RIP RAPP ARCHAEOLOGICAL GEOLOGY AWARD

Presented to Michael R. Waters

Michael R. Waters
Texas A&M University

Citation by Steven L. Forman

It is an honor and a pleasure to present the citation for the 2004 Rip Rapp Award to Dr. Michael R. Waters (Professor, Texas A&M University) in recognition of his many contributions to geoarchaeology. Mike is no stranger to GSA awards, having received the Kirk Bryan Award with Vance Haynes in 2003 for their work on Holocene arroyo dynamics in the Southwestern U.S. The Rip Rapp Award is particularly distinctive for Mike because it recognizes how he has uniquely blended archaeology and Quaternary Geology and Geomorphology to advance the evolving science of geoarchaeology. Mike's quest to integrate these disciplines started in graduate school at the University of Arizona where he immersed himself in the worlds of Vance Haynes and Bill Bull. This explains his predilection for Clovis and older sites and imaginative approaches in interpreting fluvial terrace sequences. He possesses an ease and clarity in skillfully uniting archaeologic and Quaternary geologic records providing interpretative frameworks for vast areas in the Southwestern U.S., south Texas, the Savannah River in South Carolina, the Lena River in Russia, and soon-to-come for central Mexico. His vast experience, contributions, and insights are reflected in the elegantly written text Geoarchaeology, which is an invaluable source book for students, practitioners, and professionals.

Mike is an astute field geologist. He is highly motivated to see the artifactual, stratigraphic and geochronologic evidence for claims of a pre-Clovis site. His assessments are critical and much valued by the community. However, he casts a critical eye in a humane and jovial manner, seeking clarity with consideration of previous efforts. It is to Mike's credit that many archaeologists and Quaternary geologists continue to seek his input because he forwards alternative ideas, based on the field and laboratory data, and openly enriches the dialectic. In one of his many posts at Texas A&M as Executive Director, North Star Archaeological Research Program he gathers a diverse group of archaeologists, geologists, geophysicists and geochemists focused on critically evaluating evidence for pre-Clovis occupation at sites across the Americas. In this new role he continues to integrate new approaches and ideas that will redefine the archaeologic record for the earliest occupation of the Americas.

To his credit Mike takes risks and the community often benefits. Case-in-point, is his landmark research at the Diring Yuriak Site in Russia, which provided the oldest evidence of Arctic habitation by humans and these results appeared in Science. Mike ventured up the Lena River alone, befriended a "grizzly bear" of a site archeologist, evaluated, and photographed artifacts, established for the first time a verifiable stratigraphic context, and hand carried back pounds of luminescence samples to finally date this site. I am impressed with how much Mike accomplishes and sees at "unworkable" archaeological sites.

In the charged arena of research on the peopling of America, Mike Waters is a calm, down-to-earth, data-bound and thoughtful voice. He is not distracted or lured by media attention but, sticks to the geoarchaeologic context. Mike is a quality person and under the worst field conditions keeps his cheer. He is scrupulously fair to all, humble, but has a real drive to push frontiers of knowledge. His scholarship, diverse abilities, endless optimism, creativity, humanity, and ability to integrate across disciplines distinguish him as a scientists deserving of the Rip Rapp Award.

Response by Michael R. Waters

It is a great honor to receive the Rip Rapp Award for 2004. I would not be here today without the support of my family, friends, colleagues, and teachers.

My interests in archaeology and geology began early in San Diego County, California. My parents, Jane and John Waters, supported and encouraged these interests. As a high school student, I assisted with excavations and surveys all over San Diego County working mostly for Paul Ezell and Charlotte McGowen.

When it came time for college, I asked Paul Ezell where I should go to school to obtain a degree in archaeology. He sent me to his old alma mater in Arizona. There I started as an undergraduate in the department of anthropology. Because of my interests in the peopling of the Americas, I became acquainted with Julian Hayden. Julian taught me much about desert archaeology and introduced me to radical thinking about the first inhabitants of the Americas. During this time, I was also influenced by Vance Haynes who taught me that it was essential to understand the geology and dating of sites in order to pursue first Americans research. With the encouragement of Ted Smiley, Larry Agenbroad, Julian Hayden, and others I changed my major from archaeology to geology, and throughout the rest of my education I straddled both fields.

After graduation, I was fortunate to obtain a position as a geoarchaeologist at Texas A&M University in the Departments of Anthropology and Geography. From this base, I have been able to work on the first Americas problem; conducting research at early sites in the United States, Russia, and Mexico. I was also able to pursue research on the landscape evolution of many streams in southern Arizona in an effort to understand the effects of landscape changes on late prehistoric agriculturalists. A great day came in 2002 when Rob Bonnichsen and the Center for the Study of the First Americans relocated to Texas A&M University. Since the move, Rob and I have been conducting collaborative research at early sites in Mexico, Texas, Wisconsin, South Carolina, and elsewhere.

All along the way, I have had the good fortune to meet and work with many wonderful archaeologists and geologists. I have had the chance to work with and forge long standing friendships with colleagues such as Steve Forman. I have been blessed with wonderful students such as Lee Nordt. Every site I have worked on has been an adventure, a learning experience, and a chance to make new friends.

None of what I have done would have been possible without the support of my wife Susan and daughter Kate. Both have endured my many absences in the name of archaeology.

I mention my past and some of the people that have helped me along the way in order to say that I am not alone tonight at this podium. I am here because of many people. I stand here on the shoulders of my family, and those of my teachers, friends, and colleagues. I thank all of them.

In closing, I thank Steve Forman for his kind words tonight, Lee Nordt for nominating me for this award, and the Archaeological Geology Division for this honor.

GILBERT H. CADY AWARD

Presented to Robert B. Finkelman

Robert B. Finkelman
U.S. Geological Survey – Reston

Citation by Brenda Pierce

This year's recipient of the Gilbert H. Cady Award is Robert B. Finkelman, in recognition of his outstanding achievements in the fields of coal geochemistry and quality. Bob was one of the first coal researchers to specialize in trace elements and mineral matter in coal and he has helped set some of the research, methodological, and laboratory standards that are in use today.

Throughout his career, Bob's coal quality projects have focused on a number of research areas, including most recently: developing quantitative information related to modes of occurrence of elements in coal; developing national and international coal quality databases on the properties of coal currently being mined throughout the world; developing models to predict trace element behavior during coal cleaning and combustion; characterizing coal combustion by-products to aid in anticipating their environmental impacts; assessing the human health impacts of coal usage; and understanding the occurrence and distribution of arsenic and mercury in coal.

Bob has made significant and ongoing contributions to many aspects of coal geology, geochemistry, and coal quality, but two aspects in particular stand out: trace element mineralogy and human health research. These two monumental contributions also point out Bob's dual ability of not only conducting science, but coordinating and leading it too.

Bob developed the most comprehensive approach to quantitatively determining the modes of occurrence in elements in coal. Quantifying these modes of occurrence is essential for model development for forecasting their behavior during coal cleaning, combustion, conversion, leaching, and weathering and for anticipating their technologic, environmental, and human health impacts. Bob and his colleagues refined and combined the unique selective leaching protocol developed earlier with quantitative microprobe analysis, semi-quantitative X-ray diffraction analysis, and scanning electron microscopy. The merger of these techniques has resulted in a highly reliable method that is accurate and reproducible.

Among other accomplishments, Bob's human health project at the U.S. Geological Survey (USGS) has been a source of human health and biomedical-related information to the Armed Forces Institute of Pathology (AFIP). In conjunction with AFIP, Bob has offered workshops on the human health impacts of coal use and metals around the world. Most recently Bob was asked by the U.S. Embassy in South Africa to spend time there to raise awareness of coal related health issues. He took advantage of the opportunity and spread the word about human health issues throughout the region.

In addition to his research career, Bob is an inexhaustible source of national and international collaborative relationships. The USGS in particular, but coal science in general, has benefited from Bob's creative and thoughtful partnerships with industry, academia, federal agencies, state agencies, and international governments and groups. Many organizations use the data generated by Bob and his colleagues, including the U.S. Environmental Protection Agency, the American Ash Association, the AFIP, the Electric Power Research Institute, the Department of Energy, state geological surveys, and innumerable foreign government, academic, and research organizations.

In addition to Bob's research work, he is very active in a number of research organizations. Bob is a member of and often has had leadership positions in GSA, the South African Fossil Fuel Foundation, International Association of Cosmochemistry and Geochemistry, American Society of Forensic Geology, American Society for Testing and Materials, and many others. Bob is also an associate editor of Medical Geology and a member of the editorial board of the International Journal of Coal Geology and Geologica Acta.

Bob's distinguished career, involving research, teaching, and administration has made a large and lasting impact upon the field of coal geology. Bob personifies devotion to coal science, promotion of science in the interest of humanity, and collaborative efforts. For Bob's pioneering work on the inorganic geochmistry of coal and his innovative spirit, he is most deserving of the Gilbert H. Cady Award.

Response by Robert B. Finkelman

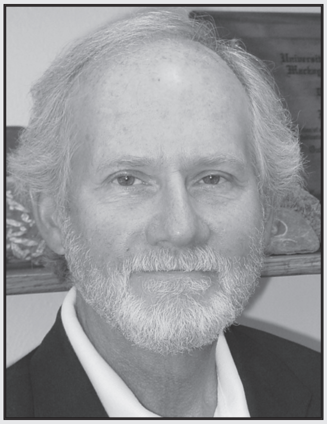
I am thrilled and honored to receive the prestigious Gilbert H. Cady Award. The award signifies that a lifetime of professional work in coal science has been recognized and deemed to be worthy by those who know the topic best. What more can a scientist ask for? As all my distinguished predecessors, I too have benefited from mentoring and guidance from some very talented colleagues who gave generously of their time. Special thanks goes to Hal Gluskoter who befriended me when he was with the Illinois State Geological Survey, snatched me from the USGS when he was with Exxon, and enticed me back after he joined the USGS. Sam Altschuler, Irv Breger, Ed Dwornik, Mary Mrose, Dal Swaine, and Pete Zubovic all made important contributions to my professional development. To these and to more than 400 coauthors and numerous colleagues and associates, I owe an enormous debt of gratitude. They are the unsung heroes. Finally, I owe my wife, Judy, and children, Kim and Ari more than most because they had to put up with more than most. Their unstinting love and encouragement not only allowed me to accomplish all that I have, but inspired me to accomplish more that I had dreamed possible.

I have looked at coal science not as an end unto itself but rather as a means to explore the interconnections between geoscience and the world beyond. Initially, I focused my attention on the inorganic constituents in coal – the minerals and trace elements, cataloguing the minerals and elements present in coal and their relationship to one another. Initially, motivated purely by scientific curiosity, I tried to identify the most likely modes of occurrence of all the naturally occurring elements in coal. Ultimately, realizing the full significance of this information, I attempted to quantify the modes of occurrence. Along the way, I tried to show how this information could be used: deciphering the evolution of coal quality; demonstrating how to use coal as an economic source of byproducts and as a biogeochemical indicator of mineral resources; developing models to predict the technological behavior of coal; understanding the environmental impacts of coal and trying to mitigate the human health impacts. This last task has led me to help develop the field of Medical Geology, an exciting new opportunity to explore the interconnections between geoscience and animal and human health. In many countries, coal is a central player in this field.

Coal science and the coal science community have been good to me – tonight being a prime case in point. I have tried to return something to this community. I have been active with the Coal Geology Division of GSA and with TSOP. I have helped organize conferences and provided editorial guidance to journals. I have taught coal science and mentored students from around the world. I have done this because my upbringing and professional mentors taught me that it is not simply appropriate to share our knowledge with the next generation – it is essential. I also have done this because I am convinced that coal science still has a lot to contribute to society and it is our responsibility to ensure that there will be coal scientists to make these contributions.

E. B. BURWELL, JR., AWARD

Presented to John W. Bell



John W. Bell
University of Nevada, Reno

Citation by William C. Haneberg

Each year since 1969 the Engineering Geology Division has conferred its highest honor, the E.B. Burwell, Jr. Award, upon the authors of an outstanding recent publication in engineering geology or a closely related field. Previous awards have been made to the authors of textbooks, professional reference books, technical monographs, papers published in various scientific journals, and a host of other publications. All have been outstanding contributions to the science and profession of geology, and the list of Burwell award winning authors reads like a veritable who's who of modern engineering geology. This year I am pleased to present the 2004 E.B. Burwell, Jr. Award to John W. Bell, Falk Amelung, Alan R. Ramelli, and Geoff Blewitt for their paper, "Land Subsidence in Las Vegas, Nevada, 1935–2000: New Geodetic Data Show Evolution, Revised Spatial Patterns, and Reduced Rates," which was published in the August 2002 issue of *Environmental & Engineering Geoscience*.

In their award winning paper, John, Falk, Alan, and Geoff synthesized stratigraphic, structural, geomorphic, geodetic, and remote sensing data collected over seven decades to produce an uncommonly detailed understanding of land subsidence in one of our country's most rapidly growing urban areas. Doing scientifically sound work with practical implications, as these authors surely have, is the essence of good engineering geology. They showed how modern techniques such as satellite radar interferomety, also known as InSAR, and GPS geodesy can be integrated with traditional geologic maps and borehole logs to provide unprecedented understanding of the actively deforming sediments upon which sit more than a million people and billions of dollars of real estate. They also illustrated—to my particular fascination—how faults in poorly lithified basin-fill sediments can act as hydrogeologic barriers that control the geographic patterns of land subsidence to an extent not previously recognized in the engineering geologic literature. The important implication is that the areas of greatest subsidence do not necessarily coincide with groundwater pumping centers. Their detailed maps and measurements further document that artificial recharge can be used to significantly reduce land subsidence rates. Although theirs is not the first paper to describe the use of GPS and InSAR to study land subsidence, it is certainly one of the most comprehensive and readable syntheses of conventional geodetic data, satellite geodetic data, and Quaternary geologic information collected over several decades.

Finally, there are two other reasons why I am pleased to be presenting this award to John, Falk, Alan, and Geoff.

First, their paper is the first Burwell Award winner to be published in *Environmental & Engineering Geoscience*, which is published jointly by GSA and the Association of Engineering Geologists. As a member of its editorial policy board, I congratulate the four authors and thank them for submitting their manuscript to *Environmental & Engineering Geoscience*.

Second, this year's award winning paper shows the kind of first-rate science that can be done by state geological surveys. State surveys are almost always under-funded, typically under-staffed, and, unfortunately, often under-respected by geologists, politicians, and taxpayers. Having spent an appreciable portion of my career working for a state geological survey, I know that they can and do foster an incredible amount of first-rate applied geology that is directly applicable to the solution of real problems. Therefore, it is fitting to bestow an award for excellence in engineering geology upon a paper for which three of the four authors are state survey geologists.

John, Falk, Alan, and Geoff, please accept the 2004 E.B. Burwell, Jr. Award with my congratulations and admiration.

Response by John W. Bell

It is an honor to accept this award from the Engineering Geology Division on behalf of my co-authors Falk Amelung, Alan Ramelli, and Geoff Blewitt. I am very grateful to Bill Haneberg for nominating our paper and thank him for his very complimentary review of our contribution.

This paper has a long history, beginning with my initial efforts shortly after coming to Nevada in 1976. Since that time, land subsidence studies in Las Vegas have evolved through several phases in which various colleagues have assisted in the collection and analysis of data. This paper is the most recent effort, and I am indebted to my co-authors for helping to develop this last comprehensive data set. Falk Amelung did pioneering work on the use of synthetic aperture radar interferometry (InSAR) in Las Vegas. Alan Ramelli helped establish the first GPS network there in 1990, and Geoff Blewitt more recently provided assistance in improving the accuracy of our GPS measurements. Our paper had three principal goals:

1. to synthesize decades of work by many researchers;
2. to present new insights into old problems using space-platform-based technology; and
3. to highlight poorly understood aspects that remain for further study.

To reminisce a bit, my interest in surficial geology and urban engineering problems evolved several decades ago as a graduate student at Arizona State University. Most of the credit for my interest in land subsidence I owe to the late Troy Péwé, my advisor and mentor, who taught me how to focus my interests and learn to make relevant societal contributions. At that time, land subsidence in central Arizona had become a hot topic, and many important studies were initiated by Troy and others, and I was anxious to start a graduate career in applied geology. Like many college graduates in the late 1960's, however, my career was interrupted by military service, and after one semester at ASU I was drafted into the US Army. That didn't stop Troy, though, from trying to maintain my enthusiasm for surficial geology. I still like to tell the story of how he sent me a complete set of notes for his Glacial and Pleistocene Geology class that he wanted me to study while I was slogging around the Mekong Delta.

Soon after arriving in Nevada, it became apparent that land subsidence was going to become a serious urban engineering problem for the rapidly growing Las Vegas area.

Although subsidence had been known in Las Vegas since the 1940's, it was evident by the late 1970's that subsidence would be an expensive, long-term problem, and I and numerous other scientists from the USGS and the Desert Research Institute initiated a variety of multi-disciplinary studies. Las Vegas has provided us a unique setting for a linkage of Quaternary geology, hydrology, structural geology, soil mechanics, groundwater mechanics, and geodetics allowing us to investigate engineering geology problems now found in many urbanized areas of the arid western US. Yet despite more than 60 years of study, many puzzles remain to be solved.

One of the most remarkable advancements in the study of land subsidence during the last 10 years has been the application of space geodesy, in particular, InSAR and GPS. I believe that Las Vegas has provided us a valuable opportunity to successfully employ these unique technologies and to demonstrate the long-term potential for resolving many remaining questions related to aquifer deformation processes. This paper relied heavily on the contribution from my co-author Falk Amelung who published one of the first InSAR studies in Geology in 1999, titled "Sensing the Ups and Downs of Las Vegas: InSAR reveals structural control of land subsidence and aquifer-system deformation". Based on the findings from this original study, we were able to unravel some of the mysteries for this subsequent paper, including the unusual antithetic subsidence-induced motion of faults and the magnitude of aquifer uplift associated with artificial recharge. The InSAR data completely revised our conventional models for the spatial distribution of subsidence in the valley. These new tools provide an unprecedented ability to develop spatially detailed characterizations of aquifer system deformation. They can provide groundwater managers guidance for placement of new wells, data for better management of existing wells, and the ability to better assess long-term groundwater resource activities.

Several important problems remain to be solved, and space geodesy likely will provide the answers. Earth fissures remain one of the single-most-difficult geotechnical problems associated with subsidence, causing millions of dollars of damage in Las Vegas alone. We still do not fully understand the nature of the horizontal strain responsible for creating fissures, but radar interferometry--including the use of the new permanent scatter methodology—can provide us with a tool for detecting and mitigating these hazards.

As a long-time member of both GSA and AEG, *Environmental and Engineering Geoscience* seemed an ideal medium for presenting our work. Thank you again for the honor of this award.

2003 GEORGE P. WOOLLARD AWARD

Presented to David T. Sandwell

David T. Sandwell
Scripps Institution of Oceanography

Citation by Eli Silver

David Sandwell's scientific work is focused on planetary remote sensing, including satellite and shipboard acquisitions of the Earth and radar of Venus. It is for both his scientific accomplishments (including over 100 publications) and his unselfish contributions to the global Earth Science community that he is receiving this award.

Dave's contributions to geological understanding through the use of geophysical tools (the basis for the Woollard award) include his methods for utilizing satellite altimetry and gravity to determine submarine bathymetry for the world's oceans. Prior to this breakthrough discovery (just a few years ago), our knowledge of the ocean floor was patchy, with local well-studied areas set in a broad, poorly resolved (yet sometimes brilliantly interpreted) seafloor. That degree of knowledge was augmented dramatically in short order, so that presently the entire sea floor is known to a fairly high level of detail. Dave's early work with Walter Smith on the southern oceans (the first region to be declassified) showed, for example, the incredible complexity of the spreading fabric between Africa and Antarctica, a region notoriously difficult to study by surface ships. Within a few years the data for the entire world's oceans were declassified, and the exquisite Sandwell and Smith maps of the world were soon made available to anyone for rapid downloading from Dave's website. These maps have revolutionized our ability to carry out global mapping of seafloor evolution. They have also allowed new understandings of the relations between bathymetry and oceanographic processes, such as internal waves, tidal dissipation, and vertical diffusivity.

Not content to simply utilize the fruits of this outstanding discovery for a career of distinguished science, Dave has also become a leading practitioner of InSAR, or interferometric synthetic aperture radar. His contributions to InSAR include discovery of creep events along the San Andreas fault, displaying the 3D deformation field associated with the Hector Mine Earthquake, search for precursory slip on faults, and ground deformation associated with groundwater removal in the LA basin. Following from his deep understanding of InSAR, his most recent work includes the development of Synthetic Aperture Sonar, with the promise of increasing resolution from swath bathymetry and allowing the development of change detection techniques. This effort holds the promise of a far greater level of understanding of seafloor processes. In addition to his work on this planet, Dave has also actively interpreted structures on the surface of Venus using radar imagery. Presently he is senior scientist on the ABYSS Spacecraft proposal for the development of a new satellite altimeter mission to map the marine gravity field to an accuracy of 5 times better than it is known today.

In addition to research, Dave teaches courses in remote sensing, geodynamics, and the physics of surfing (it doesn't hurt that he's also an outstanding surfer). Like his research results, his teaching materials are freely available on his website.

It is a great pleasure to present David Sandwell as the 2004 recipient of the George P. Woollard award. It would have been an even greater pleasure to be here in person to present this citation, but I am presently at sea using tools that Dave is working hard to improve.

Response by David T. Sandwell

It is an honor and thrill to receive this George P. Woollard award from the GSA. I think Woollard would overjoyed to see gravity measurements become a premiere tool for exploring the remote areas of our planet. I thank Eli Silver and the rest of the committee for nominating me and also for their kind words.

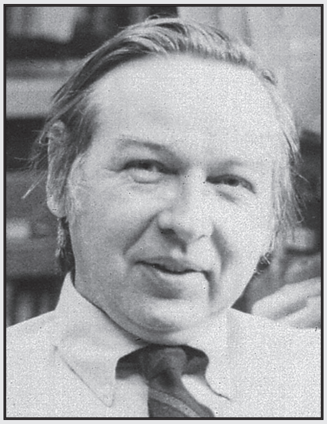
I owe this award to the beauty of plate tectonics and the marvels of engineering physics. Any fool can plot some gravity data to reveal global plate tectonics in all of its glory. I was lucky to be a graduate student under Bill Kaula and Jerry Schubert at a time when NASA still had full control of the earth-orbiter space program. Bill Kaula taught me a number of important things such as: not everyone should be a seismologist; radar altimeter data from GEOS-3 and SEASAT would reveal something new about the Earth; and the southern oceans were largely unexplored. Jerry Schubert taught me to believe in theory, focus on the important issues, and make sure things are correct. Part of this award should go to Walter Smith who, along with Paul Wessel, pioneered the computational tools for the analysis of global data sets. Walter and I have worked closely for more than a decade and we are always pushing each other for better results.

While many awards go to scientists who create theories, we must not forget the teams of creative scientists and engineers who develop our measurements systems. For example, I challenge you to think of a measurement that does not rely on GPS for positioning or time transfer. My award today relies on radar altimetry, which at first glance appears to be a simple measurement. However, consider that a range precision of 3 centimeter is needed to achieve a gravity field accuracy of 3 milligal over the ocean. How can this work when the ocean surface is covered by 3-m tall waves and the satellite is moving at 7000 m/s? What about the tides and currents and atmospheric delays? All of this magic was created by scientists and engineers who usually don't receive awards.

This award would also not be possible without the beauty and simplicity of plate tectonics. Back in graduate school at UCLA we studied a book edited by Allan Cox called "Plate Tectonics and Geomagnetic Reversals". The book contains chapters by famous scientists such as Hess, Wilson, McKenzie, Morgan, and Parker showing pictures of rigid plates sliding across a slippery mantle driven by convective escape of heat from the Earth. I had diagrams of plate boundaries consist of ridges, transforms, and subduction zones all neatly organized to fit on a sphere. As skeptical scientists we don't really believe our own models and as a student, I thought plate tectonics was simply an abstract description of a more complex process. Well I was wrong and gravity data helped to confirm that the simple descriptions of plate tectonics especially in the deep ocean basins. I think Woollard would be astounded and satisfied if he could look at the marine gravity field today.

HISTORY OF GEOLOGY AWARD

Presented to Stephen G. Brush



Stephen G. Brush
University of Maryland

Citation by Sally Newcomb

Professor Brush has come into the history of geology from a process of inquiry that ranged from acclaimed work in physics research, through a growing interest in the origin of the major ideas of physics, to realization of the importance of geology in investigation of earth cooling and age determination in 19th and 20th century science. He earned an A.B. in physics at Harvard, and a Ph.D. in theoretical physics at Oxford University, where he was a Rhodes Scholar. His computer calculation done as a post doc at the Lawrence Radiation Laboratory showing that idealized classical plasma would exhibit a phase transition to an ordered solid state is now employed in studies of stellar and planetary structure. He is currently Distinguished University Professor of the History of Science at the University of Maryland. His publication list runs to 48 pages, so we will concentrate on the geology.

That publications list clearly shows that he had an early interest in the history of the major ideas in physics and how they progressed through time. An incomplete list of the ideas that he investigated in depth includes those about kinetic theory, thermodynamics, the equation of state, statistical mechanics, and random processes. For our interests, among other things, Dr. Brush has written a three volume history of planetary physics, published in 1996, that in many ways is a statement of his ruminations about geology, and how its ideas were advanced and received over the 19th and 20th centuries. In the second volume, Transmuted past: The age of the Earth and the evolution of the elements from Lyell to Patterson, he contrasted the methods and assumptions of humanist history and scientific geology in their common goal of studying the past. He was concerned with how the age of the earth and geological time were determined, the methods of geochronology, and cosmic evolution. He contrasted the methods of the humanities and the sciences in comparing the geologist Charles Lyell to the historian of his time, Leopold von Ranke, and the geologist Archibald Geikie to his contemporary historian, G.M. Trevelyan. This, and his further thoughts about history and geology should be required reading for all of us here. Due to his knowledge of the history of mathematical methods, Professor Brush also brings rare insight to his comments about the progression of ideas about central and volcanic heat. The third volume, Fruitful encounters: The origin of the solar system and of the moon from Chamberlin to Apollo, also contains much of interest to geologists.

It would be remiss to omit several other facets of Prof. Brush's contributions. He has been a constant and effective voice for the participation of women in science, both currently and in recognition of their historical contributions. A number of publications written over at least 35 years attest to this. In articles about the discovery and chemical history of the earth's core, he called attention to the generally little known work of the Danish seismologist, Inge Lehmann, in the discovery of the solid core within the liquid core (*Am.J.Phys.* 1980,48(9), 705-24; *EOS* 1982,63(47), 1185-88). In 1985 he published "Women in physical science: from drudges to discoverers" (*The Physics Teacher*, Jan. 1985, 11-19) which discussed the work of ten women, four of whom were Nobel prize winners, and six of whom made discoveries that arguably were of equal value. Prof. Brush also has been, and is, a voice for university faculty, and has served as the chairperson of the University Senate at the University of Maryland.

His concern for the proper practice of science has for many years extended to writing and testifying about the challenges of the non-science of creationism, a great concern for many of us who teach in the earth sciences, as well as those who work in evolutionary biology. In an article in *The Science Teacher* (1981,48(4), 29-33), "Creationism/evolution: the case against equal time" he pointed out how creationism differed from science, despite efforts to make it seem like a scientific theory. In 1982, in the *Journal of Geological Education*, he examined the criticisms by creationists about radiometric dating as applied to the age of the earth ("Finding the age of the earth by physics or by faith?" 30(1), 34-58). In that article, he reviewed the history of scientific work that led to our current understanding of the age of the earth. Those arguments were refined in his later books. This literature bears re-reading in our present climate of opinion about the nature of science.

Prof. Brush continues as an exemplar for the history of science including geology, and as a voice for science in general. The award from the Division of the History of Geology to him is most fitting.

Response by Stephen G. Brush

I am greatly pleased and honored by the History of Geology Division Award, and regret that I cannot be here to receive it in person.

Many of you probably started your careers with a strong interest in geology and later developed an interest in the history of that science. My own path was different: I began in physics and chemistry, then pursued a side interest in the history of those subjects, which led me to 19th century kinetic theory and thermodynamics. Here I found a fascinating problem: how can one explain the irreversible flow of heat from hot to cold, if matter is composed of atoms that obey Newton's time-reversible laws of mechanics? Newton's laws recognize no fundamental difference between past and future, yet there is obviously a difference in the natural world. Is there some mysterious "arrow of time" that points in only one direction?

The efforts of Ludwig Boltzmann and other physicists to solve this problem in the late 19th century are well known to historians of science and have become part of the collective memory of the physics profession. But something is missing from the standard account: the role of geology. The connection is revealed in Lord Kelvin's 1852 paper in which he asserted a general principle of Dissipation of Energy. Energy is always conserved but tends to be converted into less useful forms, as time marches on. As a result, he wrote, the Earth, whose surface was once too hot for life to exist, will in the future be too cold. The cooling of the Earth from its initial state as a hot fluid ball was for Kelvin the most important example of an irreversible process.

But the cooling of the Earth was not merely an application of a fundamental principle of physics. It was also an important part of the reason for proclaiming that principle. In the same year, 1852, the British geophysicist William Hopkins announced a similar (though less general) principle: terrestrial refrigeration is part of the inevitable "progressive development" of inorganic matter "towards an ultimate limit." It is hardly a coincidence that Hopkins was a mathematics tutor at Cambridge University who prepared the young Kelvin for the crucial Tripos examination.

Kelvin was convinced that the physical history of the Earth was one of the most fundamental problems in all of science. Hence his effort to estimate the age of the Earth, which led him into conflict with uniformitarian geologists, since his own estimates of 100 million years or less seemed to exclude their assumption that much longer periods were available for slow processes to form the Earth's surface.

The significant point here is not that a physicist disagreed with geologists, but that a geological problem was considered important by a physicist. More generally, I found several examples of problems in planetary science that stimulated contributions to physics, chemistry, and astronomy.

My personal hero in the history of geology is Thomas Chrowder Chamberlin. In his 50s, with an established reputation as a leader of American geology, he moved into theoretical astronomy and overturned Laplace's nebular hypothesis, because he found it incompatible with evidence from glacial formations in North America. His planetesimal hypothesis for the origin of the Earth made Kelvin's calculations irrelevant (as did the introduction of radiometric dating) and remained a significant approach in planetary cosmogony throughout most of the 20th century, although his hypothesis about the encounter of the Sun with another star has been discarded.

To sum up: the focus of my work in the history of geology has been the interactions between geology and other sciences. Today these interactions continue to be important, for example in the study of the planet Mars. Geologists are the experts who can figure out whether Martian rocks were formed by water and hence suggest the existence of life on that planet. Here is the beginning of a new story to be told by future historians of geology.

O.E. MEINZER AWARD

Presented to Ghislain de Marsily

Ghislain de Marsily
University of Paris VI

Citation by Mark Person

This year's O.E. Meinzer Award is presented to Ghislain de Marsily of Paris VI University. Of note, de Marsily is the first Frenchman to receive this prestigious award. I think it is fair to say that it would be a challenge to find a hydrologist over the age of 30 who hasn't heard of the name "Ghislain de Marsily". This is easy to understand given the prominent role he has played in the hydrologic community during the past three decades. He has written four books and authored over 100 journal articles. He has sat on numerous advisory boards including the Swedish Nuclear Inspectorate, the WIPP Project for Sandia National Laboratory, the Nuclear Waste Program of the European Commission, The Commission of Environmental Management Technology of the US National Academy of Science, US National Academy Committee on Disposition of High-Level Waste and Spent Fuel, NEA-IAEA review team for Yucca Mountain Site Recommendation Performance Assessment. I could continue and so far I've only listed his committee work outside of France. Marsily has received many prestigious awards. He is a fellow of the American Geophysical Union and received that society's Horton Award for Hydrology, in 1995. He received the Körber Award, presented by the Foundation for the Advancement of European Science in 1992. In 1994, he received an honorary doctorate from the University of Québec. In 1999 he was appointed as a foreign associate to the US National Academy of Engineering. He is a member of the International Water Academy, Oslo and joined the French Academy of Engineering in 2000. Again, the list goes on.

Marsily, a classically trained Civil Engineer, received his Ph.D. in 1968 from the University of Paris. He began his career working as a drilling and grouting contractor in the Sahara and in France. In 1967 he began a research and teaching career at the Paris School of Mines. During the next 20 years, de Marsily built an internationally recognized program in hydrogeology. In the 1990's, it was the place to go for young American hydrogeologists wishing to receive their European finishing. As a postdoc at the School of Mines in 1990, I noted that the program included about a half dozen research scientists and dozens of graduate students. The School of Mines was constantly being visited by prominent faculty from North America. What was remarkable to me about the hydrogeology program at Fontainebleau, in addition to the four course meals served at lunch, was the spirit of cooperation and congeniality. It is clear that this atmosphere was created by de Marsily's personal example. In perhaps one of the most difficult decisions of his professional career, de Marsily left the Paris School of Mines in 1989 to become the Director of the Laboratory for Applied Geology, University of Paris VI.

The Meinzer award, which was established in 1965, recognizes significant contributions to the advancement of hydrogeology. Marsily is recognized for two publications which helped to prominently establish the field of stochastic hydrology in the 1980s. First is de Marsily's seminal paper published in Water Resources Research with Martheron entitled, " Is transport in porous media always diffusive? A counter example". This study elegantly demonstrated that for horizontal flow in stratified aquifers, hydrodynamic dispersion grows with scale and the conventional advection-dispersion equation is not strictly applicable. Marsily is also cited for his textbook "Quantitative Hydrogeology" first published in English in 1986. This book was among the first to introduce a generation of hydrogeologist to geostatistics in general and kriging in particular.

I conclude on personal note. Apart from his many awards, what I find truly remarkable about Ghislain de Marsily is his dry wit, humility, and self sacrifice. I'll never forget the story which Alfonso Rivera, then a doctoral student at the School of Mines (and now the chief hydrologist for Natural Resources Canada), related to me about how de Marsily was known to meet with students well after midnight on his numerous trips to Fontainebleau. Ghislain, this Mienzer award is both richly deserved and long-overdue. Please join me in congratulating the Professor Ghislain de Marsily, the 2004 O. E. Mienzer Award recipient.

Response by Ghislain de Marsily

Thank you, Mark, for these kind words. I am very honoured by the Geological Society of America, and by all the friends and colleagues who have contributed to make me the recipient of the Meinzer award. Apart from the pleasure I had when learning that my 1980 paper on dispersion with Georges Matheron and my 1986 text book are considered to have contributed to our discipline, my belief is that the true reason for this award is the large number of colleagues that, over the years, I have been lucky enough to meet, to appreciate, and to develop a friendship with… To all of them, to all of you, let me say "thank-you".

Mark mentioned the introduction of geostatistics as a contribution by my text book. Let me say that geostatistics is due to Georges Matheron, I only presented a small aspect of it as applicable to hydrogeology. Matheron is also co-author of the 1980 paper. It therefore seems to me that this Meinzer Award is in fact directed to Georges Matheron, who sadly passed away some four years ago. It is a greater honour for me to somehow stand in for Georges Matheron today before you, as it is in fact his great influence on earth sciences, including on hydrogeology, which is recognized here today. Few of you may have met him, he was an extraordinary person, a remarkable scientist, a man of honour.

In one of the latest talk that Matheron gave, he mentioned towards the end the following maxime : "The owl of Minerva spreads its wings only with the falling of the dusk". I later discovered that this is in fact a citation from Hegel, written in 1821, in The Philosophy of Right. Minerva, or Athena in Greece, daughter of Jupiter, was the goddess of Wisdom and Arts. Minerva's bird, the owl, is thus, I believe, the symbol of wisdom. The falling of dusk is the end of the day, the end of the story, the end of life. When Hegel wrote this, he was 51, and he died 10 years later. When Matheron quoted this, he was about 61, and he passed away a few years later. But what do we understand from spreading its wings? One interpretation could be that the owl flies away, that, at the dusk of life, wisdom goes away, and only ignorance and apathy are left. I am afraid that this may be the correct interpretation, and I am all the more afraid as

I have now many more years behind me than both Hegel and Matheron before they left… !

But there may be another one, which is hidden in the words "only" — let me recall the sentence — "The owl of Minerva spreads its wings only with the falling of the dusk". The meaning can then be quite different — wisdom can only develop, or rather can only reach far enough to grasp the full picture (the spreading of the wings) at the end of the day! If this is true, then it will make many of us in this audience happy, our bald heads, our grey hair are only here to show how wise we are, how widely spread are our wings of wisdom… !

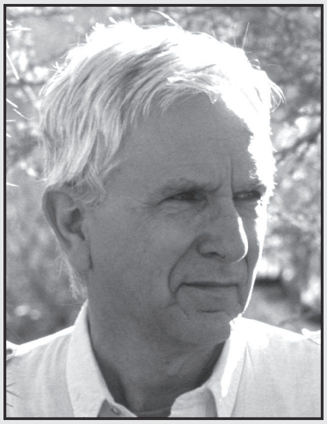
But let me come back to the Meinzer award: the two contributions that Mark mentioned date from 1980 and 1981 (French text book, but published in 1986 in English, thanks to the translation made by Gunilla, my wife). If these contributions were the mark of wisdom, I think this would clearly point out which interpretation of the maxim is correct, as far as I am concerned, whether I like it or not.

But let me suggest a third interpretation, which, in fact, I would favour: many of us in this audience are or were teachers, as both Hegel and Matheron were. They tried as hard as they could to help their students, to develop in them this wisdom that makes scientific contributions, that makes our science progress. Let me suggest that the "spreading of the wings" is the starting of the flight of these many former students, now actively working, publishing the papers, making the contributions, that, 25 years from now, when they too see the falling of the dusk, will earn them a Meinzer Award.

Let me thank you again for this Award, and conclude that it is in fact dedicated to these many students which I was lucky enough to be able to help, and who are now here, among us, starting to spread their wings.

G.K. GILBERT AWARD

Presented to William K. Hartmann



William K. Hartmann
Planetary Science Institute, Tucson

Citation by Harry Y. McSween

William K. Hartmann studies the origin and evolution of planetary surfaces and small bodies of the solar system. In 1962, he first identified multi-ring basins on the Moon, including the discovery of the Orientale basin by using photographs rectified by projection onto a globe. He also began studying the rates of cratering to estimate the ages of planetary surfaces. In 1965 he correctly predicted an age for the lunar maria of ~3.6 billion years, four years before the Apollo missions allowed confirmation of that estimate by radiometric dating. As a member of the Mariner 9 science team, he scaled cratering rates from the Moon to Mars, and in the 1970s estimated ages of a few hundred million years for young Martian volcanic flows. These ages were controversial at the time, but appear to have been validated by the young crystallization ages of Martian basaltic meteorites. In 1973, Bill coined the term "megaregolith" to describe the surface of the Moon. His studies of early intense cratering on the Moon raised questions about the interpretation of a terminal cataclysm versus a more extended sweep up of planetesimals during the early stages of planet formation, a debate that still rages. With Donald Davis, he first proposed the currently favored hypothesis for the origin of the Moon by a giant impactor hitting the Earth. This mechanism required the Earth's core to have formed very early — a problem then but since accepted based on short-lived geochronometers. Working at Mauna Kea Observatory in the 1980s, Bill carried out observations of asteroids and comets. This work included the first prediction that comets were not bright icebergs, but had dark, carbonaceous surfaces, since confirmed by spacecraft encounters with comet nuclei. In the 1990s as a member of the Mars Global Surveyor science team, he refined the system of crater counting to construct a chronology for Mars, by integrating crater statistics, stratigraphic mapping, and meteorite ages.

If all that were not enough, Bill is widely known as a talented painter of space-related artwork that has received wide acclaim. He is also an accomplished author of textbooks and popular non-fiction books on planetary science, as well as a science fiction novel.

Response by William K. Hartmann

When I had my backyard telescope as a teenager, the smallest things anyone could see on the moon were a kilometer across. Now we've walked there, and we have geologic maps of erupting volcanoes on Jupiter's moon,Io.

The G. K. Gilbert award is wonderful frosting on the cake of having been able to live through these adventures. .

As planetary geoscience evolved from the 60s till now, it seemed like the world was a wonderfully progressive place. But a dangerous, unexpected counter-trend has become apparent — a growing influence of anti-intellectualism, and specifically anti-geology in our country. We are called upon to respond.

Let me give two examples. First, the Grand Canyon Association's bookstore — the bookstore for tourists inside Grand Canyon National Park — has added to their inventory a beautiful, glossy, full-color book which explains to visitors that Earth is 6000 years old, that the strata visible from the canyon rim were all laid down by Noah's flood a few thousand years ago, that radiometric dating is all wrong, and that geological science is just one "culture" of choice, which should get no more special treatment in schools than other "cultures," such as "creation science." This story briefly surfaced on CNN and CBS around late 2003. When I called the Grand Canyon Association on Sept. 8, 2004, a spokesperson said the book is still there, and all their books were reviewed for their educational value.

The second example came in an undergraduate class I teach once a year.

Recently, before I ever got to the topic of lunar exploration, some students raised their hands and said "Is it true that people never landed on the moon? We saw this TV documentary that showed it was all faked by NASA...." It's really scary to participate in actual events, and then 35 years later see kids being taught by a "fair and balanced" news medium that it happened . Thanks a lot, Fox TV!

I'm uncomfortable seeing these trends in my own country. What can we do?

One answer is that somehow we need to alter the economic structure in which producers and publishers get rewarded for selling junk science without a counter-pressure of public criticism or shame. Perhaps more public and forceful outcries from professional societies are in order.

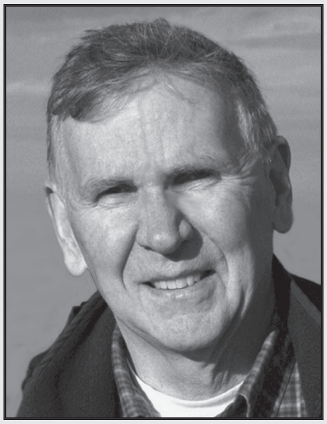
A second possible response is that people would be better prepared to resist the onslaught of anti-geology if we taught more about the historical adventure of geological thinking. For example, by the 1700s, the 6000-year age began to be successfully refuted by simple studies of sedimentation rates and rock cooling rates. Many arguments that fundamentalists foist on the public in different parts of the world today are specifically an attack on modern geological science, but involve claims that were successfully refuted by low-tech methods 200 years ago!

Am I being a dreamer to hope we can rebuff the new trend? I respond with a story told by a Russian colleague. What's the difference between a realist and a dreamer? The realist thinks that maybe a flying saucer will hover over the capital and the aliens will get out and share all their knowledge and help us solve the world's problems. That's the realist, mind you. The dreamer thinks maybe we can get our act together and do it ourselves.

Thanks.

KIRK BRYAN AWARD

Presented to Stephen C. Porter



Stephen C. Porter
University of Washington

Citation by Lee Nordt

Stephen Porter's 2001 article, "Snowline depression in the tropics during the last glaciation" (*Quaternary Science Reviews* 20, 1067-1091) has been selected for the 2004 Kirk Bryan Award. This paper capitalizes on Porter's four decades of research around the world to provide the best discussion of tropical snowline depression available to Quaternary geologists and paleoclimatologists. It includes a concise discussion of the methods employed to reconstruct past snowlines (equilibrium-line altitudes, or ELAs), a comprehensive review of previous studies of ice-age ELAs in the tropics, and a clearly reasoned discussion of climatic change in the tropics during the last glaciation. The crux of the paper is a comparison of terrestrial and marine data on the amount of tropical cooling that occurred during the LGM. Porter's paper, however, is far more than simply a review of published data. It provides the best summary yet on the discrepancy between the various proxy paleotemperature metrics, and demystifies ELA calculation by identifying and illuminating the numerous assumptions and sources of uncertainty inherent in the process. Porter's investigation focuses directly on the role of the tropics in the Earth's climate system.

Porter is anexpert in using glacial geomorphology to delineate the extent of former mountain glaciers and in using this information to estimate the history of ELA fluctuations. Porter's illustrative diagram summarizing the fundamentals of five main methods used to estimate ELA is eloquent and informative, exemplary of his skill at distilling a problem to its essence and communicating the gist to experts and students alike. This is the figure that authors of future textbooks on glacial geology will adopt to convey an understanding of snowline reconstructions.

Porter draws on his extensive field work and critical analysis in glacial geology in compiling and evaluating information from 18 tropical regions in Africa, Central and South America, and the Pacific islands to conclude that the tropical ELAs lowered about 900 ± 135 m during the last ice age, implying that mean annual temperature was about 5 °C lower during the last glacial maximum than today.

The tropical ELA depression value agrees with the average that Porter has determined for temperate latitudes. The similarity across the globe argues that air temperatures lowered relatively uniformly. Porter's data suggest that temperature lowered at least twice as much over land as over the ocean.

Porter's review of glaciation in the tropics is meticulously presented and rigorously reasoned. It is a capstone of his very significant contributions to Quaternary geology and paleoclimatology. A career of research experience is brought to bear on this glacial-geologic synthesis of one of Earth's most intriguing phenomena, glaciers astride the equator. His article is a superior piece of writing and analysis, deserving of the Division's highest award on many levels.

Compiled by A. Gillespie with help from comments by D. Kaufman and D. Rodbell.

Response by Stephen C. Porter

Thank you, Alan, for your generous words. It is a singular honor to receive the Kirk Bryan Award and to be included among the distinguished list of former awardees that contains the names of many of my friends and colleagues. I regret never having met Kirk Bryan, although our educational paths were somewhat similar: each of us received undergraduate and graduate degrees from Yale, but mine followed his by some four decades.

For some time, I had planned to write a review paper on Pleistocene snowlines. I finally was spurred to action when Rick Fairbanks invited me to participate in a symposium at Lamont-Doherty in 1995 on "Tropical Temperature Variations and Global Climate Change," thereby allowing me to discuss the importance of snowline variations as a paleoclimate proxy in the tropics. The eventual outcome was the paper you selected for this year's award.

My early interest in alpine glaciation was stimulated by summers spent hiking and climbing in the Sierra Nevada. As a college undergraduate in the early 1950s, I was introduced to glacial and Quaternary geology by Professor Richard F. Flint and to steep glacier-carved peaks in the American West by the Yale Mountaineering Club. Following naval service with the Pacific Fleet, I returned to New Haven and began graduate work under Dick Flint, John Rodgers, and Link Washburn. While I was considering possible dissertation research projects, Flint suggested that I investigate the glaciated central Brooks Range of Alaska, then a remote, sparsely mapped region. In 1959 I began a study of the Paleozoic bedrock and Quaternary geology across the range crest. Part of the project was a reconstruction of former snowlines and their paleoclimatic significance based (naively) on cirque-floor altitudes.

In the mid-1960s, I studied the glacial record of Swat Kohistan in northern Pakistan and adopted the term equilibrium-line altitude (ELA), introduced by Mark Meier and Austin Post in 1962, for snowlines of former glaciers. To reconstruct Pleistocene ELAs, I applied accumulation-area ratios of modern glaciers, and used this approach in subsequent snowline investigations in the North Cascades, New Zealand's Southern Alps, and Hawaii.

In the course of these studies I became aware of problems and limitations in reconstructing former snowlines, and in interpreting their climatic significance. These considerations are important in any snowline study, for some paleoclimate syntheses have cited paleotemperature estimates based on snowline data without a critical evaluation of methodology and potential error range.

During the past four decades snowline studies have mainly focused on ELAs as late-Quaternary climate proxies, but they also can be important in reconstructing earlier glaciations. Recently, I used ELAs to infer a long history of glaciation in the Hawaiian Islands, spanning most of the last million years. In this study, the history of volcano construction, differential isostatic subsidence, alpine glaciation, subglacial eruptions, and long-term variations in global ice volume all come into play. It is in multi-faceted research like this that I find Quaternary geology to be such a challenging and rewarding field.

Thank you again for honoring me with this distinguished award.

LAURENCE L. SLOSS AWARD

Presented to James Lee Wilson

James Lee Wilson
Consultant, Texas

Citation by Maya Elrick

It is a great pleasure for me to introduce James Lee Wilson, recipient of the 2004 GSA Larry Sloss Award. Jim is an ideal recipient for the Sloss Award because of his outstanding research and teaching achievements in paleontology, sedimentology, stratigraphy, and petroleum geology over the past 60 plus years and because of his service to the geologic community. His research includes studying sedimentary systems from each geologic time period (working on all of the Sloss sequences) and he has studied deposits on most of the world's continents.

I had the honor of meeting Jim in the late 1980s, then later going on an extended field trip to northeastern Mexico in 1991. After his introduction to Cretaceous deposits of this region, he joined my students and me during five subsequent field seasons studying mid-Cretaceous carbonates in the Mexican fold belt. During these field seasons, he shared his priceless geologic knowledge; his knowledge of Mexican history and culture; the location of unmarked "roads" to outcrops; the location of the only available motels, restaurants, and camping spots; and best of all, his insight and humor around the campfire while drinking El Presidente rum out of plastic cups. During this time, Jim was also working extensively with the late Bob Goldhammer and all of us came to call Jim "the Master" or "El Jefe" because of his role as mentor, colleague, and friend.

Jim's academic career has taken him across the United States and Canada beginning in the early 1940s with his B.S. and M.S. from Rice University and University of Texas—Austin, then his Ph.D. in 1949 from Yale University. Since then, he taught at the University of Texas—Austin, Rice University, University of Houston, University of Miami, University of Calgary, and the University of Michigan—Ann Arbor. He spent a year as a Fulbright research scholar and visiting professor at the Paleontological Institute, Munich, Germany. He has mentored over 35 graduate students and countless professional geologists.

Jim's academic career is woven together with work in the petroleum industry. As a member of the famous Shell Oil research group of the 1950s and 1960s, Jim spent three years in the Netherlands working on the Mesozoic geology of the Middle East at the time many of the great oil fields were being discovered. This same group conducted the first studies of modern carbonate and siliciclastic environments in the Bahamas and Persian Gulf and applied the concepts to understanding ancient carbonate systems.

Jim's contributions to stratigraphy are broad ranging and innovative. Early on (late 1940s and 1950s), his focus was on Cambrian and Ordovician strata, and especially on the use of index fossils for dating and environmental interpretation from outcrops in the Appalachians to Texas. This work culminated in a review of Cambrian biostratigraphy of North America. His research on carbonates and evaporates of the Williston Basin was pioneering and his analysis of the basin helped start industry interest in not only the Williston, but in basin analysis as a distinct branch of geology.

During the 1960s and 1970s, Jim pioneered studies in Pennsylvanian mixed carbonate-siliciclastics of the U.S. southwest, including cyclostratigraphy, reciprocal sedimentation, and syntectonic sedimentation. He became the world's expert on phylloid algal carbonate buildups. During this time, he also conducted some of the original research in deeper water cratonic carbonates recognizing diagnostic facies, biofacies, and bedding styles—these types of features were being recognized in Mesozoic and Cenozoic offshore and deep-sea deposits, but not in Paleozoic deposits. His early interests in modern carbonates continued with publications on subaerial alteration of Pleistocene limestones in Mexico.

In 1975, he published the well-known book, "Carbonate Facies in Geologic Time," which quickly became the textbook (the "carbonate Bible") for carbonate sedimentology-stratigraphy in academia and the petroleum industry. As the title implies, it includes petrographic through regional-scale studies of carbonates spanning each of the 2nd-order Sloss sequences (Paleozoic though Mesozoic deposits). This comprehensive book has informed and stimulated thousands of undergraduates, graduate students, and professional geologists interested in historical geology, carbonate stratigraphy and sedimentology, paleontology, microfacies, and petroleum geology and has been translated into Russian and Chinese.

His most recent area of stratigraphic research is in the Cretaceous of Texas and Mexico, and he published essential works on lithostratigraphy and tectonic control on sedimentation and organized and edited a major compilation of Jurassic and Lower Cretaceous deposits. Jim just recently finished work on the *Atlas of the Geology of Northern Mexico*.

Jim is a GSA fellow and an honorary member of the American Association of Petroleum Geologists (AAPG) and the Society for Sedimentary Geology (SEPM). He received the AAPG Distinguished Educator Award, served on AAPG's advisory council and house of delegates, and was an AAPG associate editor. He received AAPG's highest award in 2002—the Sidney Powers Medal. He was president of SEPM for 1975–76 and received the SEPM Twenhofel Award in 1990. SEPM has established the Wilson Award in his honor.

While doing all this, Jim has been a most outstanding human being and role model to geologists and nongeologists alike. He is a kind and loving husband. When I asked him how he has been able to sustain such a long and fruitful career, his immediate answer was, "my wife Dell," whom he has been married to for 60 loving and supportive years. He is a father of three sons, a grandfather, and an honest and caring friend to many. He has the unique ability to guide without dominating, find the good in all people and things, share his vast knowledge, live a balanced life, and make you laugh. I can think of no geologist at this time who better deserves this award. Congratulations to the Master.

Response by James Lee Wilson

I am delighted and touched to receive the Larry Sloss Award. I had known and admired Larry for a very long time. He had a strong influence on my views of stratigraphy and improved my interpretation of ancient environments.

I have had the advantage of extensive experience in stratigraphic successions with the Shell Research Group and several academic positions. My research and teaching have been more clearly understood through the use of Sloss' mapping techniques.

I first learned of Sloss in l944 when I was helping with structural mapping for Carter Oil Company in Montana. The Company decided to drill a deep test on the Cedar Creek faulted anticline along the border between North Dakota and Montana. Coring showed a good, but unexpected, fossiliferous, oil-bearing carbonate sequence here. Help was needed for identification and correlation of these strata. The closest available person was a young new professor, Larry Sloss, who was teaching at the Montana School of Mines at Butte. To this date, he had only published something on Middle Paleozoic brachiopods. With the information Sloss gave the company they were able to show that the Williston basin was of Paleozoic age and that it later subsided during the Cretaceous and Tertiary Periods. In the last fifty years, the Ordovician through Mississippian strata in the giant Williston basin have produced substantial amounts of oil. The Cabin Creek discovery gave the first indication of production on the western flank of the newly discovered basin.

Of course Larry Sloss' best known contribution to stratigraphy is that he laid the groundwork for quantifying facies and for understanding the significance of unconformities. Thickness and facies data were plotted on triangular diagrams with end members of basic sediment types (sand, shale, and carbonate-evaporite). Facies maps constructed from ratios based on this simple system are of great use in many phases of sedimentary geology. The Krumbein and Sloss book on stratigraphy and sedimentology remains a classic in its field, even after 50 years. He also guided some outstanding graduate students, such as John Andrichuk, Andrew Bailey, and Peter Vail. Later in his career, his studies comparing sedimentary basins brought him international recognition and fame.

Larry left a great legacy. His work laid the foundation for the development of the seismic and sequence stratigraphy elaborated by Vail and a large group at Exxon Research Laboratory. One cannot but admire Larry's drive, hard work and ambition, and above all his sense of humor. The latter is best displayed in his recounting part of his own history when awarded the Twenhofel Medal (Journal of Paleontology, 1980, p. 1366). He wrote,

"I wish I could leave you with some pithy aphorism, some trenchant maxim, that would make me seem a more worthy role model for rising young geologists. Instead all that runs through the mind is that a lack of virtue does not necessarily lead to a lack of reward, that procrastination saves time, (the problem may go away), and that there is, indeed, a free lunch — and I just had one!"

Despite his above disclaimer, his enthusiasm, industry, and sharp wit made Larry Sloss a good and not-to-be-forgotten teacher and colleague.

STRUCTURAL GEOLOGY & TECTONICS DIVISION CAREER CONTRIBUTION AWARD

Presented to Kevin Burke

Kevin Burke
University of Houston

Citation by John F. Dewey

I have known Kevin Burke for forty five years and I count him as one of my dearest and most respected friends. As a twenty two year old graduate student in 1959 at Imperial College, I went to seek his advice, on the geology of western Ireland where I was mapping, in his South Kensington office at the Atomic Energy Division of the Geological Survey of Great Britain. Kevin's University of London Ph.D work was also on the Precambrian and early Paleozoic rocks of western Ireland. Kevin was a very busy man but, generously, gave a large amount of time to help me. During the 1960's, I saw little of him when I was a Lecturer at the University of Cambridge, and Kevin was Advisor on Nuclear Raw Materials to Korea, then Senior Lecturer in the University of the West Indies, then Professor at the University of Ibadan. Our paths crossed again in 1969, when Kevin visited me in Cambridge, where he owned a house, and our serious research cooperation began with a paper on "Precambrian Orogeny in Africa". In 1973. the position of Professor and Head of Department at the University at Albany came up unexpectedly and it was our unanimous opinion to offer the position to Kevin, which he accepted to our great relief and gratitude. Thus began nine exhilarating years of co-operative research including Steve Delong, Jeff Fox, Bill Kidd, Win Means, and Akiho Miyashiro, and many superb doctoral students including Bill Bosworth, Dwight Bradley, Jack Casey, Bruce Idleman, Jeff Karson, Paul Mann, Eric Rosencrantz, Dave Rowley, Celal Sengor, and Mark Swanson. Kevin was a fine, relaxed, HOD and the Department was a cohesive teaching and research unit. He took the administration with "a pinch of salt", while avidly promoting the interests of the Department both intra- and extra-murally. He coined the term "chaircreature" in response to his objection to being called a Chair in the initial PC days of the seventies. On one occasion, at an HOD meeting, the Chairman of Physics remarked that one of his Faculty had just published a major important paper in the top physics journal. Kevin casually passed over that week's copy of Nature and pointed out that the lead article was by one of our graduate students, Celâl Şengör. For the last twenty one years, Kevin has graced the University of Houston, where he has vigorously continued his powerful research contributions with colleagues and students and acted as a marvelous promoter of and ambassador for geology. I can summarize my view of Kevin in the following words: enthusiastic, direct, confident yet un-conceited, lateral thinker, eclectic broad knowledge inside and outside geology, humour, and a determined eagerness to understand the history of the Earth and its processes. Kevin's knowledge and understanding of geology in its broadest dense is second to none, and he is the best generalist geologist I have known. I hope that this Career Contribution award turns out to be a mid-career award; Kevin shows few signs of slowing down. I present to you a top-class scientist and a fine person.

Response by Kevin Burke

My appreciation of this award stems largely from surprise because I long ago gave up measuring things. Recognition is welcome, if a bit overwhelming, because it gives me the chance to express appreciation of the privilege of working in the United States. I was welcomed as a middle-aged exotic 30 years ago and given the opportunity to meet and learn from the then young leaders of the plate-tectonic revolution. Meetings, Field-trips, and Penrose Conferences of the Geological Society were a vital part of my education. I have worked in many countries in the past 50 years and visited more but for me nowhere has rivaled the United States as the place to practice science.

I was brought up to consider public service a duty and that has led me down strange paths including: working with coral-reef ecologists and cosmo-chemists; being a British civil servant; living in Universities in Africa and the Caribbean; learning a little about life inside the beltway; seeing something of all the continents except (as yet) Antarctica and helping non-solid Earth scientists develop a broad appreciation of Earth System Science. I have found this breadth of experience helpful although I would certainly not recommend it as a way of life. I have worked with outstanding scientists although I can here name few. Tuzo Wilson, Bill Kidd, John Dewey and Celal Sengor dominated wonderful years for me when I first came to North America and Lew Ashwal, Nick Cameron and Trond Torsvik are actively stirring up my old age.