In-Situ 9500 multiparameter instrument. Dissolved oxygen is measured in mg/L. The dissolved oxygen levels will be higher in areas that are farthest away from the fault where water discharges from the Edwards Aquifer. The dissolved oxygen level at the fault is about 4.68 mg/L and the dissolved oxygen level at the farthest point from the fault is 7.57mg/L. The data show that dissolved oxygen levels are higher in areas that are farthest away from the fault because the water has traveled the farthest and absorbed more oxygen.

High dissolved oxygen levels are needed in Barton Springs for the survival of the endangered Barton Springs salamander. A good understanding of dissolved oxygen levels is important for maintaining the health of the Barton Springs salamander. The data suggest that if the dissolved oxygen levels get too low, the salamanders will likely move to areas where there are higher levels of dissolved oxygen.



field trip

Surface to Subsurface Trinity Lithostratigraphy: Implications for Groundwater Availability in the Hill Country, Eastern Blanco and Northern Hays Counties, Texas

trip coordinators:

Brian B. Hunt, Douglas A. Wierman, Alex S. Broun, C.M. Woodruff,
Jr., and Ronald G. Fieseler

The Austin Geological Society hosted its fall fieldtrip on November 12, 2011 on a beautiful day in the Hill Country. There were about 60 attendees that participated on the trip.

This trip was a follow-up and compliment to the recent publication titled Hydrogeologic Atlas of the Hill Country Trinity Aquifer (Wierman et al., 2010). Attendees visited unique locations of the Trinity Group centered along Flat Creek in northern Blanco and Hays Counties. The trip was a hands-on geologic fieldtrip with hammers, acid, and hand lenses abounding.

Participants first visited a private ranch with unique exposures of the Middle Trinity units. Measured sections were presented that included the Hammett, Cow Creek and Hensel formations. Stops visited portions of those composite sections which focused on the aquitard character of the Hammett Shale, and the aquifer and recharge characteristics of the Cow Creek and Hensel Formations, respectively. Sites visited included exposures of the Cow Creek via a man-made cave, a slot-canyon formed in the upper Cow Creek, and a unique exposure of the non-conformity between the Cow Creek and overlying Hensel. An overview of the surface and subsurface geology was presented after lunch by Alex Broun. Al brought geophysical logs and cuttings from boreholes in sample jars for attendees to look at. Doug Wierman discussed some of hydrogeologic aspects of the Trinity aquifer and issues of availability which link Al's geologic work to the observed water-level data.

The second stop was a measured section that begins in Flat Creek and extends up western Fitzhugh Road—providing a nearly continuous section from the top of the Cow Creek through the Hensel, lower Glen Rose, and into the upper Glen Rose. The focus of discussions was on the stratigraphy of the units and their hydrogeologic character. Chock Woodruff discussed his work on the so-called marls of the Glen Rose (no, there are not any) and Bill Rader discussed some the fauna at the *Corbula* Marker bed.

The guidebook (AGS GB 33) contains new material from the fieldtrip and also a complete copy of the Hydrogeologic Atlas in 11×17 color format. There are two additional (optional) fieldtrip stops in the guidebook that were not visited. The Sycamore Sand (Lower Trinity Aquifer) is discussed by Eddie Collins in Pedernales State Park; the other is a discussion and measured section of the contact of the Trinity and Fredericksburg strata in Blanco County near the town of Blanco.



Field trip stop along Flat Creek in Blanco County looking at the regional aquitard unit (Hammett Shale). Brian Hunt speaks to some of the attendees about the Hammett Shale exposed in a road cut next to the creek (not shown). The cliffs in the background are the Cow Creek and the subject of subsequent stops.



Alex Broun discusses his geologic work in the subsurface using geophysical logs and borehole cuttings.

note

1966 UT Tower Shooting: Memories and Vantage of a Tragic Day by a Geologist

James W. Sansom, Jr., P.G.
Engineering & Environmental Geologist

Below is a summary of the events, requested by a friend, of my memory of the August 1, 1966 UT Tower shooting by Charles Whitman. Whitman killed 14 people and wounded 31 during his shooting spree from the observation deck of the UT Tower.

In 1966 I worked for the Texas Water Development Board as a geologist. At the time of the Whitman shooting our offices were in the Sam Houston State Office Building that is located immediately northeast of the State Capital Building one and a half blocks east of North Congress Avenue on East 14th Street. I was in a large room where three of us had our offices on the 6th floor that faced north toward 14th Street.

Typically at lunch time I turned on my hand-sized transistor radio to listen to the news and eat my brown bag lunch. Normally I listened to KTBC where Neal Spelce presented the noon news. When I turned on my radio this time Neal was obviously excited and reporting that someone was shooting a gun from the observation deck of the UT Tower. Those of us in our office immediately looked at the tower and could see puffs of white dust randomly showing up around the top portion of the tower. In that we were located on 14th street and the Main Building Tower is located about 23rd Street, some 9 blocks, we were about seven tenths of a mile slightly southeast of it. We heard from the news accounts that the white puffs of dusts were the result of bullets from the ground shooting at the Tower. Being on the 6th floor of the Sam Houston Building gave us a good view of the Tower (Figure 1).

The equipment in our office included survey instruments. I opened the support tripod for a survey instrument and put a survey level on it. With the magnification of the lenses of the survey level, I was able to view the observation deck of the Tower much better (Figure 2). I saw Whitman moving around on the deck wearing his red checker long sleeve shirt. I did not see anyone else with him from my view of the southeast corner of the observation deck. Neal reported on the radio that the police did not know how many were firing from the deck. After watching Whitman move about the deck for a while, I was convinced that he was alone. At that time I called the police department and told them who I was, where I was looking from and how, and that I only could see one person on the observation deck. I hoped that my call would be of some help, for the police were very busy.



Figure 1. Image from Google Earth showing the 2013 view of the UT Tower in relation to the Sam Houston Office Building. Many of the taller buildings were not present in 1966.

During this time numerous ambulances passed in front of our building going east on 14th en route to the emergency room at Brackenridge Hospital.

It doesn't seem like very much time passed when I noticed the south entrance of the observation deck of the Tower began to open very slowly. Slowly two Austin policemen came through the door. One went west, and the other went east, then north. Shortly after that they both returned to the door and tried to signal the shooters below, but instead kept their heads down due to gun fire from below and went through the door. As I remember it, Whitman was in the northwest corner of the deck when the two policemen arrived and they shot and killed him there.

Another part of my story includes my father, James W. Sansom, Sr., who worked as a Plasterer for UT's Physical Plant. The Physical Plant for UT includes all the maintenance and repair personnel that are necessary to keep UT operating like carpenters, electricians, welders, yard maintenance people, power plant operators, painters, etc., and one plasterer, my Dad. Many of UT buildings were built in the 1930s when plaster was used for the interior walls. UT has continued to grow over the years from a student population in those days around 20,000 to over 50,000 today. Repairs and alterations to these building required the services of Physical Plant personnel many times. On August 1, 1966, my father was doing some plastering work in the Tower. He exited before noon and drove his truck back to eat lunch at the Physical Plant facilities located on 24th street about one block west of its dead-end into San Jacinto Street on the northeast side of UT's campus. He had to just miss Whitman because he used one of the

same elevators that Whitman did when he went to the top of the Tower. Due to the tragedy, telephone service was not very good with everybody checking on relatives, and of course we did not have cell phones in those days. I was able to talk to my mother and later she called to tell me that dad got through to tell her that he was safe.

Within the next few weeks, Dad was given the job to patch some of the bullet holes in the limestone walls of the Tower that were the result of police and others firing at Whitman. He told me that the stairway from the elevator to the observation deck was still very bloody when he was there.



Figure 2. Example of Surveyor's Level from AGS member John Mikels. This level was likely manufactured in the late 1800s to early 1900s.