2010

GSA Medals & Awards

Presented at the

122nd Annual Meeting

of the

Geological Society of America

30 October 2010

Denver, Colorado

RIP RAPP ARCHAEOLOGICAL GEOLOGY AWARD

Presented to
Ervan G. Garisson

Ervan G. Garisson
University of Georgia

Citation by Scott H. Pike

Today I have the great pleasure of reading the citation for the 2010 recipient of the Rip Rapp Archaeological Geology Award, Erv Garrison. This award is appropriate to recognize the significant contributions that Erv has made to the burgeoning field of archaeological geology. Hidden within Erv's laidback southern demeanor is a scholar and educator who pursues his research with a quiet intensity and provides unwavering support and opportunities for his undergraduate and graduate students. Throughout Erv's career he has always been at the interdisciplinary crossroads between the physical sciences and archaeology.

Erv was first introduced to archaeometry as a master's student at the University of Arkansas, where he worked on nuclear fission track and alpha-recoil dating on micas from the Mississippian site of Hazel Mount and published a dating sequence of the Hohokam in *Archaeometry*.

Following his "archaeometric muse", Erv pursued his dissertation training in nuclear archaeometry at the University of Missouri. Studying under David Cowan and Ralph Rowlett, Erv learned the rudiments of thermoluminescence dating techniques that led to his dissertation on the electron spin resonance dating of archaeological flints. Erv's important work dating geological and archaeological flints made it to the pages of *Nature*. Erv was the first to date an Acheulean biface for the site of Combe Grenal in France.

While at MU, Erv incorporated TL in a rescue excavation of the Shriver site, a Pre-Clovis site in NW Missouri; work that was later published in *Science*. Erv recalls reconciling the TL dates with the midcontinent glacial stratigraphy as a key point in his career trajectory. From that time on out he sought to employ geology to help decipher the archaeological past.

Erv's first foray into the field of archaeological geophysics was in the late 1970s while still at MU. While directing a summer-long excavation in the Meramec River Valley in the Eastern Ozarks, he and David Denmam, using the university's new proton magnetometer and metal detectors, located slag heaps and iron deposits from the oldest bloomery forge in Missouri. Later Erv surveyed a steamboat wreck in the White River, the George Washington Carver National Monument, and a city-block of Mormon Nauvoo.

Erv's academic job at Texas A&M allowed him to focus his research and teaching on geoprospection of terrestrial and marine/estuarine sites. Erv designed a marine archaeology survey course where students mapped known historic shipwrecks in the Gulf of Mexico. In the 1980s, Erv received funding from the Minerals Management Survey to guide a major study of marine survey and mapping methodologies. During this work, he and his team discovered and excavated a 19th century French shipwreck in the Chandeleur Islands off Louisiana.

In 1981, Erv began an international multi-year collaboration with the Archaeological Service of the Canton of Neuchatel in Switzerland. Erv's team carried out geophysical surveys along Lake Neuchatel's north shore and eastern mid-lake sections. In concert with a systematic geophysical coring program, Erv characterized the post-Late Glacial Maximum lacustrine landscape and its relationship to prehistoric settlements on the ancient lakeshore. Erv also led excavations of Neolithic and Late Bronze Age settlements funded in part by EARTHWATCH and the Canton of Neuchatel. In 1985, Erv's team discovered one of the largest bronze metal troves ever discovered in Switzerland.

From 1990 to 1992, Erv began a three year appointment with the National Marine Sanctuaries Program where he established a base for their heritage programs. Following a brief sojourn in DC, he conducted and published a marine geoarchaelogical study off Santra Cruz Island in the north Channel Islands where he calibrated CHIRP sonar data with sediment cores.

In 1992, Erv found himself heading to the University of Georgia where he continues to hold joint appointments in the Anthropology and Geology departments. Erv established a summer field school in shallow geophysics, the first university-based course of its kind offered in the US. Since 1993, the course has taught over 100 students, mostly undergrads, how to use magnetic, electrical and radar survey instruments.

Erv's research program at UGA includes an ambitious marine geoarchaeological survey of the continental shelf that uses NOAA vessels and Georgia survey equipment. The studies have resulted in graduate theses and published journal articles outlining the archaeological and paleontological potential of the continental shelf as a coast landform in the late Pleistocene. Perhaps the most notable discovery of this work to date was the discovery and subsequent excavation at J Reef of a complete subfossil mandible of the extinct Atlantic gray whale, dated to 36 ka. The fossil is currently at the Smithsonian being cast for reference copies.

Having now worked in archaeological geology for over thirty years, Erv and his UGA colleague and former Archaeological Geology Division Award winner, Norman Herz, pulled their vast and varied experiences together and, in 1998, co-authored the textbook "Geological Methods for Archaeology." In 2003, Erv wrote a second textbook "Techniques in Archaeological Geology."

I resist labeling this award a "life-time achievement award" because as I know Erv will continue to produce significant research and train more students in the coming years. With this award the Archaeological Geology Division acknowledges Erv's contributions to the fields of archaeology and geology, yet we also await his future valuable contributions to our science.

Response By Ervan G. Garrison

I would like to thank Scott Pike, my citationist, for finding 500 words to describe my career in archaeological geology. It has made me feel like I may have accomplished something over the past 30 years. I thank my peers in this vibrant branch of GSA and the larger discipline of geology, for extending this honor to me. It is both gratifying and humbling, well-worn adjectives, in the sense

of acceptance prose, but true, nonetheless. I am, likewise, moved to be accepting an award named for a true gentleman and one of the founding scholars of this field, George "Rip" Rapp. Having my name mentioned in the same context as Rip's is an honor. I follow my UGA colleague Norman "Norm" Herz in receiving this award. I was co-citationist on Norm's award.

I am glad Scott mentioned, I'm not quite ready to go quietly into emeritus status. Those of you who know me would probably say Erv doesn't generally go anywhere "quietly". I think, as a teacher and researcher, I have a few miles left in my tank, and if anything energizes one to do more, it is to be recognized for their work on occasions such as this. I am lucky, as I say, to be at a great Southern university, the University of Georgia. It is a pleasure to work at an institution and with earth science colleagues who value a field like archaeological geology. I wish more of our research universities did so. Saying this, I can enumerate several such institutions who house previous awardees so I, and UGA, are in very, very good company. Lastly, as I am so keenly aware, I owe my family for the love, patience and support they have given me over my academic career.

My "travels" in archaeological geology began, as Scott notes, while I was a graduate student at the University of Missouri. I had chosen "Mizzou" for my doctoral training, after two degrees from the University of Arkansas, because of a nuclear reactor. Not just any nuclear reactor, but a "research" reactor and a nascent Laboratory for Nuclear Archaeometry. My University of Arkansas masters study was centered on nuclear track dating of muscovite (mica) in prehistoric pottery. At MU, Walter D. Keller, "Mr. MU Geology" introduced me to the electron microprobe.

My real exposure to earth science, outside of crystalline mineralogy, began at MU through both classes and field studies at the side of some very talented archaeologists and geoscientists. One of these individuals was W. Raymond "Ray" Wood, "Mr. Plains Archaeology", who made "closet" geomorphologists and paleoecologists out a lot of us. So I went to Missouri to "do" archaeometry and left Columbia with a skill set for geoarchaeology.

Interestingly enough, as my career has evolved, I find that I was drawn more-and-more to the "geo" side of things archaeological to the diminishment of my more strictly archaeometric studies. Now this is not to say I do not appreciate an electron microprobe, an XRD or an optical reader for a luminescence dating system. Nor have I abandoned my abiding interest in the application of shallow geophysical techniques in the service of archaeology. One can look around my UGA lab and see more than a little evidence for this passion.

I have not been much of a "job hopper". I have only worked at two great universities—UGA and Texas A&M. My only time outside of the academy was my short stint as archaeologist for the National Oceanic & Atmospheric Administration (NOAA). Even after I came to Georgia, in 1992, I never completely "left" NOAA by virtue of their generous support of my own and my students' offshore marine geoarchaeological studies of the continental shelf. NOAA's research vessels and in-kind support has facilitated research leading to two UGA masters theses and, lately, an on-going doctoral study.

I would like to expand on each of these milestones in my career—Missouri, Texas, Washington, D.C. and Georgia—in sequence, beginning with my introduction to archaeological geology at the University of Missouri. Few people enter a doctoral program with a brand new 6 week old baby but the Garrisons did. Children don't notice "graduate school poverty" so it worked for us over our almost four years at MU.

One brief but important note regarding a publication I co-authored while at the University of Arkansas and in the employ of the reknowned Arkansas Archeological Survey (no, AAS does *not* use an "a"). Jeff Flenniken and I worked for AAS at Fayetteville. Jeff is one of the real gurus of lithic technology and he was good, even back in the mid-70s. He was interested in the properties of novaculite and asked my help on a simple heat treatment experiment which subsequently turned into a 1975 publication in *JFA*. That brief foray into the thermal behavior of flint led to, probably, one our more cited papers.

As I noted, MU had a research reactor *and* a Laboratory for Nuclear Archaeometry. That facility is now directed by my good friend Mike Glasscock. Mike had not arrived at MU while I was resident but he inherited a unique and singular facility in archaeological science. With the unfortunate demise of Penn's MASCA, it pretty much stands alone on the U.S. landscape. MU was doing TL as well. Ralph Rowlett introduced me to that technique and well as to European prehistory. Neutron activation was not new to me when I entered MU. I had used the smaller reactor at then UM-Rolla for the same purpose. MU's machine was a 15 MW reactor thereby allowing shorter, higher neutron flux studies. Without access to such a device I doubt there would have been a doctoral study and subsequent *Nature* article on the ESR dating of French Acheulean flints.

As I say, MU was an eye-opener to a lab-rat like myself. People like Ray Wood and his, then, students were out at Rodgers Shelter, in western Missouri, rewriting the book on paleoenvironmental studies in Midwestern-Ozarks archaeology. I didn't get to work there but I "watched" over their academic shoulders. Without knowing it, I began to adopt their methodology in my own work—palynology/phytoliths; paleoclimate; sedimentology; zooarchaeology; etc. etc. So when I *did* work on a project that involved archaeological geology—the Shriver Site—I was conversant. At Shriver, a "pre-paleo" horizon was identified and subsequently described in a 1978 *Science* publication by Mike Reagan, *et al*. I did the TL and, in the process, met many of the field principals on the study not the least of which was KU's Wakefield Dort, Jr. Dort introduced me to the Peoria Loess and how litho/pedostratigraphy works. Artefacts found atop18 ka land surfaces, such as those at Shriver, by simple deduction, have that *Terminus post quem*. That lesson stuck.

Now, glacial landscapes are non-existent in the Southeast U.S. unless their unseen remains are perched on some buried Paleozoic terrane in the Appalachians. Glacial landscapes abound north of 39 degrees North Latitude aka central Missouri. There I confronted glacial till and end moraines. In one case, my earnest graduate schooled recognition of till-produced "geofacts" led me to contradict a good friend and professional archaeologist's identification of these as "pre-forms". He graciously took it in stride but I learned how very important it is to recognize the "faux" in presumed archaeological materials. A little earth science prevents big embarrassments.

Texas was different. No glaciers down there—at least not since the Paleozoic. I met my first vertisol—it cracked our house foundation. A&M was a place where marine studies are preeminent—oceanography, marine geology, marine geophysics, nautical archaeology, etc. They even had a three person submersible! While I had begun the use of shallow geophysical methods while at MU, the horizons for these types of studies were much broader in Texas. There I had access to marine geophysical instruments such as acoustical and magnetic, and high-precision microwave radar positioning systems. The sea called but first I did a terrestrial survey for David Hurst Thomas at St. Catherines

Island, Georgia. Dave and his American Museum of Natural History team were systematically surveying that barrier island for a lost Spanish mission, *Santa Catalina de Guale*, one of string of 16th and 17th missions established from South Carolina, southward to St. Augustine and one of more important. I borrowed a proton mag from my friend Rik Anuskiewicz, then an archaeologist with the U.S. Army Corps of Engineers, and went "mission hunting". Long story short—we "scored". In less than three days we hit a series of anomalies that had to be associated with some type of man-made structures. We left some flag pins with "guidance" such as "dig here" written on them. Dave dug and the rest is well-documented in journal articles and monographs.

I returned to Georgia in '79–82 to work with Rik Anuskiewicz on the study of a Confederate ironclad, the *CSS Georgia*. It was a project long on interesting results but difficult underwater archaeology. If one has not dove the Savannah River at ebb tide then they cannot really know what fear really is. It's dark—no, it's black—and the current in that river turns a diver into an underwater streamer. I did gain real experience in marine sediment coring using a large Ewing piston coring rig. Reconciling the coring data to SONAR data was a real learning experience. It was the genesis, for me, of the use of this methodology in evolving a protocol for doing marine geoarchaeology off both U.S. coasts and in European lakes.

I "left the land" altogether thereafter conducting several geophysical surveys of lacustrine sites in Switzerland together with offshore sites in the Gulf of Mexico and the Santa Barbara Channel from 1985-1993. In this period I was working at Texas A&M from '85-'90 and then with NOAA from '90-'92. Two interesting projects in the Gulf involved an 18th century French shipwreck and the other a geological mapping of the continental shelf off Mobile. In the Santa Barbara Channel, a large portion of which is National Marine Sanctuary, I led a geoarchaeological study of the drowned shelf of Santa Cruz Island using CHIRP SONAR for the first time and combined this with shallow sediment coring of interesting sub-bottom profiler strata. While we found no ancient land surfaces or paleosols we did get an appreciation of how much discharge those so-called "ephemeral" island streams can produce. Our RC dates for the buried surfaces came back "historic" in age. Those offshore sediment prisms are young. To reach Holocene levels, on the island's shelf, it will take piston or vibracore technology or core the deeper Santa Barbara Basin, which is exactly what Jim Kennett, UCSB, and the Ocean Drilling Program (ODP) did a couple of years later.

Lake Neuchâtel was formed by glacial scour and erosion. I don't know if Louis Agassiz noticed this when he wrote *Studies of Glaciers*, while professor still at Neuchâtel. He probably did. Agassiz remains one of my geological heroes along with another Swiss pioneer, F_A. Forel, who, while at the University of Geneva, founded the modern study of limnology, in the late 19th century. Forel mapped the location of all the prehistoric sites along the Leman aka Lake of Geneva. His career was a clear harbinger for modern archaeological geology. In 1985, '86, '88, '90 and '93 I led geophysical surveys of the northern shore and central basin of Lake Neuchâtel. We were looking for *anything* prehistoric—sites, boats and buried landforms. In an early issue of our field's journal, *Geoarchaology*, we published our discovery of buried Pleistocene age paleochannels which helped inform our understanding of the extensive lake level change in this Alpine hydrological system, from the Paleolithic to today. We dug onshore as well. Excavation of Chalcolithic to Late Bronze Age settlements provided insights into sedimentation rates, erosion-deposition, along with locations for paleoecological studies using these sediments. One thing, in that regard, we quickly learned, was the infill of this lake, after "LGM", was more than we ever imagined. A 14 m+ sediment core, taken in the central lake, was only able to sample Atlantic Period pollen.

1992 marked my move back to academia and to the University of Georgia where I reside today.

As I have said, I never completely "left" NOAA when I made this move. Gray's Reef National Marine Sanctuary is 20 miles offshore of Sapelo Island, Georgia. Thanks to the generous support of the NOAA folks there, we—me, my UGA students and NOAA scientists—began a systematic geoarchaeological survey of this sanctuary. Sherri Littman and Windy Weaver wrote graduate theses on sediment coring studies there. Their work and my own led to a 2008 synthesis of the late Quaternary geology of this mid-to-inner shelf with an eye toward archaeology and paleontology. Working with Fred Rich at Georgia Southern gave me and my students insights into paleoecology of the Georgia Bight and that facet has become an integral element of my research since 1994. In 2006 we discovered a real surprise in the course of our underwater surveys—a prehistoric whale. Not just any prehistoric whale but an extinct Atlantic Gray Whale not seen in the north Atlantic since the 17th century. Excavation over the course of the following two summers recovered a nearly complete mandible and two vertebrae dated to 36-38 ka.

The Smithsonian currently has the mandible making copies for their collection.

The continental shelf has not been as giving in terms of human prehistory at least not off Georgia. It's a big place and hard to survey using SCUBA. Nevertheless, three artefacts have been found in the course of our work there. Two are chipped stone and one is bone/antler. None have come from intact deposits so they are interesting in their own right but telling in what this implies for site preservation on coastal plain landforms. There *are* exposed stream terraces and paleosols out there so hope lives in regard to an eventual discovery of a late Pleistocene—early Holocene archaeological locale. My students, I hope, will find these sites.

A final word regarding shallow geophysics and archaeological geology- what a difference this has made to our endeavors. UGA has supported my own "habit" such that I teach a summer course, each year, in the use of radar, magnetics and EM-electrical methods.

Other schools now do this but when we started back I 1993, UGA was "alone". Many of our UGA students have done theses using these methods. Maybe one of them will find another lost mission. We can always hope.

To sum up, I reiterate that an award such as this makes one think their career choice may have been worth it. I certainly think so. Thank you again for this honor.

GILBERT H. CADY AWARD

Presented to
Colin R. Ward

Colin R. Ward
University of New South Wales

Citation by Tim A. Moore

Invariably, when one thinks of mineral matter in coal, one thinks of Colin Ward. But Colin is no mere specialist mired in the details of a single aspect of coal geology – his expertise spans the breadth of coal science. Topics of papers authored by Colin also cover organic composition, geomechanics, mining hazards, coal seam gas, and the wide, wonderful and weird world of coal ash and its properties. Although Colin has spent almost forty years in academia, he has always worked closely with industry and is one of the few academics who truly value the inputs and contributions that industry can make. For this he is highly respected by industry professionals and continues to give workshops around the world.

Australia has been Colin's primary laboratory. Australia's coal deposits are the greatest in the world in terms of variety of coal ages, coal types, coal quality and all the resultant properties that arise from such a level of variation. Such variation might drive a mine manager or coal company CEO to drink. However, it gives the scientist a chance to see the full spectrum of variability in coal. For this reason, I believe Colin's deep and unique understanding of coal comes in part from his exposure to the coal measures of Australia.

Colin's curiosity has also carried him outside of Australia. In the early 1970s he worked and studied in Illinois. In the same decade he was one of the first to examine in detail the coal deposits of northern Borneo, in the Malaysian state of Sarawak, and later to work on the coal in Thailand (the infamous Mae Moh coal deposit and power plant). He has spent significant time in Kentucky studying, among other things, core logging in coal-bearing sequences. Since then, Colin's work has covered virtually every continent where coal occurs.

There are two publications of Colin's that stand out and should be mentioned. The first is the book "Geology and Coal Technology". Originally printed in 1984 it still stands out in terms of its scope. It covers the academic side of coal including depositional environments and petrographic composition as well as applied aspects such as coal quality variation and the implications this has for beneficiation. It is still used as a textbook to this day. The second highly significant publication is the paper "Analysis and significance of mineral matter in coal", published in 2002. This incredibly fine synopsis is consistently one of the most cited and downloaded papers in the history of the International Journal of Coal Geology.

Above and beyond his ability and breadth as a scientist, one of Colin's greatest attributes is that he is always willing to help those coming into the field as well as those already established. This probably explains Colin's extensive list of co-authors and has resulted in an impressive list of over 300 publications. It is for all of these accomplishments that Colin truly has earned the honour of receiving the Geological Society of America's Cady Award.

Response by Colin R. Ward

I would like to thank GSA very sincerely for the honour associated with this award, and also the respected colleagues who initiated and supported the nomination. The list of previous recipients is long and distinguished, and it is both a pleasure and a privilege to join such an illustrious group. Two previous recipients, Hal Gluskoter and John Ferm, served as mentors for me during study leave appointments, and several others have become collaborators and colleagues on different projects in more recent years. I have benefited many times from their wise counsel, as well as their friendship and support.

My involvement with coal geology began in my undergraduate days, which were supported by a scholarship from the Australian coal industry. As part of that scholarship I gained vacation work experience in activities such as drill core logging and underground mine mapping, and was introduced to the wide and wonderful range of coal quality parameters that need to be evaluated for different market applications. When I moved on to academic employment I thought it might be useful to look at the mineral matter in coal, rather than follow the more conventional fields of coal petrology or coal-measure sedimentology, and over the years that has turned out to be a very worthwhile focus for research activities. I have managed to work on coals from all of the continents except Antarctica, and have been to outcrops, mines, research centres and conferences in more than 20 different countries around the world.

Nobody wins an award like this alone, and I would like to acknowledge the large number of colleagues who have been involved in the different research and publication activities. I would particularly like to thank Lila Gurba, David French and Zhongsheng Li for their many and varied contributions, as well as the graduate students and technical staff who provided input to the research programs. I would also like to thank the referees of our various papers, for challenging our perceptions and, perhaps above all, for helping to keep us honest.

Coal is a fascinating geological material; in fact, there is no other rock like it on the planet. I have enjoyed looking into its properties over the years, and especially investigating the use of new technologies for coal evaluation. I have also enjoyed communicating the results to others in the industry and research communities. The Cady Award is a totally unexpected honour, and I thank the Coal Geology Division for the recognition it has bestowed.

E.B. BURWELL, JR., AWARD

Presented to
William L. Bilodeau, Sally W. Bilodeau, Eldon M. Gath, Mark Oborne, and Richard J. Proctor

for their article titled
"Geology of Los Angeles, California, USA"
in the March 2007 issue of Environmental & Engineering Geology (v. XIII:2, pp. 99-160).


William L. Bilodeau


Sally W. Bilodeau


Eldon M. Gath


Mark Oborne


Richard J. Proctor

Citation by J. David Rogers

This year's Burwell Award winning article has a simple title that understates the profound effect that Los Angeles has had on the profession of engineering geology, perhaps more than any other city in the world. Bringing together all the diverse aspects that geology plays in development of this large and sprawling city has been admirably done by the authors and will serve the engineering geology community of Southern California as an important resource for many years to come.

There is much about Los Angeles that has affected the profession of engineering geology, perhaps more than any other city. The need for infrastructure was evident soon after its founding, given its agreeable climate coupled with the shortage of water; a population boom, with its consequent transportation requirements; and recurring large earthquakes amid the rumble of smaller, stress-relieving tremors. The development of Los Angeles recounts a story that highlights the fact that technical expertise is constantly needed to meet the challenges of urban development in an environmentally changing and tectonically active area.

This article does a superb job of explaining how the various geohazards threatening the greater Los Angeles Basin were discovered, beginning with the 1915 Los Angeles County Flood Control Act, the adoption of the Uniform Building Code in 1927, the 1929 California Dam Safety Act, the 1933 Long Beach Earthquake, which prompted passage of the Riley and Field Acts regulating seismic design considerations, the Engineering Geologists Qualifications Board established by the City of Los Angeles in 1958, the 1971 San Fernando Earthquake which led to passage of the Alquist-Priolo Act in 1972 and the Seismic Safety Act of 1975, the 1990 Seismic Hazards Mapping Act, and the numerous modifications to the Uniform Building Code for seismic safety, most of which came about in the 1990s, after the 1989 Loma Prieta and 1994 Northridge earthquakes.

The countless geohazards which impact Los Angeles development arise in large part from its being situated along one of the world's most active tectonic boundaries, between the Pacific and North American continental plates. Much of the city's sprawling infrastructure lies upon an enormous sedimentary basin, filled with 30,000 ft (9,100 m) of mostly shallow marine sediments of late tertiary and Quaternary age. Virtually all of the major challenges that have impacted the practice of engineering and environmental geology, as well as engineering seismology, have been profoundly impacted by what has transpired in and around Los Angeles over the past 100 years. That the area presently supports a population base of roughly 17 million people is stark testament to its importance as a commercial center. And, the area continues to grow. The Port of Los Angeles/Long Beach now imports about 25% of the seaborne commerce entering the continental United States.

Los Angeles has become, in essence, a model American city because the great majority of its structures have been built after the initial adoption of building codes with strict seismic design tenants, beginning in 1933. Three-fourths of the city's structures have been constructed since 1945 using increasingly demanding building codes. In addition, LA was the first city to require grading and excavation permits (1952), engineering geologic input (1958), special design considerations for landslide mitigation (1967), surface fault setbacks (1972), liquefaction assessments (1991),and tsunami run-up (2006). All of these improvements were driven by the political fallout of high-visibility failures, either within their jurisdiction or elsewhere (such as the 2004 Andaman Islands tsunami). It is likely that Los Angeles will continue to maintain a leading position in developing increasingly safe building codes as they await the ultimate test, when a large magnitude earthquake emanates from the southern San Andreas fault.

Brief biographies of the co-authors

William (Bill) Bilodeau is a geology professor at California Lutheran University in Thousand Oaks, California. After completing his BA at the University of California, Santa Barbara in 1973 and his Ph.D. at Stanford University in 1979, he began his teaching career at the University of Colorado at Denver. His research interests lie in the areas of structural geology, regional tectonics, clastic sedimentation and stratigraphy. Since coming to California Lutheran University in 1990 he has strengthened the field aspects of the geology program, introducing new courses in geophysics and introductory oceanography. In his 20 years at CLU, Bill has always fostered a field-based approach to his classes, and leading annual field trips to Death

Valley and Owens Valley/Eastern Sierra in his introductory Physical Geology course. He also leads international Travel/Study Seminar trips each year, which have allowed him to take students, alumni, faculty and interested geologists to places like Costa Rica, Belize, Ecuador and the Galapagos, Italy and Sicily, Turkey and Greece, New Zealand and to Australia. His favorite destination is the Grand Canyon, where he will be leading his 13th raft trip in June 2011.

Sally Bilodeau is a California Professional Geologist (PG), Certified Engineering Geologist (CEG) and Certified Hydrogeologist (CHG), and a Certified Environmental Manager in Nevada. She has over 30 years of experience in the environmental field and specializes in RCRA permitting, assessment, and corrective action. She received her BA in Earth Science from California State University-Fullerton and obtained her MS in Applied Earth Science from Stanford University. She has been with AECOM (and ENSR) since 2000. She originally worked as an engineering geologist assessing geologic hazards associated with land development and later became involved in cleaning up hazardous waste sites. She has publications ranging from fault studies in Guatemala to Groundwater Monitoring of US Landfills. For the Cities of the World Series that the Association of Engineering Geologists (AEG) started in 1980, she has co-authored three papers, Geology of Denver, Geology of Boulder, and most recently Geology of Los Angles. She is a past recipient of the AEG best paper of the year awards in 1983 and 1988.

Eldon Gath is President of Earth Consultants International, which he founded in 1997. Previous to this he was Principal Geologist with Leighton & Associates. He also served as President of the Association of Engineering Geologists in 1996-97. He has a BS in Geology from the University of Minnesota (1978), complimented by 29 years of post-graduate education at various Southern California institutions, and holds Professional Geologist and Engineering Geologist licenses in California. He has worked extensively on engineering geologic projects, community planning, and seismic hazard studies in Southern California, but has also completed multiple projects in Turkey, Japan, and Taiwan, plus for the last five years has been heavily involved with paleoseismic studies and seismic risk models for the Panama Canal expansion. He has served on many steering and guidance committees including for the National Academy of Sciences, NEHRP, USGS, Los Angeles County, and many professional organizations. He is a Member of AEG, GSA, AAPG, AGU, SSA, EERI, IAEG, and several local geological organizations in southern California.

Mark Oborne is a senior engineering geologist with the Geotechnical Group of the Department of Public Works for the City of Los Angeles. He obtained his Bachelors (1978) and Masters (1982) degrees in Geoscience from California State University at Northridge specializing in structural geology and stratigraphic analysis. He is a licensed professional geologist and Certified Engineering Geologist in California and has worked as a geologist in the southern California area for over 30 years with an emphasis on land development and later on public works projects for the City of Los Angeles. He has authored and co-authored publications regarding active faulting, landslides, and geologic investigations for tunnels .

Richard J. "Dick" Proctor grew up in southern California and received his BS in geology from UCLA in 1954, when he joined the Metropolitan Water District as their first geologist on their payroll. After service in the Army he returned to UCLA for a MS degree (1958), when he joined the newly formed California Association of Engineering Geologists. By 1963 he was MWDs chief geologist with a staff of 12 geologists, working on an extensive program of tunnels and aqueduct extensions associated with the California Water Project and the Colorado River Aqueduct, before retiring in 1979. During those formative years he also served as Chairman of the Los Angeles County Engineering Geologists Review Board and the U.S. National Committee on Tunneling Technology. He co-edited the landmark volume "Engineering Geology in Southern California" for AEG in 1966, wrote AEG's first Professional Practice Guidelines (1981), and co-edited "Engineering Geology Practice in Southern California," published by AEG in 1992. In the 1970s he became a Visiting Associate Professor of Geology at Caltech, as well as a consulting geologist for Lindvall-Richter in Pasadena. Dick served as President of the Association of Engineering Geologists in 1980 and is a previous recipient of the E.B. Burwell Award (1972), the AIPG Van Couvering Award (1990), AEG's Holdrege Award (1995), AEG Publication Award (1998), AIPG Parker Medal (2003), and Honorary Member of AEG (2004).

Response by William Bilodeau

On behalf of my co-authors, I can honestly say we were all pleasantly surprised and are highly honored to receive the E.B. Burwell Jr. Award for 2010. We would like to thank both the Awards Committee and the Engineering Geology Division of the Geological Society of America for this Award. In addition, we would like to thank Dave Rogers for his citation and particularly thank Allen Hatheway who got us all started on this road.

This paper got its start with Eldon Gath at the helm long before I became involved in it. Sally and I joined in the effort around 1996. Allen Hatheway, as editor of the "Cities of the World" series, asked Sally to see if she could help get the paper moving as she had experience in writing two other papers on the geology of major cities, Denver and Boulder, Colorado. Allen thought Sally, with her charm and enthusiasm, could spark renewed writing on the project. The paper had quite a few co-authors involved but they were all just too busy to get it done. Sally was given the green light to reorganize and reassign duties and deadlines. She brought me in to write the sedimentology/stratigraphy and regional tectonic history but we soon realized there was more that needed to be done. Eldon Gath and Richard Proctor were the only two survivors of the original authors from the first go-round. Eldon is the expert on Southern California earthquakes and kept us current on the latest information coming out of the Southern California Earthquake Center and active tectonics in general. Richard is an old hand at this and has received the Burwell Award before. He was a great source for providing the historic stuff like old photos and information on historic landslides, tunnels, the San Fernando Earthquake and Fairfax methane explosions. He also provided the most entertaining stories and essential insider knowledge about the fathers of Los Angeles engineering geology. Mark Oborne provided key governmental access to the City of Los Angeles map files and area specific information that kept us honest about editorializing about certain high profile hazards due to pending lawsuits. Sally had hoped to pull it all together but realized that she was just too busy at work (the paper had languished for several years). I had a sabbatical coming up in early 2006 and volunteered to respond to review comments and assemble it all. Once it was accepted for publication, the journal editors wanted the final copy in time to publish it before the 2007 annual meeting of the Association of Engineering Geologists which was to be held in Los Angeles that year. We just made it. Despite the work being a marathon effort it was very gratifying to finally assemble a detailed picture of the geology of Los Angeles and the evolution of the practice of engineering geology as experienced in Los Angeles.

GEORGE P. WOOLLARD AWARD

Presented to
Timothy H. Dixon

Timothy H. Dixon
University of Miami

Citation by Shimon Wdowinski

Tim Dixon has pioneered the application of space geodesy (GPS, InSAR and DORIS) to study a fascinating variety of geologic processes. Nowadays space geodesy, with its amazing accuracy to measure small surface changes, is widely used in geological research and basically considered as a mainstream science. However 30 years ago, when Tim joined NASA as a young scientist, geological applications of space geodesy were mostly a vision. Tim's dedicated research, as well as the contribution of his generation of pioneering geodesists, has paved the road for a large number of researchers to use GPS, InSAR and other techniques in a large variety of geological applications. He is definitely a worthy recipient of the Woollard award that recognizes "outstanding contributions to geology through the application of the principles and techniques of geophysics."

Tim contributed to the development of space geodesy as a tool, as well as pushing the boundaries of the types of geologic problems that can be studied with these tools. Furthermore his publications on this topic, in particular his 1991 Reviews of Geophysics paper on GPS, as it was very early in the GPS era, have encouraged others to pursue this research tool. Tim and his students, post-docs and colleagues have used space geodesy to study plate motion, crustal deformation and faulting, earthquake hazard, mountain building, volcanic processes, post-glacial rebound, coastal subsidence, ground water depletion, and climate change-induced melting of the Greenland ice sheet. Some of Tim's and coworkers key contributions include studies of global plate motion (REVEL-1) and regional tectonic studies in the Andes, Caribbean, California, Central America, Iceland and other areas. He also had major contributions to studies of crustal deformation, faulting and seismic hazard assessments. For example, Tim pioneered GPS observations in the Caribbean and was the first to estimate a long-term rate and seismic hazard for the Eriquillo Fault that ruptured this January causing the devastating earthquake in Haiti. His accurate slip estimate from 1998, which was validated a decade later when much better data were available, was derived from only three GPS sites in Hispaniola, but with excellent understanding of the island's geology and of earthquake deformation processes.

Tim's research often brings together disparate data types, combining space geodesy with other information in new creative ways. For example, with his wife Jackie, he studied the weak upper mantle in the western US, combining data from geodesy, seismology, geochemistry, and laboratory data on material properties of minerals, to show that the weak mantle is a consequence of not only relatively high temperature but also high water concentration. This study was also one of the first to demonstrate consistency between laboratory and geodetic descriptions of olivine rheology, despite many orders of magnitude difference in strain rates between the two approaches.

More recently, Tim and coworkers have begun using space geodesy to address a number of socially important problems related to hydrology and global change. For example, they have used InSAR and GPS observations to study subsidence in Mexico City associated with ground water withdrawal in excess of recharge. These types of studies are likely to grow in importance as population pressure and climate change exacerbate water resource issues. Another example is sea level rise and the role of local subsidence in flood hazard. Tim and coworkers have been using space geodesy to address this issue in New Orleans. Their studies highlight the role of compaction and oxidation of Holocene organic-rich soils and marsh deposits in causing current high subsidence rates, and consequent low elevation in some parts of New Orleans, as contributors to the catastrophic flooding after Hurricane Katrina. They also showed that some of the levees that failed suffered very high subsidence rates in the three years prior to Hurricane Katrina, implying that the levees had simply subsided one or more meters below their design height, and were easily over-topped in the hurricane storm surge.

Perhaps one of Tim's most important accomplishments has been the establishment of a vigorous laboratory for space geodetic research at the University of Miami. This laboratory trains students and post-docs, and welcomes visitors, especially students, from all over the world, for extended periods of time. Visitors can learn the latest tools of space geodesy, and bring this expertise back to their home institutions, thereby promoting its use for a wide variety of geologic problems.

Tim's vision from three decades ago for using space geodesy as a tool in geological research became a reality. His scientific work, student and post-doc mentoring and contribution to the community make him a most appropriate recipient of the 2010 Woollard Award.

Response by Timothy H. Dixon

I am extremely grateful to GSA and members of the Geophysics Division for honoring me with this award.

The research that I have done would not have been possible without the contributions of a large number of dedicated scientists and engineers who create and maintain the infrastructure we call satellite geodesy. When Woollard was doing his work in the 1940's, 50's, and 60's, geodesy existed as a discipline, but it was not a widely used tool in geophysics. The advent of artificial satellites initiated geodesy as a both a measurement technique and major discipline. It is a global endeavor. More than most disciplines, it requires collective effort. It is usually not possible to recognize the people who contribute these efforts in a formal way, but I would like to remedy that now.

Most of us take it for granted that an inexpensive GPS receiver can tell us where we are within a few meters. But to support the type of measurements necessary for many geological applications, where location precise to a few millimeters may be needed, a large group of dedicated geodesists have to maintain a sophisticated global system. This system developed over many decades, beginning with the launch of Sputnik in 1957. In the early 1980's, shortly after engineers developed and launched the first satellites of the GPS system, several clever people figured out that these satellites could also be used for high precision geodesy. This built

on developments in Very Long Baseline Interferometry (VLBI) and Satellite Laser Ranging (SLR) supported by NASA, NOAA, the Navy, and many international institutions. While VLBI and SLR were too large and expensive for most geological applications, many of the lessons learned still apply today to GPS and InSAR, for example how to generate high precision satellite ephemerides, and how to calculate and correct for variable atmospheric effects. On-going efforts in orbital mechanics, atmospheric physics, signal processing, and geophysical modeling continue to improve the precision and range of applications. Satellite geodesy is widely used today, including environmental and global change applications, with the support of individuals and institutions who maintain satellite tracking networks, calculate high precision ephemerides, write or improve software for data analysis, and maintain data archives, all in support of our global geodetic endeavor.

No one works in a vacuum, and I certainly owe more than most to the distinguished students, post-docs and faculty colleagues that I have had the privilege of working with. I cannot name everyone, but let me at least mention current and former students Ailin Mao, Edmund Norabuena, Peter LaFemina, Gina Schmalzle, Kim Outerbridge, Batuhan Osmanoglu, and Yan Jiang; post-docs and lab visitors Giovanni Sella, Andy Newman, Sang Wan Kim, Juliet Biggs, Sang Hoon Hong, Christina Plattner, and Francesca Cigna; and colleagues Falk Amelung, Enrique Cabral, Chuck Connor, Chuck DeMets, Roy Dokka, Kevin Furlong, Rob Govers, Chris Harrison, Pam Jansma, Jeff Lee, Glenn Mattiolli, Meghan Miller, Fred Pollitz, Marino Protti, Merith Reheis, Susan Schwartz, Seth Stein, Shimon Wdowinksi, and John Weber. I have also been privileged to study and work at institutions that have been both supportive and inspiring, including the University of Western Ontario in Canada, Scripps Institution of Oceanography in San Diego, the Jet Propulsion Lab, and the University of Miami. Finally, I owe a huge debt of gratitude to my wife Jackie, who has been my rock and partner in research, family and life, despite having a very productive career of her own in earth sciences. Thank you.

BIGGS AWARD FOR EXCELLENCE IN EARTH SCIENCE TEACHING

Presented to
Michael C. Rygel

Michael C. Rygel
SUNY College at Potsdam

Citation by Robert L. Badger

I am very pleased that the Geological Society of America has chosen to honor Michael Rygel with the 2010 Biggs Earth Science Teaching Award. Mike came to our department at the State University of New York at Potsdam a little over four years ago and immediately infused a sense of energy and enthusiasm that was contagious to both students and faculty. He has had a significant impact on our program of study, has proved to be an exceptional teacher, has led outstanding field trips for his classes, involved students in top quality research, and continued his own research at an extraordinary level.

Mike was raised in a steel mill town outside of Pittsburgh by a single parent who struggled to put food on the table. After high school, he joined the National Guard for lack of anything better to do, and later used the GI bill to attend the University of Pittsburgh at Johnstown. The first in his family to attend college, he did so as a means of escaping the steel mills and a life of working there, but he was clueless about what to study. During freshmen orientation the students were invited to attend open houses at the various departments, so Mike tagged along at the tail end of a group of 50 or so potential biology majors. But a geology professor, with just one interested student, persuaded Mike to come with him instead. And that has made all the difference. One caring faculty member at an opportune point of time, a small department that nurtured their students to grow and prosper, and an escape from a steel mill town into the international scientific world. A geologist was born that day, and a fire was lit that continues to burn vigorously.

Mike is very aware that it is the field of geology, and a few very fine and caring faculty, who have allowed him to develop into the person he is today. Now he is paying that forward, trying to be the caring faculty member to make a difference in the lives of the students he teaches. He sees a lot of himself in some of our students, about half of whom are the first in their family to attend college. He does his best to show the care and concern for their wellbeing that he was once shown, and to offer life-changing academic opportunities.

In and outside of the classroom, Mike is a terrific teacher. His method of teaching is to have constant interaction between him and the students, to maintain a very flexible schedule that can weave and bob in whatever direction the class takes, and to use assessable learning goals. I think he actually goes into each class thinking, "What do I want them to learn in this class?" Followed by, "How will I know they have learned it?" Students respond very positively to his teaching style; in four years I have heard nothing but praise from them. A few quotes from student evaluations:

"Very concerned with student performance."

"The best I've EVER had."

"Professor Rygel is a great instructor and clearly has a passion for his field."

"Always around to answer questions, give extra help …. Very fast email responses."

"Dr. Rygel did an excellent job of bringing the material to life. He invested a lot of personal effort and initiative in making sure students were learning and involved."

While using this very student-friendly teaching style, he has high expectations for their quality and quantity of work. The high standards that Mike sets for the lower level courses that he teaches have a four-fold benefit for our students and program. First, it gives the students an outstanding background preparing them for upper level work. Second, it teaches them workload expectations for our major, so they are fully prepared to exert the necessary effort to succeed in upper level coursework. Third, it acts to weed out students, at a very early stage, who are not willing to commit the time and energy to a rigorous major course of study. And fourth, because hard working students usually rise to his challenge, it acts as a recruiting tool for students into our program. Since Mike's arrival, our list of majors has grown from about 40 to 75, in large part due to his influence.

During Mike's second year at SUNY Potsdam, he wrote a successful ACS three-year grant to fund student research in Nova Scotia. This project is at the World Heritage Joggins Site. Three students accompanied him for a month during the summer of 2008, and they were featured in a half hour documentary on CTV the following winter on the Joggins site. All three presented their research at the northeast GSA in Portland, Maine in the spring of 2009. After that first summer of research in Nova Scotia, he was so excited about the geology that the next summer he led a dozen students on a ten day trip there. At the end of the trip, he and four of the students remained for a month of fieldwork. All four of these students accompanied him, with costs covered by his grant, to the national GSA in Portland, Oregon last fall to present their research. These opportunities he is providing to our students are incomparable to anything we have ever offered. He will be leading another ten day trip to Nova Scotia in the spring of 2011.

Mikes teaching role extends beyond the walls of our university. In 2005, the Canadian Society of Petroleum Geologists voted his Ph.D. dissertation the best in all of Canada, even though it had nothing to do with oil. In the fall of 2007, this same group flew him to Calgary to give the keynote talk at a luncheon for their annual meeting. In February of 2008, and again in January of 2009, the Canadian Society of Petroleum Geologists sponsored him to spend a week on tour, giving talks at various universities. His first tour took him to five universities in the Canadian Maritime Provinces; the second tour was to five universities in Ontario. Just as visiting speakers to my university when I was an undergraduate geology student 40 years ago influenced my career, I am certain that Mike's speaking tours are influencing dozens of young geologists today. He is a dynamic speaker and a marvelous role model.

As you can gather, Mike's a pretty special guy. Our dean has likened our hiring him to the drafting of Willie Mays. And to think, we almost didn't hire him. One of his letters of recommendation referred to him as a "perfect gentleman." But he's overcome that flaw and developed into an incredibly fine colleague and teacher, well worthy of the Karen Biggs Excellence in Earth Science Teaching Award.

Response by Michael C. Rygel

I am honored to receive the 2010 Carolyn Biggs Earth Science Teaching Award. I would like to thank Robert Badger for being a great mentor, nominating me, tenaciously writing letters on my behalf, and his unwavering support of my academic experiments — regardless of the amount of paperwork that they create. I would also like to thank Galen Pletcher, Jack Beuthin, Glenn Simonelli, Martin Gibling, and the students who wrote letters of support.

I chose a career in academia primarily because of the quality education that Jack Beuthin, Uldis Kaktins, and Bill Brice gave me at the University of Pittsburgh at Johnstown. Their influence as teachers, mentors, and role models inspired me and remains the standard by which I judge my own performance. In particular, I owe special thanks to Jack Beuthin for introducing me to undergraduate research, particularly the reading, writing, and planning that underpins a successful project. He challenged me to live up to my full potential and supported me every step of the way; for that I am eternally grateful.

I owe special thanks to Martin Gibling, my Ph.D. advisor at Dalhousie University. Although my tuition and stipend were funded wholly from his NSERC Grant, Martin allowed me to teach labs and to take a leave of absence in the spring of 2002 to do a sabbatical replacement at the University of Pittsburgh at Johnstown. Thankfully, Martin believes in developing the individual and was willing to take a risk by allowing me to explore my career choices. Chris Fielding and Tracy Frank sponsored my post-doc at the University of Nebraska-Lincoln. They helped me mature as a scientist and researcher which made me a better teacher, undergraduate research mentor, and allowed me to "hit the ground running" in a tenure-track position.

Although teaching is my main responsibility as a professor at a primarily undergraduate institution, I have had very little formal training as an educator. To help remedy this situation, Glenn Simonelli allowed me to audit his "Elementary Science Education Methods" class in 2007. Glenn's class forced me to rethink every aspect of what I do in the classroom and profoundly influenced my teaching style. I would also like to thank the organizers of the NAGT *On the Cutting Edge* project and countless colleagues (especially Neal O'Brien and Bill Kirchgasser) for sharing their teaching experiences, philosophies, and materials with me.

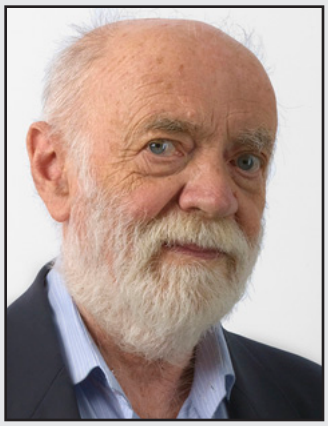
Although the education and arts programs have the largest enrollment at SUNY Potsdam, the natural sciences have large enrollments and play an important part in the overall framework of a liberal arts education - especially given the number of future teachers at our school. Our administration, particularly former Dean of Arts and Sciences Galen Pletcher, recognizes the special challenges that the natural sciences face (equipment, lab space, the large number of contact hours associated with labs, etc.) and has stood by us throughout the present financial crisis.

I would like to thank all of my present and former students for their time, hard work, and patience. Making improvements to my teaching requires experimentation; thanks for putting up with long days in the field, countless hours in the vans, failed technology, new labs that flop, and the repercussions of my newfound role as a father.

Perhaps most importantly, I would like to thank my wife, Adrienne, for her support during the decade-long pursuit of my dream job.

MARY C. RABBITT HISTORY OF GEOLOGY AWARD

Presented to Gabriel Gohau



Gabriel Gohau
Lycée Janson de Sailly, Paris (emeritus)

Citation by Kennard B. Bork

We live in an increasingly "Global World," but barriers of language and culture do still exist. It is therefore possible that many members of the Geological Society of America (GSA) will not be familiar with French historians of geology. My pleasant task today is to introduce Dr. Gabriel GOHAU, a French colleague and renowned scholar, as the 2010 recipient of the Geological Society of America's "Mary C. Rabbitt Award." This honor, bestowed by GSA's History of Geology Division, is an excellent example of our recognition of valued work in an international context.

Professor Gohau's insightful writings, and his leadership of COFRHIGEO *(Comité français d'histoire de la géologie)*, are celebrated in France and among Francophone readers around the world. Americans may be familiar with Gabriel's superb book, *Histoire de la géologie* (1987), translated into English (1990) by Albert and Marguerite Carozzi. Also in 1990, Gohau published *Les sciences de la Terre aux XVIIe et XVIIIe siècles*. His important book on *Naissance de la géologie historique* appeared in 2003.

I can tell you that American and British members of COFRIGEO, such as Ken Taylor, Martin Rudwick, Hugh Torrens, and yours truly, have profited immensely from a long line of important articles produced by Dr. Gohau. Hallmarks of his writing are clear explications of major issues and fresh insights into significant historical contexts. Early in his career he illuminated the development of ideas concerned with the origin of mountains. That topic will be revisited in an upcoming book on the prehistory of tectonics. From the late 1970s to the present, Prof. Gohau also has generated valuable biographic analyses of major figures in the history of the geosciences. Subjects of his informative portraits include Buffon, Constant Prévost, Jean-André De Luc, Élie de Beaumont, Lamarck, Dolomieu, Lavoisier, Cuvier, and, in Britain, Rev. Thomas Burnet, and James Hutton. They provide helpful factual frameworks, but also integrate biographic details with larger intellectual and cultural issues. The reader often thinks, "Aha! That is an interesting insight!"

For those not familiar with Prof. Gohau's impressive background, a bit of biography is in order. He was born in Nantes, in the Loire Atlantique region of western France. After schooling in Nantes, he moved to Paris and graduated from the École normale Supérieure de Saint-Cloud in 1959, achieving a prized *Agrégation de sciences naturelles*. A French-professor colleague of mine used to delight in listening to speeches or reading texts by agrégés, because of their clarity, Cartesian rigor of logic, and linguistic poetry. From 1959 through 1995, Gabriel taught at the *Lycée Janson de Sailly* in Paris. For those not familiar with the French educational system, it is worth noting that the school is one of the most prestigious in France. Its aim is to educate the very best students in areas ranging from science to politics. In 1983, Prof. Gohau completed his doctoral *Thèse d'État* on "Ancient ideas on the formation of mountains." The *Société géologique de France* recognized his many contributions to understanding the history of geology by awarding him the "Prix Wegmann" for 1994. Three years later, Gabriel Gohau took over as President of the *Comité français d'histoire de la géologie*, succeeding COFRHIGEO's founder and leading light, François Ellenberger, our Division's History of Geology Award winner in 1994. Fittingly, Gohau edited the 1997 book *De la géologie à son histoire* that paid hommage to Ellenberger's many contributions to the history of geoscience.

It is not possible in these brief remarks to pay full tribute to the impact of Prof. Gohau's extensive scholarship in our discipline, but both Ken Taylor and I have strong recollections about how Gabriel's clear prose and keen analyses helped us deepen our appreciation for the maturation of geology. Topics such as Actualism versus Catastrophism, Lamarckian evolution, the duration and calibration of geologic time, Theories of the Earth, evolving understanding about metamorphism, and paleontology as a key to unlocking Earth history were all treated in eloquent depth by Gohau. He also helped decode the philosophy behind geological concepts, as he commented on the epistemology of Karl Popper and the philosophical grounding of Lamarck's work. When I was working on a paper about the merit of studying the history of science, it was helpful to have his 2005 discussion of that exact topic, as published in the *Dossiers de l'Union Rationaliste*. Which introduces the point that the significant role of rationalism is built into Gohau's vision of historical and current events. And that he appreciates the power of history to inform and excite students.

Although retired from classroom teaching, Prof. Gohau remains active as a scholar and leader of the French history of geology community. He retains his love of hiking in the mountains and vacationing along the Atlantic coast of France. Those attuned to French history will be amused to realize that Prof. Gohau's home in the Paris suburbs is on Avenue Bernard-Palissy, named in honor of the great Renaissance potter and proto-geoscientist.

Our Awardee cannot be with us physically today, but he is pleased to be with us in spirit. It is truly a privilege to recognize Professor Gabriel Gohau as the recipient of our Division's "Mary C. Rabbitt Award" for 2010.

Response by Gabriel Gohau

I wish first to express my gratitude to the Geological Society of America and its History of Geology Division for this unexpected award. Let me also express my very great regret that I am unable to receive it in person, for reasons of health. François Ellenberger, my French colleague upon whom you bestowed this distinction sixteen years ago, was similarly obliged to remain at home instead of crossing the Ocean. And my friend David Oldroyd also had to be absent when the award was presented to him a decade ago, although in his case for the reason that he was at the time making a journey in a distant desert on the back of a dromedary. I am much less of an outdoor adventurer than David.

The list of the award's previous recipients is impressive, and in reading it

I sense the magnitude of the honor you are doing me. I will refrain from arguing that the award is undeserved, even though that is what I think; this could not help seeming to be false modesty, and lacking in respect for your judgment.

I was educated as a naturalist; in France the study of biology and geology are strongly linked. As a lycée professor in Paris, I acquired a taste for the history of science during the 1970s through the works of two distinguished French philosophers of science, Gaston Bachelard and Georges Canguilhem. In 1972 I met Canguilhem, who suggested that I undertake to write a *thèse d'Etat* under the supervision of one of his most noted students, François Dagognet. Thus I owe my philosophical education to this French school of historical epistemology, a school characterized by study of epistemological obstacles that produce intellectual discontinuities separated by periods of stasis or equilibrium, to borrow from Gould's way of speaking. Robert Dott and Ken Bork both mentioned, on receiving this prize, that there exist two categories of historians of science: scientists themselves, and professional historians. In France, philosophers also play an important role.

My 1983 thesis was entitled "Past ideas on the formation of mountains—the prehistory of tectonics." In 1976, meanwhile, François Ellenberger had founded the French Committee for the History of Geology, our national subgroup within INHIGEO. He appointed our friend Jean Gaudant as secretary, a post he continues to fill with great devotion. I joined COFRHIGEO, as our Committee is known, and in the years that followed this gave me the opportunity to meet American and British friends who have preceded me in winning this award. Ken Bork came to Paris in 1980 for the International Geological Congress. Another participant in the 1980 Congress was Ken Taylor. Right away we got on well together, finding that we had ideas in common about geology during the second half of the 18th century. I also encountered Hugh Torrens, when François Ellenberger organized a repeat performance of his memorable historical field trip from the 1980 Congress. Similarly, I came to know Martin Rudwick, who came to France frequently, and of course Albert Carozzi who often travelled to Geneva. Together with his wife Marguerite, in the late 1980s, Albert translated my *History of Geology*, and this brought my name to the attention of American readers. Perhaps this book helped in turn to raise American consciousness of Continental European characters in geology's history, and French ones in particular. But if so this may be seen as repayment of a debt, for so many of these francophone figures have been studied by researchers from the English-speaking world. Martin Rudwick on Cuvier, for example, or Ken Taylor on Desmarest, or Albert Carozzi who has written so extensively on Saussure, as well as on other Swiss figures, such as Elie Bertrand, who has been analyzed also by Ken Bork. And as is well known, Carozzi has translated de Maillet and Lamarck, among others, into English.

I may say I owe my choice of tectonics as a subject of research to the realization that Buffon could think of a syncline as a hole in the ground. Also, I wanted to fathom his idea of irreversible epochs, and I discovered that the cyclic conception of history in nature, which I had thought arose with Hutton, had a prior history. So I studied tectonic ideas from ancient Greek times forward. Thus I encountered classic authors who wondered if mountains date from the Deluge or even the Creation, a subject on which I learned much from the famous *Earth in Decay* by Gordon Herries Davies, recipient of this award in 1996. Lately I returned to this subject in a brief history of tectonics that was published this past summer.

In contradistinction to mountain formation, another subject that has occupied me a great deal is geohistory. Receiving this award in 2008, Gregory Good noted an advantage held by historians of geology over those concerned with physics: geology is an historical science, and geologists are readily drawn to think about time. The historical sciences have always been a preoccupation of mine. I learned from reading the philosopher Antoine Cournot that all history is contingent. And I concluded that geohistory must be constructed from the Earth's archives, which is in fact a double sort of archiving: stratigraphic archives marking different points in time, and facies archives indicating spatial distinctions. On these grounds I judged that the birth of a real geohistory must be situated around 1780. I share both the subject and the judgment with others, including Ken Taylor (from his thesis on Desmarest and his attention to geology in 1776), and David Oldroyd, with whom I was long acquainted through reading his work and by correspondence before meeting him personally. David's separation of "genetic" from genuinely "historical" systems of temporal thinking remains central to my conception of geohistory and historical science. I wrote a book on this topic in 2003, and organized a conference on it with my friend Stéphane Tirard.

Of course, the birth of geohistory is now a sphere we cannot consider without engaging Martin Rudwick and his two large volumes on the reconstruction of geohistory. He and I agree on the centrality of the contingency of history. Our religious convictions differ, of course, as I am an atheist. But I am prepared to agree that the Genesis story served as an outline sketch or template for some early histories of the world. Provided, that is, that cultural conditions permitted liberties to be taken in interpreting the Bible, something Burnet did, as only an Englishman could do at the time. This was pointed out by the historian of biology and geology Jacques Roger, who was for me a scholarly model and guide.

I see in the statement of thanks by Davis Young, on receiving the award in 2009, that he came to the history of geology through critical responses to young-Earth creationism. In my research I have encountered figures who held to the creationists' short time scale; such is the case for instance of the abbé Maupied, who sought to adapt to this view the work of the geologist Constant Prévost (well known to Ken Bork) and of his friend the biologist Blainville. But others like the Biblicist Jean-André Deluc whom I examined with Ellenberger, and Cuvier who derived much from Deluc, represent the prevalent attitude among serious scientists in having accommodated their religious convictions to their scientific investigations.

One more word on my acquaintance with American and British colleagues. At an early stage of my career I inquired into the geology and chemistry of Lamarck; and I formed a valued acquaintance with the American-trained specialist in evolution, Jon Hodge, who has made his career in England. More recently I studied Darwin's geology. For the latter it was a pleasure to work through the fine book by Sandra Herbert, herself a recent recipient of this award, with whom I first became acquainted years ago, at a meeting held for the centennial of Darwin's death.

I am writing this response at Saint-Brévin, a Breton town where the Loire flows into the Atlantic, near Nantes. I look out on the vast Ocean that separates us. It is now some 200 million years since the New World began to distance itself from Europe and Africa. When this message reaches you the distance will have increased by perhaps a half-millimeter. Thank you for staying close in spirit.

O.E. MEINZER AWARD

Presented to
Mary Jo Baedecker

Mary Jo Baedecker
U.S. Geological Survey–Reston

Citation by Isabelle M. Cozzarelli

I am honored to introduce Mary Jo Beadecker as the recipient of the 2010 O.E. Meinzer Award of the Hydrogeology Division of the Geological Society of America. This award is presented to Mary Jo in recognition of her pioneering research in the field of contaminant hydrogeology. From her early work on the diagenesis of natural organic compounds in marine sediments, to her later work on degradation of contaminants in aquifers, Mary Jo has focused on elucidating the fundamental electron-transfer processes at work as organic compounds degrade in subsurface environments. She is an expert at understanding complex hydrogeologic systems where organic matter is driving redox reactions. Mary Jo's body of published work represents a major contribution towards understanding and quantifying the transformation of organic compounds and the concomitant inorganic geochemical evolution of groundwater.

Mary Jo Baedecker was born in 1941 in Richmond, Kentucky, USA. She completed undergraduate work at Vanderbilt University (1964) and received the master's degree in chemistry from the University of Kentucky (1967) and the Ph.D. in geochemistry from The George Washington University (1985). From 1968 until 1973 she was a research scientist in Ian Kaplan's research group at the University of California-Los Angeles. She was trained as an organic geochemist and in her early work she focused on the diagenesis of marine sediments.

In 1974, Mary Jo joined the U.S. Geological Survey (USGS) as a research chemist. Early in her career at the USGS Mary Jo worked with William Back and focused on examining degradation reactions in the highly reducing environment created when an aquifer is contaminated with landfill leachate. In this groundbreaking work Mary Jo used a process-oriented approach that offered, for the first time, a detailed and comprehensive conceptual model of plume evolution and its impact on aquifer chemistry **(Baedecker and Back, 1979, *Ground Water* v.17(5), p. 429-437)**. This landmark paper was selected as a 20th century benchmark paper in the field of groundwater by the International Association of Hydrological Sciences. In a related paper, **Baedecker and Back, 1979, *Journal of Hydrology* v. 43, p.393-414,** Mary Jo creatively linked the fundamental redox geochemistry of marine sediments to occurrences of redox zonation in contaminated aquifers. Prior to this research, investigations of contaminated aquifers beneath landfills had been largely qualitative without detailed attention to hydrogeochemical processes. These seminal papers laid the foundation for rigorous thinking about contaminant hydrogeology and geochemistry.

Her work on landfills set Mary Jo on a new research path, developing conceptual frameworks for understanding complex contaminated systems. Perhaps her greatest impact has resulted from her rigorous studies documenting biogeochemical processes at a crude-oil spill site near Bemidji, Minnesota. In **Baedecker, Cozzarelli, Eganhouse, Siegel, and Bennett, 1993, *Applied Geochemistry* v. 8(6), p. 569-586**, Mary Jo used an innovative approach linking organic and inorganic geochemistry, microbial processes, and mathematical modeling. This paper was part of a series of Bemidji papers she published in *Applied Geochemistry* in 1993 (see also Bennett, Siegel, Baedecker, and Hult, 1993, *Applied Geochemistry* v. 8(6), p. 529-549, and Eganhouse Baedecker, Cozzarelli, Aiken, Thorn, and Dorsey, 1993, *Applied Geochemistry* v. 8(6), p. 551-567). Mary Jo was a co-author on numerous papers detailing later follow-up work at the Bemidji site including those that focused on the fate of metabolites of petroleum biodegradation (Cozzarelli, Baedecker, Eganhouse, and Goerlitz, 1994, *Geochimica et Cosmochimica Acta* v. 58 (2), p. 863-877) and the incorporation of degradation reactions and redox processes into a multispecies reactive solute transport model (Essaid, Bekins, Godsy, Warren, Baedecker, and Cozzarelli, 1995, *Water Resources Research* v. 31 (12), p. 3309-3327).

Mary Jo's sustained research at the Bemidji site represents one of the earliest comprehensive bodies of work on the biogeochemical evolution of a contaminated aquifer, and led to international recognition of the importance of natural attenuation processes in understanding the environmental fate of contaminants. Her early contributions in this field were instrumental in the growth of a major water program at the USGS, the Toxics Substances Hydrology Program.

Later in her career at USGS Mary Jo took on a number of leadership positions, culminating in her appointment as the Chief Scientist for Hydrology. In that position, she was responsible for the direction and management of research programs in the hydrologic sciences and served as advisor to the Associate Director for Water. She retired from the USGS in 2004, where she continues to explore the frontiers of contaminant hydrogeology as a scientist emeritus. Mary Jo has a long history of service to GSA, which included serving on the Management Board and as Chair of the Hydrogeology Division. The Division awarded her the Distinguished Service in Hydrogeology Award in 2002 in recognition of her dedicated service to GSA, the Hydrogeology Division, and the hydrogeologic community. She has remained an active member of the hydrogeologic community, serving, for example, on the Water Science and Technology Board of the National Research Council (NRC) of the National Academies from 2007 to 2009. Mary Jo's elegant fundamental scientific investigations not only moved the field of contaminant hydrogeology forward but also influenced and inspired younger generations of scientists to tackle the difficult problem of understanding the transformation of organic contaminants in subsurface environments. It is an honor for me to be given the opportunity to highlight these accomplishments. Mary Jo has been an inspiration to me, throughout my career, and I feel lucky to be able to call her mentor, colleague, and friend. Please join me in congratulating Mary Jo Baedecker, recipient of this year's O.E. Meinzer award, based on her outstanding contributions to the science of hydrogeology.

** Citation publications noted in bold.*

Response by Mary Jo Baedecker

It is an honor to receive the O. E. Meinzer Award from the Hydrogeology Division and I thank the nominating committee, those who supported my nomination and my friend and colleague, Isabelle Cozzarelli for the kind words in the citation. Being selected for this award came as a surprise and it is a nice honor to receive it toward the end of my career with the U.S. Geological Survey (USGS). I understand that the papers for which I am being cited have been used in teaching at universities and I find that very gratifying as I have a great interest in helping young people learn about geochemistry and hydrogeology.

Over the years, there were many people who had significant impacts on my career. First, I would like to recognize my colleague and first mentor in the earth sciences, Ian Kaplan, who at UCLA, hired me to work on the early diagenesis of marine sediments and ignited my interest in organic geochemistry. This was an exciting time to be a part of the Kaplan group in the early 1970s, as many of the students and post-docs have become world-renowned scientists.

Coming to the USGS in 1974, I had the good fortune of being assigned to work with Bill Back, a hydrogeologist, known to all in this field. He told me to "apply what you know to groundwater" and that is how we started working at landfills. We took an interdisciplinary approach combining organic and inorganic geochemistry and hydrogeology to understand processes in and downgradient from a landfill. In 1982, the USGS Toxic Substances Hydrology Program started and few scientists wanted to work in such complicated environments. Because I was working at landfills, it was a natural for me to get involved with this program and I worked at three of the sites, making the Bemidji, Minnesota, oil-contaminated site my primary research site. Don Siegel, Marc Hult, Olaf Pfannkuch and I started the research at the site and we had a long collaboration in the early years. Isabelle Cozzarelli and Bob Eganhouse came to the USGS shortly thereafter, and we have had many years of collaboration at this and other groundwater contamination sites. After a 10-year hiatus on my part, we are working together again at the Bemidji site, along with Barbara Bekins, who renewed my interest at the site when she asked me to analyze some oil samples.

Bill Back and Blair Jones were two of my USGS mentors who had the ability to look at the larger picture. I am indebted to them for encouraging my research. Another person who shaped my career was Roger Wolff, who thought I had the right skills, and convinced me to give back to the USGS by going into research administration, which I did for 10 years. Unfortunately, Bill Back and Roger Wolff died a few years ago and are no longer with us.

I want to recognize and thank the USGS for providing such a wonderful atmosphere to pursue research, by funding the infrastructure to conduct field investigations, and for encouraging an environment of collaborative research. None of my work could have been completed without the support of other scientists at the USGS and from Universities. Finally, I want to thank my parents, who encouraged me to "think big" and stressed education, and my husband, Philip, and daughter, Cheryl, who were always supportive of my career. I am very pleased to accept the 2010 O. E. Meinzer Award.

INTERNATIONAL SECTION DISTINGUISHED CAREER AWARD

Presented to
W. Gary Ernst

W. Gary Ernst
Stanford University (emeritus)

Citation by Yildirim Dilek

It is my great pleasure to present Professor W. Gary Ernst, the recipient of the 2010 Distinguished Career Award of the GSA International Section. Gary has led and shaped our thinking and ideas about convergent margin tectonics and metamorphism through his multi-faceted international contributions for over 50 years. He is a truly distinguished international geoscientist.

Gary Ernst retired from active teaching at Stanford University in 2004, after 44 years of distinguished academic career and service, but has remained very active publishing more than ever, and promoting earth sciences nationally and internationally through his editorial work. Gary has always been a true pioneer in metamorphic petrology, particularly in documenting the high-pressure conditions of ancient subduction zone systems in the Franciscan Complex in California, the Sanbagawa metamorphic terrane in Japan, and the Alpine orogenic belt in Europe through his original work, as well as in experimental petrology and mineralogy. After his initial work in the California Coast Ranges, he began working with Japanese colleagues in SW Japan, then went to the Alps to study metamorphism, mantle heterogeneity and plate tectonics, to Taiwan, to South Island in New Zealand, to NE China (to work on Archean tectonics), later to Kazakhstan, Southern Urals (Russia) and East-Central China (to work on HP and UHP terranes). That is a remarkable list of international collaboration. One of Gary's many important contributions to the international earth science community is a rather large cadre of graduate students, whom he trained and worked closely with at UCLA and Stanford, and who are now among the most distinguished and established members of our society.

He has held various Visiting Professor positions in national and international universities. He has touched upon the lives and careers of numerous international researchers and students through his personal interactions with them during these visits, while serving as a great ambassador of the North American geoscience community.

Gary's service to the professional organizations and learned societies in the broad fields of earth sciences surpasses that of many distinguished scientists. He served as the Vice President (1979-80) and President (1980-81) of the Mineralogical Society of America; Chairman (1973-76) of the Volcanology, Geochemistry and Petrology Section of the American Geophysical Union; President of the Geological Society of America (1985-86); and, Chairman of the Board on Earth Sciences in the National Research Council (1984-87). Throughout his long and distinguished service to all these societies and organizations, Gary has been a leader promoting the advancement and implementation of many initiatives, ideas, and projects that shaped the course of our profession.

The significant, high-impact scientific work and contributions of Gary Ernst have been widely recognized by the international scientific community through some of the most prestigious awards he has received during his career. These awards include the Geological Society of Japan Medal (1998), the GSA Penrose Medal (2004), the Mineralogical Society of America Roebling Medal (2008), and the Marcus Milling Legendary Geoscientist Award (2008) of the American Geological Institute. These national and international honours attest to Gary's creative, innovative and frontier work in structural petrology that he always so eloquently documented in the context of regional tectonics and geodynamics of different metamorphic terranes around the world.

Gary Ernst has enriched our science through his own research and leadership, and continues to do so. I do not see any sign of him slowing down in his scientific activities. I am very pleased that the GSA International Section has recognized his fundamental contributions by awarding him the Distinguished Career Award. Congratulations, Gary!

Response by W. Gary Ernst

Yildirim, John, fellow geologists, I am pleased beyond expression, but equally humbled and embarrassed by this recognition—especially when I consider the large number of Earth scientists conducting international geologic research. The ranks of potential award recipients must be enormous. Nevertheless, many thanks! Professional societies celebrate scientific accomplishments with awards, and far more contribute substantially to advancement of the discipline than can ever be properly recognized. Thus, to receive such an honor, one must be industrious, intelligent, and lucky—I'd choose the latter.

Trained as an experimental mineralogist, field geologist, and sometime-geochemist, I have been fortunate to work in contrasting geologic regions in the central and western United States: the early Precambrian of northern Minnesota; the Cretaceous miogeocline + Tertiary alkaline volcanics of north-central Montana; and the Coast Ranges, Klamath Mountains, and White-Inyo Range of the California Mesozoic convergent margin. Although these areas are exceedingly diverse and their study most edifying, my interest in Alpine-Circumpacific contractional plate margins has allowed me to investigate subduction complexes and to a lesser extent, coeval landward volcanic-plutonic arcs in Chile, Alaska, SW Japan, east-central China, Taiwan, South Island New Zealand, the Western Alps, northern Kazakhstan, and the southern Urals. Entry into some of these areas resulted from doctoral and postdoctoral colleagues I was supposedly supervising, but was learning from while we pursued joint research. I have been favored with a remarkably gifted set of UCLA and Stanford graduate students (14 M. Sc., 33 Ph. D.), post-docs + research associates (>45). Equally important for my geologic development, I have had great friends and scientific colleagues at the USGS as well as academic institutions in Japan, Taiwan, Switzerland, Italy, China, Russia, and New Zealand.

Looking back on these international cooperative studies, three were especially formative for my career: The first involved work on the high-pressure/low-temperature metamorphic belts of SW Japan during

1963-68, where I benefited immensely from associations with Hisashi Kuno, Akiho Miyashiro, Yotaro Seki, and Shohei Banno. The second occurred during 1970-76 when I studied the petrotectonic evolution of the Western Alps in the company of Peter Bearth, Eduard Wenk, Volkmar Trommsdorff, Giorgio Dal Piaz, and Giovanni Piccardo. The third concerned investigations of ultrahigh-pressure continental-collision complexes in central and eastern Asia with Louie Liou, Shige Maruyama, Nick Sobolev, Nick Dobretsov, and Ruth Zhang. Most important of all, my wife, Charlotte, has been unwavering in her love, and in providing active support during mineralogic-geologic-tectonic escapades to various far-off places; she has also persistently tried to educate me regarding the finer things in life.

I heartily thank the GSA International Section for this Distinguished Career Award. I accept it on behalf of the many less-well-recognized Earth scientists far more deserving than I. This sobering knowledge will inspire me to continuing efforts—I'm not done yet!

ISRAEL C. RUSSELL AWARD

Presented to
William M. Last

William M. Last
University of Manitoba

Citation by Fawn Ginn

It is an honor and a great pleasure for me to deliver the citation for the inaugural Israel Cook Russell award for major contributions to the field of limnogeology to Bill Last.

Bill has made major contributions to the field through three decades of research, teaching and editorial activities. He is recognized internationally as a leading authority on limnogeology and lacustrine evaporites and as a world leader on research related to saline lake basins. He has authored over 130 research papers dealing with lakes and lake sediments and has authored or edited a total 21 monographs and books, many of which are key references in paleolimnology and limnogeology.

Like Isreal Russell, Bill is an avid field researcher who loves to experience nature first hand. The salt lakes of North America and Australia are his primary laboratories, and for many years these continental evaporitic settings were not well studied. Anyone who has been on a field trip with Bill can't help but feel his excitement for his research as he wades in to the muddiest and saltiest lakes without hesitation. He pioneered work in the fundamentals of saline lake geology, where he has shown that the mineral record in saline lakes can provide precise and accurate information on past lake conditions. This research paved the way to quantitative interpretation of lake histories, with applications to Quaternary and pre-Quaternary environmental change. Bill's Lake Sedimentology Lab at University of Manitoba is one of the world's most active and productive labs dedicated to limnogeology. The lab has attracted limnogeologists world-wide, and has been host to many scholars. This stream of colleagues has helped him develop collaborative lake sediment research on a global basis.

In addition to research, Bill has made major contributions to the field of limnogeology with his editorial work. During his tenure as co-editor-in-chief of *Journal of Paleolimnology*, he has been universally acknowledged as greatly expanding the coverage and influence of this journal. He initiated and co-edited several research volumes of the book series *Developments in Paleoenvironmental Research*, which have become essential references in the field. He has served on editorial boards and as associate editor on eight other journals.

Bill is an excellent and dedicated teacher and mentor. His enthusiasm in the lecture theater is second to none. Anyone who has listened to a lecture or seminar by Bill will catch his unbridled enthusiasm for whatever the topic is he is presenting. His commitment and passion for his work has inspired many students and colleagues to pursue new avenues of scientific research.

Bill has been an active member of GSA for over 30 years and a Fellow since 1999. As the representative for GSA at University of Manitoba since 1982, he strongly encourages membership and participation in GSA meetings.

Bill's contributions to the field of limnogeology have and continue to be essential to its forward momentum. Bill is bringing distinction to this award by being the first recipient. His humility makes it even more meaningful.

Response by William M. Last

I would like to thank Fawn for her kind words and generous comments about my career, and the Limnogeology Division for presenting me with the Israel Cook Russell award. Being appreciated by ones colleagues and professional peers is very gratifying. I am delighted and humbled by this expression of appreciation. I am also deeply honored to have my name associated in any way with I. C. Russell, one of the pre-eminent explorers in the early days of our profession and certainly a giant in the ranks of geolimnologists.

When Fawn first approached me about the Russell award nomination, I must admit I was a bit hesitant. "Achievements in limnogeology through contributions in research, teaching and service" sounded suspiciously like "good job over the past 40 years; goodbye and be sure to send us a postcard from the cottage". Although I have been working with lakes and lake sediments for my entire career, I really feel like I am just starting in the field. While it is true that I am getting to an age at which my employer is regularly sending me reminders about retirement planning, it is my intention to keep doing limnogeology for a few more decades. There are there simply too many uncored lakes and countless fascinating geochemical systems to slow down now; and with lacustrine carbonates and evaporites on Mars, we have a whole new planet to explore from a geolimnological perspective.

A few years ago in accepting the Sedimentary Geology Division's Sloss Award, Mike Arthur professed "the field of sedimentary geology is quite robust today". I would certainly echo this sentiment about our interdisciplinary field of limnogeology; explosive might be a better word to describe the past few decades of growth in this field. I am quite sure most of us old-timers can remember the days, not too distant, in which organizing a full session of papers on lakes at a GSA meeting would be almost impossible. Today we have an abundance of sessions like the ones organized here in Denver by Dan Deocampo, Mike Rosen, David Finkelstein and Tom Johnson. In the past few years, we have seen this surge of interest in lacustrine systems translate into the creation of the Limnogeology Division of GSA and sister organizations like the International Paleolimnology Association, International Association of Limnogeology, and International Society for Salt Lake Research, to name just a few. During my years of co-editing Journal of Paleolimnology, John Smol and I were constantly amazed by the exponential growth of contributions dealing with the physical and geochemical aspects of lake records. I may be considered a Pollyanna, but I really do not have any profound concerns about the state of our field nor of the level of funding of limnogeology projects in academia.

I cannot remember a time in my life that I was not fascinated with lakes. Growing up literally meters away from Lake Michigan meant my every waking hour as a youngster was spent on or in this large freshwater basin. Although I entered university intent only on doing "science" (earth science was not a teachable subject in my high school), I was quickly attracted to geology, admittedly due mainly to the fact that I could spend time outdoors while my friends were cooped up

in labs replicating experiments or dissecting frogs. In my formal education at Wisconsin and Manitoba, I was truly blessed to have teachers, supervisors and colleagues who were willing to share their knowledge and expertise, and were patient enough to provide opportunities to work in the field. Manitoba during the early 1970's was somewhat of a hotbed of lake investigations, from which the relatively large scientific community providing me with more than ample exposure to a great variety of limnogeology projects. Probably one of the best undergraduate courses I ever took was Jim Teller's geolimnology course (to my knowledge the only formal course in North America at that time dealing exclusively with the geology of lakes). At this time, Jim was laying the foundations for his career work on Lake Agassiz and I eagerly took part in this project. From Agassiz, to my thinking at least, it was a short jump into Lake Manitoba and then farther westward into the salty puddles of the Canadian Prairies, southern Australia, and South America.

I am delighted to receive this inaugural I. C. Russell award. I regard my many colleagues and students in Canada, United States, Australia, and China as sharing this award because they have all greatly helped me along the way.

DISTINGUISHED GEOLOGIC CAREER AWARD (MGPV DIVISION)

Presented to
Peter Lipman

Peter Lipman
U.S. Geological Survey
(Emeritus Scientist)

Citation by Olivier Bachmann

Peter Lipman is the first recipient of the GSA MGPV Career Achievement award. This is richly deserved and a great start for this award. Pete's pioneering and innovative work on large volcanic systems, should it be silicic caldera-forming eruptions or giant shield volcanoes, set the tone for much of the work that has been done over the past half century, and this award is allowing us to pause and reflect on how much we owe to Pete for all this hard work.

Pete's career started at a most exciting time for a geologist. Pete was finishing his Ph.D. at Stanford when Harry Hess's published his landmark paper on sea-floor spreading, setting up the stage for the plate tectonics theory to puzzle the earth science community. And it was also just as several seminal papers by Bob Smith on ash flows appeared, which were break-through explorations of processes at large caldera-forming explosive eruptions (now commonly referred to as "supervolcanoes") on our planet. As a fresh "Doc in rocks", Pete started working at the Nevada Test Site, only to realize that this place was covered with giant ash-flow deposits that meshed wonderfully with Smith's interpretations. Then, in order to obtain better perspectives on younger units, he managed to spend a year in Japan as an NSF post-doctoral fellow, to study one of the largest Quaternary caldera-forming eruptions, the Aso Tuff. Japan during 1964-65 must have been a great adventure for a couple of young westerners (his wife Beverly was with him for the whole time), and it left great memories and influences, with Japanese art and life-style hints still surrounding their lives many decades later.

Studying the gigantic ash-flow units in Nevada and Japan led Pete to one of his first major discoveries: that many of these deposits came out of the ground strongly zoned in composition and mineralogy. Both the Aso system and the Nevada Test Site units show obvious signs of being erupted from complex magma reservoirs in the shallow crust, and understanding how and why these reservoirs behave this way has kept a lot of us igneous petrologists and volcanologists busy for the last 50 years.

Pete's volcano studies moved east in 1965 and landed in a wonderful land of opportunity, Colorado(!), and more specifically the San Juan region (now recognized as the largest erosional remnant of the composite Southern Rocky Mountain Volcanic Field). With his usual efficiency, Pete started field work in the San Juan as soon as the jet lag was over, two weeks after moving back from Japan. By 1968, as French hippies were swarming the street of Paris, Pete and his colleagues were swarming all over southern Colorado in a whirlwind of mapping that has not stopped, as he was in the Colorado mountains until a few weeks ago to continue fieldwork. By a complex combination of intense mapping, advanced petrology, geochronology, and geophysical techniques, Pete and colleagues realized the southern Colorado had been a Tertiary hot plate, with almost 30 large caldera-forming ignimbrites erupted in a few million years during what is called now the western USA magmatic flare-up. Their careful unraveling of the magmatic history of this region took many years, enormous energy, creative thinking, and the most state-of-the-art techniques in geochemistry (including early isotopic determinations in the mid seventies), but I believe that Pete has laid out for us in incredible detail one of the best examples of a continental-arc magmatic province. I can't resist noting that it also contains the only magnitude-9 eruption documented on our planet (based on Mason et al. 2004). We actually don't know if this unit, the Fish Canyon Tuff, which Pete and my other mentor Mike Dungan allowed me to look at, is really the largest ignimbrite on Earth, but being in the USA and largely put on the map by Pete, it probably ought to be.

Each large magmatic province has its advantages, but the one that stands out in the SRMVF is the intermediate degree of erosion and the great amount of topographic relief (hard on the legs and lungs but scientifically advantageous). It allowed Pete to see calderas structures like few places on Earth. The great dissection by glacial valleys exposes ring faults, densely welded intracaldera facies, resurgent domes, and tops of the plutonic roots of these caldera cycles. This led to the discovery of "megabreccias" near walls of the calderas, a major advance in understanding the geometries and construction of these structures. It also allowed Pete and field geologists in other areas of the world to avoid becoming totally bewildered by Nature's tricks while mapping. Caldera landslide breccias can expose all kinds of lithologies, cropping out with unexpected attitudes and in places where they shouldn't be. Without the mental framework that km-sized blocks can slide, rotate and land kilometers away from where they started, a field geologist can rapidly go totally crazy.

After about a decade of working in southern Colorado, I can only assume that Pete got slightly tired of being stormed upon and chased by lightning every summer, and decided to get involved in studying volcanoes under balmier skies. His first work on Kilauea and Mauna Loa appeared in the late 1970's, and Pete has been back there for many decades, mapping the subaerial and submarine flanks of these fabulous volcanoes with colleagues from all over the world, including Japanese ships and submersibles that would take them to sea-floor depths to observe the gigantic landslides that take away from time to time the flanks of the Hawaiian volcanoes. He also had the good taste of acquiring a share in a wonderful house on the sunny side of Big Island, a delightful idea for some of us, who are just a short flight away from this tropical paradise.

I was fortunate to join Pete in the mid-1990s for a series of epic summers in the SRMVF to continue unraveling the histories of these supervolcanoes. Pete has been a fabulous mentor to me (and to many others young volcanophiles), not only with respect to his approach to science but also his approach to living. Volcanoes, although clearly a big part of his life, are balanced with his great family and interests far from erupting mountains. Probably few of you know that Pete is a great art enthusiast (he

was the president of the San Jose Museum of Art for several years), wine aficionado (he has one of the most amazing wine collections that I know), a world connoisseur (he loves to travel), and one of the few volcanologists who walks faster than his shadow. Pete, I want to thank you for allowing me to be here today, for everything you have done for our science, and congratulate you again heartily for this richly deserved award.

References:

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Response by Peter Lipman

Thank you, Olivier, for such kind words.

And I find it difficult to express my delight, both by this award and by creation of the MGPV Division. As a field-based geologist involved in the spectrum of MGPV activities, I've now been a GSA member of for 50 years. But no Division previously had been much of a fit for studies of volcanoes and their eruptive processes. So thank you Jim, Cathy, and the others who have finally filled this gap at GSA.

As a kid who grew up in a rural part of southern New England, visible rocks were uninteresting, mainly on walls separating abandoned farm fields—think of Robert Frost's poem "Mending Wall," and I was a slow starter.

My geologic adventures have repeatedly been blessed by the luck to be in a good place at the right time, and especially to have connected with wonderful people. Additionally, the explosion of concepts and techniques for study of volcanic activity has been just extraordinary during the past 50 years. Here are examples:

A college friend told me about a camp-counselor job on the slopes of Pikes Peak in Colorado, I applied, and at age 19 ventured west of the Hudson River for the first time (a 14-yr-old in my camp tent was geology-prof-to-be, Bud Wobus). Seeing western mountains like the Tetons inspired a desire to explore them, and when I joined the college climbing club, I found myself tied to a rope with geology majors like Eric Cheney and Steve Porter.

When I belatedly decided that rocks could be interesting, midway through my junior year, the Yale geology department let me enter the second-half course without having taken Physical Geology (I'd read the textbook during the holidays). Upon switching to a geology major, I found myself in a class of only six, including such quick studies as geochemist Dick Armstrong and mineralogist Mike Holdaway, where there was no way to hide without doing the course work.

Yale had no summer field course of its own, and waived this requirement when I obtained a field-assistant job with Ben Leonard of the USGS, in a wonderfully geologically diverse mountainous area of central Idaho. Ben was a meticulous scientist and superb teacher; my field methods were largely shaped during that summer.

During my initial year as a grad student at Stanford, I shared an office with Bob Christiansen and became the first grad student supervised by Bill Dickinson, both life-long friends. And Bill allowed me to start a PhD field project after only two quarters of class work, on igneous and metamorphic rocks in the Trinity Alps, northern California. When Mike Holdaway, by then at Berkeley, discovered that fellow grad student Greg Davis was headed for the same area, the three of us collaborated on adjacent theses, with improved results for all. But igneous petrology in the late 1950s at Stanford involved techniques little different from those pioneered in late 19th century Germany; so much has changed since!

When offered a job by the USGS in late 1961 to work on volcanic rocks at the Nevada Test Site, I went for it because the rocks were well exposed, and at least igneous, even though I knew little about volcanic terranes. Here again, luck and timing: the rocks turned out to be world-class ignimbrites and calderas, ripe for study with new concepts (especially just-published papers by Robert L. Smith) and innovative analytical techniques including major- and trace-element chemistry in quantity, K-Ar age determinations, and paleomagnetic pole directions for testing stratigraphic correlations.

Deciding that volcanic rocks were fascinating but concerned by my inexperience with young volcanism, I (in hindsight, utterly brashly) wrote Hisahi Kuno (then probably the foremost volcanic petrologist globally, but whom I had never met) at the University of Tokyo, asking to do a postdoc with him. He said "yes," I obtained funding from a new NSF program, and had an amazing year following the youngest Aso ignimbrite from caldera rim, down a paleovalley, 70 km to the ocean. This work would not have been possible without guidance from Kuno's extraordinary assistant, Shigeo Aramaki and wonderful collaborations with two recent Kuno students, Koji Ono and Kazu Nakamura.

While in Japan, I was invited to participate in quarter-million-scale remapping of the San Juan Mountains, a USGS effort being organized by Tom Steven - the beginning of another long-term collaboration and friendship. A new style of mapping for me, averaging a 7.5' quad per week—but a terrific opportunity to explore huge areas, commensurate with the enormous ignimbrites and calderas. Even so, the scale of Fish Canyon Tuff (>5,000 km^3) and La Garita caldera (75x35 km) were utter surprises!

Fortunate opportunities kept coming: the developing concepts about plate tectonics in late 60s, just as Bob Christiansen, Hal Prostka, and I were recognizing regional volcano-tectonic trends for the American Cordillera. There was more San Juan work in the early 1970s, in conjunction with Wilderness Area studies, that included helicopter support and opportunities for more detailed work on Platoro and Lake City calderas, and informative Pb, Sr, and O isotopic tracer studies (with Bruce Doe, Carl Hedge, and Irving Friedman) on caldera-related magmatic evolution. Then work as staff geologist at the Hawaii Volcano Observatory, just in time for the M=7.2 Kalapana earthquake (largest in 100 years) and new experiences with follow-up geodetic surveys, followed by mapping and by radiocarbon dating the prehistorical activity of Mauna Loa, eruptions of Kilauea in 1977 and Mauna Loa in 1984, and new collaborators - especially Jack Lockwood, Bob Tilling, and Gordon Eaton. Then eruptive and geodetic study of the amazing 1980 Mount St. Helens eruption, jointly with Jim Moore and Don Swanson, and a large summary publication edited jointly with Donal Mullineaux. More mainland caldera studies aimed at exploring the connection with granitic remnants of subvolcanic magma chambers at Questa, New Mexico, and Mesozoic systems in Arizona. Work with the USGS Marine Geology group, especially Bill Normark, to explore the landslide submarine flank of Mauna Loa; framework geology for the Creede Scientific Drilling Project, led by Phil Bethke in the late 1980s. Fieldwork with Russians at Lake Baikal and young volcanic rocks in the Caucasus and Armenia, during five separate summers bracketing amazing societal changes as the Soviet Union wound down.

After a couple years away from research as Branch Chief and manager of the USGS Volcano Hazards and Geothermal Programs, back to the San Juans in 1995, where jointly with Michael Dungan, Olivier, and others from the Université Genéve, we explored the Fish Canyon Tuff and its enormous caldera.

Then in 1997-2002, Japanese scientists initiated an amazing collaborative effort to study underwater slopes of Hawaiian volcanoes, using submersibles provided by the Japan Marine Science and Technology Center (JAMSTEC). In recent years, mapping and petrologic study of additional diverse ignimbrites and calderas farther northeast in the San Juans that bridge to older Tertiary volcanism in central Colorado, aided by superbly precise Ar-Ar age control provided by Bill McIntosh and associates at New Mexico Tech.

In addition to collaborations with many university faculty and several postdocs, I've had marvelous times with some terrific grad students, serving on about 10 dissertation committees. And I owe so much to many wonderful guys who assisted with fieldwork so many summers in southwestern Colorado and elsewhere--to name just a few that came back for more than a single summer: Russ Burmester, Dave Johnson, John Pallister, Dave Sawyer, Olivier Bachman, and Andrea Sbisa.

It's been a wonderful trip, these past 50 years or so, with so many innovations in concepts and techniques, so much beautiful country for fieldwork, and shared experiences with so many lively associates. In all of these, I am enormously indebted to USGS management that has provided flexible support for activities that often deviated from perceived bureaucratic procedures. And most of all, to Beverly and our two sons, who often accompanied me in the field and on geology-related trips, at many times under less-than-idyllic conditions.

A final plea, though: the need for intensive field-based geologic studies. Mapping continues to be an essential research tool to identify questions and resolve hypotheses. Successful lab work depends on well-characterized samples and stratigraphy, but field relations remain poorly constrained in so many areas I've worked. So much remains to be learned, even in a place as extensively studied as the Southern Rocky Mountains, and this past summer's fieldwork continues to define fascinating questions to explore with lab work this winter. It's been a great time; stay in touch, or better still, come join in the fun!

And thank you again for this much-appreciated award.

G.K. GILBERT AWARD

Presented to
Carle M. Pieters

Carle M. Pieters
Brown University

Citation by James W. Head, III

Professor Carle Pieters is a pioneer in the field of planetary remote sensing and has made innumerable contributions to planetary spectroscopy, mineralogy, and geoscience. We are here today to recognize not only her contributions to planetary geoscience but also to celebrate her leadership in the international space community, her originality and enthusiasm, and her tenacious and generous spirit.

Carle Pieters' accomplishments are exemplified by research and professional activities in several key areas. Her laboratory spectroscopy experiments at Brown University have measured and modeled the interaction of visible to mid-infrared radiation with geologic materials, including analyses of U.S. and Soviet lunar samples, lunar meteorites, Mars analogs and meteorites, and terrestrial materials. Her investigations provide a basis for understanding the fundamental principles of mineral detection and identification, photometric effects, grain size and shape influences, band strengths, mineral mixtures, and modal abundances. She has tirelessly encouraged and assisted others in obtaining quantitative information that can be used to analyze and interpret the data.

One of her passions is the remote compositional analysis of the Moon. Beginning with characterizing the diversity of mare basalt types, she showed the non-representativeness of the Luna and Apollo sample return sites and the implications of the full suite of basalt types. Using impact craters as probes of the highland crust in space and time, her early work revealed the presence of olivine in the central peaks of Copernicus. With Stefanie Tompkins she used the central peaks and interiors of craters ace to probe global crustal diversity.

One of the most difficult problems in remote sensing of planetary surfaces is the fact that crustal rocks and minerals are altered by weathering processes dissimilar to those known on Earth. Carle Pieters' research has helped to determine the processes responsible for altering materials in the space environment and to measure the effects of these processes on samples. Early work (often in collaboration with John Adams and Tom McCord) centered on regolith formation processes. Later work focused on space weathering processes, particularly on the nature of asteroidal surfaces and evaluating observational and experimental data to identify asteroidal source bodies for diverse meteorite types.

Carle's rigorous analysis of materials and problems on Earth, Mars and Venus is exemplified by her *Science* paper on the color of Venus' surface. This provided basic insight into the nature of Venus and involved a comprehensive analysis of Soviet Venera data, including the sharing of unpublished scientific information from Soviet colleagues. This effort highlights Carle's talents and reputation in international scientific circles, including Europe, Russia and Japan.

Carle is currently Principal Investigator on the Moon Mineralogy Mapper, a NASA Discovery instrument that flew on the Indian Chandrayaan-I Spacecraft; needless to say, the detection of water on the Moon and the documentation of detailed crustal mineralogy has ushered in a new era of exploration and discovery.

Carle, we congratulate you, a truly deserving recipient of the G. K. Gilbert Award! Few can match your levels of scientific accomplishment, intellectual rigor, community service, openness and unselfish cooperation in research.

Response by Carle M. Pieters

Thank you for such kind words. It makes me a bit nervous to hear my life compressed and flying by like that. I hope I can live up to the expectations!

It is impossible to say how deeply moved I am by all the colleagues, family, friends, students, who somehow managed to get me here today as the Gilbert awardee. I am off-scale honored and humbled by this award. Thank you ALL!

In thinking about what to say now, since my comments are to be posted, I thought I'd take a moment to outline a few thoughts that might be worth reading by the younger generation … or what *you* might do to be an Award winner. This might be sub-titled "Leadership in Science: Hindsight from remarkable scientific discoveries."

What makes a good leader? Hard work? Opportunity? Curiosity? Luck? Education? Experience? Commitment? Personality? Wisdom? Certainly all such things are valuable and present at some level in colleagues we acknowledge as leaders, people we entrust to influence the course of the world around us. A position of leadership is not to be confused with actually being a leader. People are put in a position of leadership by appointment, election, or seniority. Some who are in a position of influence turn out to be good leaders, while others are lousy, and a few (hopefully very few) do more harm than good.

In the course of being involved in magnificent discoveries of the last several years in planetary science … I see three requirements that define a good leader. I believe these principles are true for science leadership as well as leadership in many national or international endeavors. For the sciences, progress and good leadership are closely intertwined. The three requirements are simple to state, but not easy to embody *all* together. A good leader must be able to meet not one, not two, but *all* of the following three requirements:

1. Know what is important. These are basic principles, values, edge of knowledge. Many/Most scientists in this room meet this requirement. Nevertheless, this is a *continuous* learning and seeking process.

2. Identify what needs to be done. Develop strategy. Answer what, why, and how? And continually ask. Know the technology to determine what *can* be done. Actively participate in planning committees.

3. Get it done. This is hands-on know-how. Performing jobs, while developing teamwork. It requires perseverance, adjustments and compromise, worry about details and follow through, commitment over and over, and clear thinking to do no harm. Understand constraints of political and budget context. Taking the next step with purpose.

To be a good and knowledgeable scientist is a necessary, but insufficient, requirement for scientific leadership. A good leader has a sense of direction and the ability

to carefully plan the next step. Perhaps the hardest, most demanding, task is moving forward – and all the dedication, good fortune, and support from others that that also involves.

I can't claim to be great at this, but I know previous Gilbert awardee leaders met all three requirements, and I look forward to greeting the *next* Gilbert award winners!

KIRK BRYAN AWARD FOR RESEARCH EXCELLENCE

Presented to
Rolfe D. Mandel

Rolfe D. Mandel
Kansas Geological Survey
University of Kansas

Citation by Alan H. Simmons and E. Arthur Bettis

The 2010 Geological Society of America Kirk Bryan Award is presented to Dr. Rolfe D. Mandel, Executive Director of the Odyssey Geoarchaeological Research Program and Professor of Anthropology at the University of Kansas. The award is for his 2008 paper *Buried Paleoindian-age landscapes in stream valleys of the central plains, USA*, published in *Geomorphology*. The paper is a masterful merging of stratigraphic, geomorphological and archaeological data across the Central Plains that addresses long-standing questions in fluvial geomorphology and stratigraphy, landscape development and cultural history. Rolfe presents results from more than two decades of his interdisciplinary research in the region, focusing on two tasks; 1) a field-based quantitative evaluation of fluvial response to environmental change across the Pleistocene/Holocene boundary and 2) analysis of how geological processes have filtered the archaeological record of the region's earliest inhabitants.

In his usual fashion, Rolfe accomplishes these tasks through exhaustive field work that supports systematic hypotheses testing. As one support letter put it "The shear numbers of sites studied in detail and the area over which they are found are actually quite staggering." Rolfe goes far beyond previous work in the Central Plains by systematically investigating the stratigraphic record of valleys through the drainage hierarchy. The result is a comprehensive picture of how the region's *entire* fluvial system behaved during a period of major environmental change. He uses alluvial and soil stratigraphic studies supported by a robust radiocarbon chronology to thoroughly demonstrate that response of the fluvial system to climate and vegetation changes varied systematically through the drainage hierarchy.

The second major accomplishment of the paper is resolution of a long-standing archaeological debate about the region's first inhabitants. He applies his extensive stratigraphic data set to addressing reasons for the apparent paucity of Central Plains Paleoindian sites, while surrounding parts of the Great Plains and eastern Rockies are rich in these sites. Rolfe tackles this complex issue with an attention to pedologic, stratigraphic and paleoenvironmental data coupled with a detailed knowledge of regional archaeological manifestations. He demonstrates that the lack of Paleoindian sites is likely more apparent than real, concluding that geological filters control site visibility and preservation, rather than of an actual lack of human occupation. The sheer number of study sites, their wide geographic distribution and a very robust chronology provide unequivocal support for Rolfe's conclusions. Not content to merely demonstrate why sites appear to be so rare, he also provides realistic targets for future investigations to further his pioneering work on the peopling of the Central Plains. As Jim Knox, one of the numerous supporters of Rolfe's nomination, put it, this is simply a "great influential paper."

This detailed and comprehensive single-authored paper epitomizes the type of regional interdisciplinary research that Kirk Bryan pioneered and promoted; extensive field study with attention to detail followed by careful analysis of relevant data that leads to thoughtful conclusions. Like the namesake of this award, Rolfe's influence and experience are wide-ranging. He has made significant geomophological, geoarchaeological and archaeological contributions in areas as diverse as the Central Plains, the Big Bend region of southwest Texas, the Ohio River Valley, Jordan, and the Mediterranean island of Cyprus. Many of the more than 30 supporters of Rolfe's nomination for this award commented on their respect for his professionalism, commitment to mentoring, unselfish collaboration and contributions to Quaternary Science. Dr. Reid Ferring put it best: "In this very real way I believe that (Rolfe) mirrors the standards established by the namesake for this award." We should all be proud to recognize Rolfe, our friend and colleague, with this, the 2010 GSA Quaternary Geology and Geomorphology Division Kirk Bryan Award.

Response by Rolfe D. Mandel

Thank you, Alan and Art, for your kind words, and for nominating my article for the 2010 Kirk Bryan Award. I also thank my friends and colleagues who supported the nomination. I feel honored that the QG&G Kirk Bryan Award Committee selected me for such recognition, and I am truly humbled to be in the company of the previous awardees, many of whom are my heroes. This brings me to a strange coincidence. The day before I received notification of this award I began a lecture in my geoarchaeology class with the following confession: "Kirk Bryan is one of my heroes." Blank stares were on most faces. One student cautiously asked if Kirk Bryan had been on the TV show "American Idol." It was obvious that virtually none of the students knew of whom I was talking about, much less why I considered him worthy of admiration. They did not know that Kirk Bryan played a role in my career, and even influenced the composition of the paper that is receiving recognition this evening.

During the early 1970s, while I was an undergraduate geography student at the University of Texas, my mentor and close friend, Curt Sorenson, introduced me to Kirk Bryan's work. One of the assigned readings in Curt's soil class was a 1943 *American Journal of Science* article by Bryan and Claude Albritton entitled "Soil phenomena as evidence of climate changes." Their study area was in the Davis Mountains of West Texas, a place close to my heart, and I found the idea of using soils as proxies for Quaternary climate change a fascinating concept. Bryan's work, as well as Peter Birkeland's remarkable book, *Soils and Geomorphology*, got me excited about soil stratigraphy and influenced my graduate research and subsequent focus on soils as components of Quaternary landscape evolution. In 1996 I literally followed in Kirk Bryan's footsteps when I reinvestigated the type locality of the Calamity Creek Formation in the Big Bend region of Texas. Unlike me, Bryan and Albritton did not have the luxury of radiocarbon dating and stable carbon isotope analysis, yet their chronology and reconstruction of late-Quaternary climate

change, inferred entirely from the morphology and physical properties of buried soils, were remarkably accurate. This is a humbling lesson for all of us.

Kirk Bryan spent most of his career working with archaeologists, especially those who focused on the Paleoindian record. I have done the same thing. Bryan died in Cody, Wyoming, while visiting the Horner archaeological site. It is good to know he passed away doing what he enjoyed in life: looking at soils and archaeological landscapes. I can only hope that when I take my last breath I am looking at a buried alluvial soil somewhere in the Central Great Plains.

In the course of my career many friends and colleagues have been a source of enthusiasm and support. I thank my "dirt brothers," Art Bettis and Ed Hajic, and fellow geoarchaeolgists Paul Goldberg, Vance Holliday, Reid Ferring, and Julie Stein. It has been a *privilege* to work with some world-class archaeologists, including Alan Simmons, Mark Lynott, Jack Hofman, Alston Thoms, Neal Lopinot, Joe Saunders, and Bob Mallouf, to name a few. I am especially grateful to Millard Brent, who in 1971 took me under his wing and pointed me in the right direction, and to my mentors, Curt Sorenson and Wakefield Dort, for their guidance, patience and friendship. Also, thanks goes to Joe and Ruth Cramer, who established an endowment that supports much of my research at the University of Kansas. Last, but certainly not least, I am grateful to my wife, Sharon, and my son, Daniel, for enduring my frequent departures to places often far from home. Their tolerance and encouragement, and the support of my friends and colleagues, have been my inspiration. Once again thanks to all of you for the recognition that now links my name to my hero, Kirk Bryan.

LAURENCE L. SLOSS AWARD

Presented to
Hugh C. Jenkyns

Hugh C. Jenkyns
University of Oxford

Citation by Edward L. Winterer

Hugh Jenkyns' long-term record of achievement places him in the highest ranks of earth scientists at the international level and firmly in the tradition of Lawrence Sloss in pursuing problems of wide, even global geographic and stratigraphic interest. Hugh is an exceptionally creative and versatile scientist, combining many disciplines, including sedimentology, paleoceanography, cyclostratigraphy and sequence stratigraphy as well as inorganic, organic and stable-isotope geochemistry. Yet, in spite of this diversity of directions, his work has always been clearly focused on how to read the paleotectonic, paleoceanographic and paleoclimatic signals in pelagic sediments.

As a doctoral student at the University of Leicester he worked on the highly condensed pelagic strata of the Jurassic of western Sicily. This early landmark work had a strong influence on people trying to identify and understand pelagic sediments embedded in the continents, in terms of what was just then starting to be recovered by the Deep Sea Drilling Project (DSDP), a project in which he later took an active role. Jenkyns' early work was concerned with the sedimentary and paleotectonic evolution of the western Tethys. His set of publications on the Mesozoic of western of Sicily was a forceful exercise in sedimentology and paleotectonics, reconstructing the tectonic and sedimentary history of Jurassic carbonate platforms evolving into non-volcanic seamounts that were finally covered by pelagic sediments deposited in steadily increasing water depth. With this work, he laid the ground for the understanding of the paleotectonic evolution of the area. Following this study, he extended his work to other parts of Italy and elsewhere in the Alpine-mediterranean region where records of the Tethys Ocean and its margins are exposed.

Stimulated by the discovery of Cretaceous organic-rich shales drilled by DSDP in the Pacific Ocean, Jenkyns returned to the Tethyan region, using it as a natural paleoceanographic laboratory for the study of anoxic sedimentary environments. Working closely with organic and isotopic geochemists, he has documented a detailed near-global record of relatively brief intervals resulting from acute anoxia in an expanded oxygen-minimum zone, typically accompanied by abnormally high near-surface ocean temperatures. From this work, we now have a growing understanding of the relations of black shales to ocean paleocirculation, paleogeography and fertility patterns. He has established the global synchroneity of black-shale development in several short (< 1Ma) time intervals in the Mesozoic, in both pelagic and shelf-sea environments, using both carbon- and strontium-isotope ratios as chemostratigraphic indices. These phenomena have become known as Oceanic Anoxic Events and a considerable literature on this topic now exists. He has recently begun to use novel isotope systems to understand the changing marine redox conditions during such events. In sum, Hugh Jenkyns now nearly owns the black-shale problem.

Dr. Jenkyns' long record of distinguished research in sedimentary geology in the tradition of Sloss, plus his service to GSA as Editor of Geology, make him superbly qualified to receive the Sloss Award of our Society.

Response by Hugh C. Jenkyns

I am surprised, flattered and honoured to have received the Laurence Sloss Award and deeply grateful to those who nominated me and to those in the Sedimentary Geology Division in GSA who saw fit to support my nomination. So, what do I know of Larry Sloss? Did I meet him? Yes—twice: once at the University of Durham, north-east England, at a conference on sedimentation and tectonics in, I would guess, about 1974; and a second time when I visited Northwestern University, sometime in the 1980s. I remember writing the minutes of an ODP meeting I had just attended one morning in Sy Schlanger's Office and seeing Larry walk past the open door several times—and recall having a brief chat a little later in the day. Sy later told me that Larry had hesitated to interrupt me because I seemed to be working so hard. My mistake! If memory serves, I remember an infectious grin and an acute sense of humour. More importantly, I had as an undergraduate in the 1960s, and indeed still have to this day, that influential tome, jointly authored with W.C. Krumbein, *Stratigraphy and Sedimentation*.

Since this award comes from the Unites States, and yet most of my work has been in Europe, I would like to touch upon the impact that American science has had upon my scientific career. With my graduate work in Sicily behind me, I had begun working in Spain on Jurassic pelagic sediments until I was deflected by an all-important long-distance telephone call from California that I received while holding my first teaching job at Cambridge University in 1973. As I unreliably remember it now, an American voice—it was Sy Schlanger's - asked me whether I would be interested in participating in a cruise from Hawaii to Tahiti. Looking out of the window at horizontal rain, my answer was not slow in coming. And so it was, some months later, that I found myself working as a sedimentologist on Leg 33 of the Deep Sea Drilling Project in the middle of the Pacific Ocean—in the company of Harry Cook, Kerry Kelts and Jerry Winterer. Sy later told me that Jerry had suggested me as a participant on the cruise, so my thanks go to him (Jerry) for that support, as well as being my citationist for this award. DSDP in those days was funded only by NSF so it was an immense privilege for someone working outside the U.S. to be able to participate.

DSDP Leg 33 changed my life. The discovery of organic-rich black shales atop the volcanic edifice of the Manihiki Plateau, part of a Large Igneous Province, led me into a totally new field from which I have never escaped. Because I was aware of black shales cropping out in Europe of apparently identical age to those in the Pacific Ocean, DSDP LEG 33 taught me to think globally when considering environmental change. DSDP Leg 33 changed me from a sedimentologist to a stratigrapher and palaeoceanographer. DSDP Leg 33 taught me the value of integrating *Stratigraphy and Sedimentaion*. But, of course, I was not the first to realize the importance of melding those diverse disciplines of soft-rock geology. Someone

else, of course, had already written the book on that subject!

My thanks go also to those geologists dwelling to the west of the mid-Atlantic Ridge, particularly those of the Al Fischer school—Mike Arthur and Bob Garrison—with whom I have shared enjoyable days in the field in California and Europe as well as imbibing the results of successful experiments involving red and white grapes. Returning to Europe, I would like to record my debt to John Hudson (Leicester University) and Daniel Bernoulli (Basel/Zürich Universities) for their invaluable help and advice in the early days of my career. Finally, I would like to thank my colleagues and students at Oxford for providing a relentlessly stimulating environment in which to work (like Larry Sloss I have spent decades in the same department), and to my wife, Evelyn, for support in numerous ways.

STRUCTURAL GEOLOGY & TECTONICS DIVISION CAREER CONTRIBUTION AWARD

Presented to
George H. Davis

George H. Davis
University of Arizona

Citation by Robert W. Krantz

Many structural geologists complete significant research on select tectonic problems; George Davis played a fundamental role in the discovery of a completely new continental scale orogeny. Many earth scientists publish text books; Structural Geology of Rocks and Regions, by Davis and Reynolds, has become a standard for undergrad classes with thousands of inspired students. And almost all academic staff provide departmental and university service; George Davis supported the University of Arizona at the highest level, ultimately serving as Provost and Executive Vice President.

Shortly after arriving in Tucson as a young professor, George focused his research on what we now take for granted as metamorphic core complexes. George's investigations were among the first to document extensional kinematics, and he went on to work with other colleagues to define an orogeny that affected the North American Cordillera in middle Tertiary time, adding a new chapter to our tectonic story. These investigations culminated in the 1977 Penrose Conference on Metamorphic Core Complexes convened by Max Crittenden, Peter Coney and George in 1977. Subsequent applications of these concepts to other regions contributed to global understanding of similar orogenic systems, leading to a second Penrose Conference on Metamorphic Core Complexes in 1987.

Among his most enduring achievements, and demonstrating his passion for sharing structural geology, is George's text book, Structural Geology of Rocks and Regions. With the third edition now in preparation, including coauthors Steve Reynolds and Chuck Kluth, George's text went where no structural reference went before: it made it fun. Countless reviews have noted the accessible, entertaining style that draws students in, and the combination of geologic and non-geologic examples (pepperoni pizza?) that demonstrate and reinforce critical concepts. Finding a text that effectively covers the material is fortunate; having a text that inspires and connects with students is priceless.

Beyond geology, George has always had passion for larger academic issues and service. From department chair to University of Arizona Vice Provost and Vice President, and then ultimately as Provost and Executive Vice President, George brought a grounded science background to a university facing dramatic challenges, and he helped administer strategic solutions that focused on excellence and achievement. While appreciating his support of earth science from these lofty posts, colleagues and students found it easy to re-ignite George's passion for structural topics and distract him from administrative issues.

During his "working" years, George supervised more than 40 grad students and served on committees of many more. Being a Davis student meant working as a peer, from project planning and logistics to analysis and reporting. George consistently promoted self-reliance and leadership, which beyond scientific success led so many of us to rewarding academic and industry careers. Of course, along the way there was plenty of time for fun, or "sick fun" as George might categorize collecting thousands of lineation data or making plane table maps of vertical cliffs.

Yet, in spite of all the self-reliance that George has taught, and all that his students have achieved on their own, there is no question that they also enjoy his reflected glow. His technical insight, careful science and great personal warmth are such that even today, many years after graduation, we take great pride in the phrase, "I was a George Davis student."

Response by George H. Davis

My passion for structural geology has burned brightly ever since Dr. Charles Moke introduced me to *"structures"* at The College of Wooster. Nothing has dimmed this fire. Even while holding university leadership positions I had to do geology. Most administrators move on. UA President, Peter Likins, would say of me that every graph I made looked like a mountain, and every analogy was tectonic.

Most of you suffer the same disorder. Psychologist Roger Shepard believes that preoccupation with kinematics of *"reversible transformations"* are rooted deeply psychologically in our evolved visual systems as human beings, giving rise to our abilities to appreciate symmetrical patterns. What Shepard regards as an appreciation we regard as a profession. We address transformational puzzles in glorious field settings, and relate solutions to forces, stresses, time, and history. This combination is what makes our disorder totally incurable.

We share common paths, attending GSA as undergraduates and seeing the big names from a distance; give our first talk; move into the rhythm of national meetings; experience Penrose Conferences. We learn we are part of a *community* of scientific discovery, and grow to learn that knowing, trusting, respecting, and enjoying one another are as important as doing the mapping. In our early professional careers we experience unplanned moments of impact that give us a sense we might amount to something. In 1973 at GSA, Greg Davis and Clark Burchfiel waved me over to their table for a beer, and told me they liked my talk about the Rincons. We connect with towering influences. Mine was Peter Coney. Our ventures together in core complex discovery gave me a rare taste of cutting-edge science.

We make personal decisions regarding what is important. Our strategies have decadal influence on how we individually operate. My directions emerged at the confluence of two well-springs: *Structural Analysis of Metamorphic Tectonites* (Turner and Weiss) and *Folding and Fracturing of Rocks* (John Ramsay). *"Structural Geology of Rocks and Regions"* intends to reveal how we in fact think about the earth, and our passion for what we do.

Besides my parents, my wife Merrily, and our family, there are two special

communities whose meaning in my personal and professional life I must underscore. One is all of you. We come together as structure-tectonics people in ways minimally intersected by university, corporate, or agency politics. I believe we age well together, like a good wine. At meetings and on field trips we delight in picking up where we left off.

Then there is the special community of my very own students. It pleases me, Bob, that you connect me with promoting self-reliance and leadership. First-hand field experience was the *"bread-and-butter"* of my teaching, followed by the most precious gift I could give: freedom and responsibility in choosing a project and a pathway. This is precisely the same gift that my Ph.D. advisor at Michigan, Bill Kelly, gave me.

Bob, as I look at you this very minute, you represent *all* of my students, graduate and undergraduate, and I thank you for what you have done for me, not just today, but over the many years.