RIP RAPP ARCHAEOLOGICAL GEOLOGY AWARD

Presented to C. Reid Ferring

C. Reid Ferring
University of North Texas

Citation by Paul Goldberg and Rolfe D. Mandel

Geoarchaeology is truly an interdisciplinary endeavor. In order to succeed and to make advances in the field, one must be at least competent in one discipline and have a working knowledge of the other. Otherwise, it is possible to generate potentially significant and important data, but not know how to integrate them.

Reid Ferring is one of those rare persons who excel in both disciplines, as the doctorates in geology and archaeology attest. Way back, in graduate school days, when he was working in the Negev Desert of southern Israel, it was evident that Reid had geoarchaeological blood in his veins. He would unleash a succession of questions about the types of sediments, the presence or not of paleosols, and the nature of past climates and environments. In those days, such questions were rarely posed by archaeologists. Perhaps it was this early mindset that prompted him to pursue a doctorate in geology a decade after completing his Ph.D. in anthropology. We often wondered why Reid would punish himself twice. It is clear to us now. He was determined to wear two hats and to wear them well.

Over the past 25 years, Reid has thrived on interdisciplinary research and collaborated with individuals in many related fields of study. His research at the Aubrey Clovis site in northeast Texas is especially worthy of recognition. It is a great example of integrating archaeological, geological, and paleoenvironmental data into a treatise that sheds new light on the peopling of the southern Great Plains. Although he is well known for his research on the archaeology, geomorphology, Quaternary geology, and paleoenvironments of the Southern Plains, one of the more remarkable aspects of Reid's work is his global approach. Reid has enthusiastically applied his talents in the Near East, Portugal, Russia, and the Republic of Georgia. However, it is his recent geoarchaeological research at the Dmanisi Site in the Republic of Georgia, the oldest human occupation outside of Africa, that has gained him well-deserved international recognition.

Reid has long been an active participant in the Archaeological Geology Division of the GSA. He has served as Secretary-Treasurer, Vice-Chair and Chair of the Division Also, Reid has been the major driving force and supporter of the Claude Albritton Student Award. We thank him for this effort.

The Rip Rapp Award is given for outstanding contributions to the interdisciplinary field of archaeological geology. It is difficult to think of anyone more suited and qualified than Reid to receive such recognition. He is an international scholar of the highest caliber known throughout the World's geoarchaeological community and much of its anthropological and geological community for his considerable talents and contributions. He is a first rate scholar and teacher, and an energetic promoter of the Archaeological Geology Division of GSA. Many of us should strive to be so accomplished.

Response by C. Reid Ferring

I am extremely grateful to have been selected this year to receive the Rip Rapp Award. I offer my sincere thanks to all of you for this extending me this honor, and especially to Paul and Rolfe for their citation. I am humbled by this award, especially in light of the outstanding accomplishments of past recipients. They and many others in this division include people I am glad to call friends, mentors, role models, colleagues, or combinations of these.

My archaeological education and training was done formally at Southern Methodist University, where I had the fortune to study with Tony Marks, Fred Wendorf, Garth Sampson, Jim Sciscenti and Vance Haynes, and to study near students including Fekri Hassan and Don Henry. In 1973, a seminar on soils, taught by Dave Pheasant, a student of Pete Birkeland, left me convinced that Karl Butzer was right: I needed to know more about geology. Fortunately, my "need geology" evolved into "want geology", and in 1980 I enrolled in the geosciences program at the University of Texas at Dallas. There, an outstanding faculty revealed for me the fabric of geology and also taught me how to do it.

We are all indebted to the founders of this division, notably Rip Rapp, for their essential contribution to the now firmly established place of archaeological geology within the sciences. The founding of this division was followed by a second essential contribution, and that was the creation of the International Journal of Geoarchaeology by Jack Donahue. Under the tireless work of Jack and all subsequent editors, this journal has matured in partnership with our division and is now a signal venue for communicating the results of interdisciplinary research. A third essential contribution was realized from the efforts of Rolfe Mandel, who created the bridge between our division and the SAA. An astute organization man, Rolfe became the keeper of both ends of this bridge, and ensured its success by creation of the SAA-embedded partisan group known as the Geoarchaeology Interest Group.

But essential contributions are not like endowments. They are formalized commitments to sustain the discipline of archaeology geology. I am indebted with all of you to the efforts of the many people, who have over these years fulfilled that commitment. My gratitude extends well beyond that I have for the officers and other volunteers who make our meetings, scholarships and field trips happen each year. I am even more grateful to the many colleagues who have not just helped me so many times, but who have also enriched my life by their friendship.

Over the last 30 years, I've had the opportunity to learn more about archaeological geology as I worked on exciting problems in many places and with many colleagues. For this award, and for the collaboration and friendships I have enjoyed with you all, I am most grateful.

GILBERT H. CADY AWARD

Presented to Arthur D. Cohen

Arthur D. Cohen
University of South Carolina

Citation by John C. Crelling

This year's recipient of the Gilbert H. Cady Award is Arthur D. Cohen, in recognition of his outstanding achievements in coal and peat petrology. Art has been conducting coal research for nearly forty years and is internationally known for his studies of modern environments of coal formation. He has authored or edited ten books, over 135 refereed papers, and hundreds of reports and abstracts. He essentially established peat petrology as a discipline and developed many of the techniques used today to study peat, including atomic force microscopy. His investigations in the Everglades were among the first to use oriented microtome sections to investigate peat formation. His studies in the Okefenokee and Snuggedy Swamps led to many papers on depositional models for shoreline-related coals. He established the only peat sample bank in the world and has made essential contributions to utilization of peat for remediation of hazardous wastes in the environment. His studies on the origin of fusinite macerals have been widely cited, and he was among the first to combine micropetrography with palynology and palynofacies to reconstruct the paleoecology of peat deposits. He has studied the occurrence of mineral matter in peats and developed models to predict its distribution in coals. He has utilized unique experimental coalification techniques to investigate the origin of coal macerals.

Art has also contributed in a significant way to the education of scientists and non-scientists on coal-related subjects. He has taught popular courses at all levels, ranging from the oil, gas, and coal industry to large introductory geology courses. He has directed nine Ph. D. dissertations and twenty-three Master students. Aspects of Cohen's coal research are interwoven into all of these courses. He is perhaps, best known for his legendary field trips to the swamps of the Okefenokee and the Everglades, which are widely agreed to be some of the best ever in their scope, planning, execution, and instructional value.

In summary, Art Cohen has greatly increased our knowledge and understanding of peat and its relationship to coal formation and has worked to disseminate these ideas throughout the scientific community worldwide. For these reasons, he is a worthy recipient of the 2005 Gilbert H. Cady Award.

Response by Arthur D. Cohen

I was honored and surprised when I learned that I was to receive the Gilbert H. Cady Award from the Coal Division of the Geological Society of America. Looking down the list of past recipients, I see the names of persons whose work I have admired and studied for many years, and I am awed that my colleagues would place me in this same category.

Throughout the years, I have looked upon my research not merely as an attempt to test new hypotheses, but as voyage of discovery. Each new discovery has encouraged me to proceed ahead and explore new pathways. To me, viewing a new thin section of peat or coal is like taking a step on the moon. I have the opportunity to be the first to observe this new world and each new step is a wonderful adventure.

As I proceed through the latter stages of my career, I want to thank all of the wonderful professors and colleagues who have awakened these interests in me and have generously spent their time to educate me. I cannot thank all of them in this short speech, so I do apologize ahead of time for that. But special thanks go to Dr. H. J. Sawin, who acted in a mentoring capacity during my early undergraduate days at the University of Delaware, and to Dr. Edward Stanley, who introduced me to the field of palynology. But, most of all, I want to thank Dr. William Spackman, who so enthusiastically introduced me to the wonders of the Everglades and Okefenokee Swamps, taught me about coals and paleobotany, and showed me, by example, how to be a good teacher. If I get credit for running a good field trip, it is only because Bill Spackman taught me how to do it. He is without a doubt the best teacher I have ever had, and I have continued to copy his teaching style to this day. I often find myself saying: "Now how would Bill Spackman do this?"

I would also like to say a few words about Gilbert H. Cady, for whom this award is named. When I was a young professor at SIU, starting up the first coal research program there, I had a chance to visit briefly with "Doc Cady" (as everyone called him) at the Illinois State Geological Survey in Champaign. I stayed at his home, and, after some discussions about my goals and aspirations, he asked if I would like to have a set of thin sections of coal. He thought I might some day have some use for them. Little did I know that I would use these sections in my courses for the next thirty years. And, each time I do, I explain to my students who he was and make sure that they read one of his papers – a great legacy.

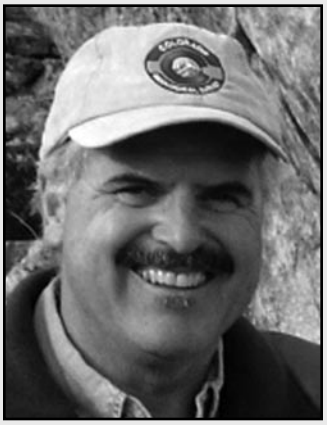
I also want to thank my past and present students, whose enthusiasm and constant questioning have enriched my life by helping me to be observant and forever open to new ideas. Sorry, there is not space here to single-out any of you.

And last, but not least, I want to thank my wife, Mary Jo, who has made my life more meaningful in many ways, and my kids, Ben and Jon, who went on many swamp trips with their dad and had to put up with the same swamp lectures "ad infinitum".

Thanks again to the Coal Division for this honor and I hope to continue to see many of you at these meetings in the years to come.

E.B. BURWELL, JR. AWARD

Presented to Ralf Topper
For the Publication
Ground Water Atlas of Colorado
Colorado Geological Survey (CGS)
Special Publication 53
by Ralf Topper, Karen L. Spray,
William H. Bellis, Judith L. Hamilton,
and Peter E. Barkmann.



Ralf Topper
Colorado Geological Survey

Citation by David C. Noe

One of the many pleasures of working as a scientist is that of encountering a comprehensive, end-all publication. I'm sure you know what I mean—an expert work that covers many levels of a subject, from beginning concepts to expert application; something that's accessible, well stated, scientifically sound, and, if you're lucky, profusely illustrated. Nearly all of us can think about one, two, or several of such publications and how they've affected our understanding of their respective topics.

On the other hand, I'm sure that we all share, to some degree, the frustration of not having an end-all publication available when we start into something new. After all, much of science is discovery, and if everything has already been done, we should all go home and turn out the lights.

Therefore, we should celebrate the publishing of any work that greatly elevates the understanding of a topic in the eyes of its users. And so, it is my pleasure to introduce this year's winner of the E.B. Burwell, Jr. Memorial Award, in recognition of distinguished contribution to Engineering Geology: the *Ground Water Atlas of Colorado*, Colorado Geological Survey (CGS) Special Publication 53, by Ralf Topper, Karen L. Spray, William H. Bellis, Judith L. Hamilton, and Peter E. Barkmann.

The importance of water in the western United States cannot be overemphasized. It supports our natural resources, agricultural and industrial activities, and human population. Ground water resources are becoming increasingly important as a consequence of population growth, drought, and the need for reliable water sources and their wise use. In Colorado, the need for comprehensive, understandable information concerning the state's ground water resources has resulted in the publication of the *Ground Water Atlas of Colorado*.

This 210-page atlas was compiled and created by the authors and CGS, working in cooperation with several state and federal agencies and professional organizations. There are three introductory chapters that explain ground water in its geological, hydrological, and legal context, and an extensive glossary at the end. The main part of the publication summarizes the location, geography, geology, water quality, and hydrologic characteristics of the state's major aquifers. This includes a systematic and straight-forward text; maps of structural basin boundaries and aquifer, water well locations, aquifer thickness, potentiometric surfaces, hydraulic conductivity, water well depths, and chemical concentrations; cross-sections; hydrologic stratigraphic sections; data tables, graphs of well depths and well yields; numerous photographs, and extensive bibliographies for each aquifer.

In spite of this robust compilation of data and other information, the Atlas has an easy-to-read 11″ x 17″ format and is lavishly illustrated, making it accessible for both technical and non-technical readers. As such, it serves as a tool for water conservancy managers and planners, policy makers, and water engineers, and as an educational resource for water users, legislators, and the general public.

Since its publication in 2003, over 1,300 copies of the *Ground Water Atlas of Colorado* have been sold to a variety of users. While it does not suggest solutions or provide land-use recommendations, the basic information contained therein is being used to address aquifer-related land use issues through a watershed decision support system[1], and as an authoritative source for judicial decisions[2]. Maps and other data from the Atlas have been used in major Denver newspaper articles. This publication has been successful in enhancing public awareness of ground water issues, and it has been adopted as an essential resource document for anyone in Colorado who works with such issues.

Finally, I would like to say a word or two about the authors, all of whom are experienced hydrogeologists. Ralf Topper and Peter Barkmann work for the Colorado Geological Survey, while Karen Spray, Bill Bellis, and Judy Hamilton practice in the private sector. While all of the authors contributed to the writing, Ralf Topper, as the senior author, did an admirable job in pulling the piece together and giving it a voice. The tone of the Atlas, from cover to cover, is one of careful scientific consideration coupled with patient and focused explanation. The writing is not too wordy, nor is it too spare. It is just right.

As someone who watched this publication take shape, and a former Burwell Award recipient, I am duly impressed by the quality and focus of the completed product. I consider this to be the end-all book for its intended topic, the one-stop, must-have resource for all who are interested in Colorado's ground water and its geologic aspects. As Phillip LaMoreaux, editor-in-chief of the journal Environmental Geology has said, "It could be a guide for any agency in the world with the responsibility of communicating with the general public as well as the scientific community in an area."

In meeting the requirements and vision of the Burwell Award, this is certainly a publication of distinction that advances the knowledge and practice of Engineering and Environmental Geology to a high degree among a variety of interdisciplinary users. I am pleased that the Award Committee felt the same and considers the *Ground Water Atlas of Colorado* to be worthy of the 2005 E.B. Burwell, Jr., Memorial Award.

[1] Information from the Atlas is being used by the Colorado Water Conservation Board and its contractors in the compilation of the South Platte Decision Support System, an integrated ground water/surface water data access system allowing data based decisions on water supply and use in the South Platte River basin in Colorado.

[2] Colorado Supreme Court Decision in Case No. 02SA216: Colorado Ground Water Commission v. North Kiowa-Bijou Groundwater Management District, September 8, 2003.

Response by Ralf Topper

On behalf of my co-authors, Karen Spray, William Bellis, Judith Hamilton, and Peter Barkmann, we are deeply honored to receive the 2005 Edward Burwell, Jr. Award for authoring Colorado Geological Survey Special Publication 53: *Ground Water Atlas of Colorado*. I would like to give you a brief history on how this publication came to be.

Surface water currently supplies approximately 80 percent of Colorado's water supply needs. The limitations on this resource, however, have been evident for decades as all of Colorado's major river systems are over-appropriated. With a 30 percent growth in population in the past decade, Colorado water managers and politicians are struggling to provide long-range sustainable water supplies.

It is in this environment that the Colorado Water Buffalos recognized the need for additional and comprehensive ground-water information. One of these in particular, Mr. Tom Cech of the Central Colorado Water Conservancy District, promoted the compilation of a ground-water atlas as a tool for water managers and an educational resource for water users, legislators, and the public. Mr. Cech brought the idea to the Colorado Water Conservation Board, where deputy director Dan McAuliffe realized the benefits of such a compendium and solicited and funded the Colorado Geological Survey to create an atlas of Colorado's ground-water resources.

And so, the project came to me under the supervision of our section chief, Matt Sares, whose dedication, management, and direction behind the scenes brought this publication to fruition.

The inspiration for compiling a large format, heavily illustrated atlas came from the *Ground Water Atlas of the United States* segments published by the USGS. The *Ground Water Atlas of Colorado* presents the research and results of many other scientists from both the public and private sector, and draws heavily on the water well permit database established and maintained by the Colorado Division of Water Resources.

As you may imagine, an investigation, compilation, and production of a publication of this magnitude requires the dedication and contribution of many individuals and agencies. Karen Spray, William Bellis, and Judith Hamilton, all experienced consulting hydrogeologists in metro-Denver, were contracted to help with this unique project. This project took two years to complete, and we were fortunate to have Peter Barkmann join the CGS during that time and contribute to this publication. The GIS and graphic services personnel within the CGS put a face to our data and visions by creating illustrations, maps, and figures and designing the layout.

I am very pleased that David Noe recognized and appreciated the voice and tone of the atlas. It is very difficult to convey technical information to a non-technical audience, while still providing factual information and holding the attention of scientific and engineering professionals. This became a greater challenge when we attempted to categorize and define the various aquifers in Colorado due to the state's varied and complex geology. That task was accomplished by formulation of a detailed conceptual plan, adherence to a well-defined outline for content, and a lengthy and comprehensive review and editing process.

In closing, I would like to borrow from an article written by Allen Hatheway, a consulting geological engineer from Montana, in the October issue of The Professional Geologist. Allen was asked, in part, "What is it that engineers need to know to practice in the applied geosciences"? Allen suggests that an engineer needs some sense of what it is they require of geoscience specification input. Consequently, he concludes that the engineer should know enough about geology to wisely acquire qualified geologic support, formulate a scope of work for a qualified geologist, and evaluate the worth of the geological work product. It is my sincere hope that the Ground Water Atlas of Colorado will be used as a reference for factual information on Colorado's ground water hydrology, allowing the less experienced practicing engineer to formulate the specification input required for their project, or at least recognize the need for additional, site-specific hydrologic information.

We are very grateful to the Award Committee for bestowing the 2005 Edward Burwell, Jr. Memorial Award upon our work. It is truly an honor to be recognized in such a fashion.

GEORGE P. WOOLLARD AWARD

Presented to Anthony B. Watts

Anthony B. (Tony) Watts
University of Oxford

Citation by Marcia McNutt

The Woollard Award recognizes "outstanding contributions to geology through the application of the principals and techniques of geophysics." Tony Watts is a most worthy recipient, having applied gravity, seismic, bathymetric, and stratigraphic data to the quantitative solution of problems in tectonics, geodynamics, geomorphology, and sedimentology. He has mentored dozens of post-docs and students, participated in more than 15 sea-going expeditions, and authored nearly 150 papers. His book, *Isostasy and Flexure of the Lithosphere*, is a tour de force, showing isostasy, modulated by the mechanical resistance to flexure, is the common cause shaping the structure of the crust in geological environments ranging from mid-ocean ridges to trenches, and from continental rifts to mountain belts.

Following in the footsteps of Woollard, Tony's first major breakthrough came from constraining the deformation of the lithosphere beneath the load of the Hawaiian volcanoes using gravity data. Expressing the strength estimates in terms of the effective thickness of an elastic plate, he proposed the thickness increased as the square root of the age of the lithosphere at the time it was loaded by volcanism, and then remained frozen at that value as the load aged. Using this concept, he estimated ages of seamounts remotely from gravity anomalies, without recourse to geochemical analyses of rock samples. With his student Uri ten Brink, he was the first to observe directly the flexure of the lithosphere beneath the Hawaiian islands with multichannel seismic data and to image apparent ponding of magmatic material beneath the crust, termed "underplating".

He then connected the long-term mechanical strength of the lithosphere to results from laboratory studies of rock deformation, building on an idea first suggested by Goetze and Evans. Tony and his students John Bodine and Mike Steckler combined rock mechanical studies showing brittle failure in the upper crust and creep at greater depths to define a 'yield stress envelope' that was temperature, and thus age, dependent. They successfully showed that mechanical loading of this rheologic structure would imitate the simple idealized elastic plate flexure.

Tony recognized the potential for flexural isostasy to explain a common pattern of coastal on-lap sequences observed in a variety of sedimentary basins in seismic reflection profiles. Other scientists had proposed that sea level rise was required to explain the global distribution of on-lap events. Tony's work showed that this onlap sequence was a natural consequence of the increasing flexural rigidity of cooling, subsiding lithosphere, avoid the need for sea level changes. Tony expanded these ideas with his students Garry Karner, Mike Steckler and Julian Thorne and their Lamont colleague Bill Ryan, developing the 'back-stripping' technique to study the thermo-mechanical evolution of sedimentary basins. This led to a new understanding of the geologic forces that create source, reservoir, and trap rocks, and produce the thermal regime required to mature hydrocarbons. It even allowed a rough guess at the resource potential of a basin from its gravity anomaly alone, especially valuable when satellite altimetry furnished global marine gravity anomalies over previously unexplored areas.

Tony's singular vision and greatest achievement has been to show the universality of isostasy and flexure of the lithosphere as common mechanisms shaping the architecture of the Earth's crust across all geologic environments. Tony Watts, the intellectual heir to Woollard, is a particularly appropriate recipient of the 2005 Woollard Award.

Response by Anthony B. (Tony) Watts

Thank you Marcia for your kind words and the rest of the committee for nominating me for the George P. Woollard award.

It is a great honour to receive this award from the Geophysics Division of the Geological Society of America. I have very much enjoyed working at the boundaries of geophysics and geology, something which Martin Bott, my Ph.D thesis advisor, encouraged. I remember, as a young undergraduate, reading Martin's papers that showed how you could use gravity anomalies to address the granite problem and thinking that this was exactly how geophysics should be used—as a tool to address geological problems.

Most of my working career has been spent in the US, which I think provides the most exciting environment to do research. My first opportunity was a post-doctoral fellowship at Columbia's Lamont-Doherty Geological Observatory. When I arrived there in the early 70s Lamont was running 5 ships and in its heyday of ocean exploration. Doc Ewing sent me to work in the gravity group and I remember Manik Talwani asking me which ocean I wanted to work in. I answered the Atlantic because it was the only ocean that I knew anything about. My reward was to be sent to the Barents Sea with Captain Kohler on R/V Vema for 2 very cold (and dark) months! When I returned, Manik told me that he already had people working on the Atlantic and Indian oceans and that I should work in the Pacific. It was a decision I have never regretted. Lamont had amassed a huge geophysical database in the Pacific, which we were able to use to test the earlier ideas of Dick Walcott and Tom Hanks that the crust might be flexed seaward of trenches. The trench work led to Hawaii, two chance meetings with George Woollard, and a career long interest in plate flexure. Although I returned to the UK in the early 90s (where I finally got to work in the Atlantic!), I have able to maintain my US contacts, thanks to sabbaticals first at MIT and then at Scripps.

There are many people who I feel should share this award. First, are my graduate students whose friendship, advice, and never-ending enthusiasm has been an inspiration to me. Marcia has already mentioned some of them by name. I would like to add though a special thanks to Pål Wessel and Walter Smith who, in addition to completing very good theses, developed **GMT** which I, and many other scientists around the world, have greatly benefited from. Second, are my close working colleagues. Again, there are too many to mention. However, I would like to say a special thanks to Peter Buhl, Evgenii Burov, Jim Cochran, Christine Peirce, Jeff Weissel and Shijie Zhong. You have all helped to make this journey an enjoyable one and my passion for geology is as strong now as it was when I first started.

MARY C. RABBITT HISTORY OF GEOLOGY AWARD

Presented to Gerald M. Friedman

Gerald M. Friedman
Brooklyn College and
Northeastern Science Foundation

Citation by Ken Bork

Does Gerry Friedman really need yet another award?!? The positive answer is that he definitely deserves to be the recipient of the History of Geology Division's highest award. It is an honor to bestow on Dr. Friedman the "The Mary C. Rabbitt History of Geology Award" for 2005, the first time the Division's award has carried the name of its third awardee.

The opening query was offered in a light manner, but it carries a heavy message. Few people have had, and deserved, the wide recognition that Gerry Friedman has earned over an exceptionally productive lifetime. We are here to honor his contributions to the history of geology, but many of us realize that his broad and deep impact on sedimentology is non-pareil. It is difficult to imagine that one person would be honored with presentation of the Twenhofel Medal (SEPM, 1997), the Sidney Powers Medal (AAPG, 2000), and a veritable treasure-chest of other medals and awards relating to his work in sedimentology, geochemistry, and petroleum geology. In addition to holding numerous offices in professional societies dealing with mineralogy, education, history of geology, petroleum geology, and sedimentology, Gerry has also won plaudits for his important papers and textbooks. A Fulbright scholar in 1964, at Hebrew University, Jerusalem, Gerry also has received honorary degrees from the University of London, where he was hooded by the Queen Mother, and the University of Heidelberg, which only deigns to give awards every 50 years (John Wesley Powell in 1886, Reginald A. Daly in 1936, and Gerry in 1986). His own educational pathway, after leaving his native Germany, included the B.Sc. degree from the University of London (1945), and Masters (1950) and Ph.D. (1952) degrees from Columbia University. Gerry's full employment history is too rich to recount here, but it includes teaching at the University of Cincinnati (1950–1954), research with Amoco (1956–1964), and faculty positions at Rensselaer Polytechnic Institute (1964–1984) and Brooklyn College, City University of New York (1984–1988; Distinguished Professor, Emeritus, 1988 to the present.) If some of you cannot be impressed by academic credentials, be forewarned that Dr. Friedman also holds a third-degree black belt in judo, so please pay attention to this citation.

Any temptation to dwell on Gerry's exceptional contributions to a rather astounding range of fields, from mineralogy to sedimentology, and from petroleum to uranium, must be reined in, as we turn our focus to the history of geology. When one thinks of the evolution of the history of geology, there are a few names in the first wave, from the 1960s onward, that still resonate. George White, Cecil Schneer, Ursula Marvin, and Martin Rudwick come to mind. A second key era in our discipline was the founding, in 1982, of the History of the Earth Sciences Society (HESS) and the concurrent inception of its journal, *Earth Sciences History*. I recall our discussions at the time, when it was agreed that a worldwide society to foster geoscience history would be of great value, but the real need was to have a journal devoted to our discipline. Truth be told, it is difficult to imagine the evolution of HESS and *Earth Sciences History* without the Society's co-founder and the journal's founding editor, Gerald Friedman. The editor of a new journal must have many talents, along with the phenomenal energy and patience required to deal with a flood of important decisions and production details. This is an opportune moment to introduce Sue Friedman and acknowledge her tireless collaborative work with Gerry. Sue's efforts have paid many dividends to the history of geology, as well as to many other professional endeavors. Visible acknowledgment of the Friedmans' contributions is the Sue Tyler Friedman Award of the Geological Society (London). They truly are a dynamic duo. In the early days of *Earth Sciences History*, Gerry's editorial work was critical in producing a journal that would gain international stature. The fledging journal succeeded in attracting members worldwide, and it served as an important forum for expanding interest in the history of geology. To this day, Gerry continues to provide articles, editorials, and helpful lists of interesting publications. His numerous contributions to HESS were applauded with the rare recognition (2001) as an Honorary Lifetime Member. Service to our GSA History of Geology Division included two years as Vice Chair (1998–'99) and two years as Chair (1999–2000).

While HESS and its journal were gaining adherents on the global scene, Gerry was using his base in Troy, New York, to organize and host a number of valuable symposia. Troy is the home of Rensselaer Polytechnic Institute, where Gerry taught for two decades, and of the Northeastern Science Foundation, over which he presides. It is also where he established the Rensselaer Center for Applied Geology, site of many noteworthy meetings. For example, in August 2000, the Friedmans convened the "Conference on the History of Geologic Pioneers." Gerry did a fine job of convincing us that the Troy region really had a claim to being the "Birthplace of American Geology." Amos Eaton (1776–1842) taught at RPI, as did Ebenezer Emmons (1800–1863). James Hall (1811–1898) was a student of Eaton and Emmons. And they have their permanent resting place in the general area, as you will find if you accompany Gerry on one of his famous cemetery tours. Once the formal meetings and trips were concluded, one learned of yet another dimension of Gerry's interests and talents. He is an ardent bibliophile and superb host. A visit to the Friedmans' home involves not only a pleasant social evening but also an amazing introduction to treasures of their personal library. The New York geologists are represented, but so is Darwin and many of the great names of the history of geology. Gerry truly is invested in the history of geology, from research to editing to collecting key works in the discipline.

It is a pleasure to recognize our Division's 2005 honoree and all-in-one sedimentologist, editor, educator, organizer-extraordinaire, bibliophile, and tireless supporter of the history of geology -- Gerald M. Friedman.

Response by Gerald M. Friedman

Achieving this great honor surprises and flatters me. I am delighted and grateful.

In 1981 I established the Sue T. Friedman Medal in the Geological Society of London, and nominated Mary Rabbit for this award, which she received from Geological Society of America (GSA) in 1984, and now I am the first recipient to receive the Mary Rabbit History of Geology Award. Two years later Ursula B. Marvin received the History of Geology Award and in 2005 she received the Sue T. Friedman Medal in London. One of the first recipients of the Sue T. Friedman Medal in London was Martin J.S. Rudwick (1981) who beat me in the election for president of the History of Earth Sciences Society (HESS).

I checked the list of previous recipients of the History of Geology Award, which is now known as the Mary Rabbit Award and that of the Geological Society of London's Sue T. Friedman Medal and discovered what follows. The first recipient was George W. White (1982), a distinguished geologist who became the first member of the editorial board of Earth Sciences History (HESS). William A.S. Sarjeant (1991), historian and bibliographer of geology, was also a recipient of the Sue T. Friedman Medal of the Geological Society of London. Michele Aldrich (1992) and Kennard B. Bork (1997), whom I consider close friends, became early History of Geology Award recipients. Robert H. Dott, Jr. (1995), dates to my Amoco days when he came to visit me in my research labs in Oklahoma. Hatten S. Yoder, Jr. (1998) spent time with me in the Canadian Shield when I was still a hard-rock geologist before I drifted into sedimentary geology. Hugh Torrens (2000) and I became friends in North Wales and Lancashire, England. Ellis Yochelson (2003) overlapped with me at Columbia University, and he was co-founder with me of HESS, and I appreciated that in his award citation he noted "that Gerald and Sue Friedman made Earth Sciences History both evolve and progress". Last year's History of Geology Award recipient was Stephen G. Brush (2004) whose "personal hero in the history of geology is Thomas Chrowder Chamberlain" (1843-1928). Chamberlain was a student of Henry B. Nason (1831-1895), who was my distinguished predecessor, of Rensselaer Polytechnic Institute in Troy, New York.

I was most fortunate and made the best move in my life when I married my beautiful wife Sue. Thereafter I became a geologist and professor and have worked on every continent except Antarctica. My work gives me great pleasure. I hold the fancy title of Distinguished Professor Emeritus in the City University of New York and Professor Emeritus at Rensselaer Polytechnic Institute. My past students hold to positions or are retired from Esso (Exxon) and Shell and served as president of GSA, vice president of the American Association of Petroleum Geologists (AAPG), and President of the Houston Geological Society (the world's largest regional geological society). In worldwide continuing education programs I have taught more than 10,500 professional scientists.

Recognition of my efforts has resulted in other medals and awards, but my favorites are the honorary fellowships or memberships in the AAPG, Geological Society of London (England), Society for Sedimentary Geology (SEPM), International Association of Sedimentologists (IAS), GSA, HESS, being hooded by Queen Elizabeth—the Queen mother of England and honorary doctorate of the University of Heidelberg (Germany). Last but not least, I must extend thanks to Larry Woodfork who helped in the efforts to make me a Kentucky Colonel (and have a plaque to prove it).

Thank you for your most generous recognition.

O.E. MEINZER AWARD

Presented to Donald I. Siegel

Donald I. Siegel
Syracuse University

Citation by Olaf Pfannkuch

Praesentatio ad Sigelium Praemium Meinzerianum.

Prohoemium: Donald Ira Siegel, this year's recipient of the O.E. Meinzer Award can look back to a long pedigree of academic ancestors. According to the European academic tradition, thesis advisors and advisees are viewed in a relationship of pater academicus and filius academicus. The lineage of my pater academicus, the late E.A. Brun of the Sorbonne (and Don's avus academicus), can be traced back to Pierre Simon de Laplace. Hence Laplace is Donald's academic great-great ancestor. In Laplace's time academic citations would be delivered in Latin. I will spare you my rusty Latin, but the headings of my citation at least will follow this venerable tradition.

Laudatio ad Siegelium, accipientis praemium Meinzerianum.

Radicis: Donald Ira Siegel has his academic roots in Rhode Island, Penn State and Minnesota. Professionally he had a foot in the oil industry, state agencies and the United States Geological Survey before re-entering academe in Syracuse. This gave him a broad scientific background from which came his scientific interests and achievements, and on which the choice of publications that were the basis of his nomination for this prestigious award are based. Cited in his nomination for this award was Don's work in paleohydrogeology, specifically aquifer recharge under ice sheets and their hydrologic and hydrogeochemical imprint on present groundwater flow systems, and the body of work on boreal peatland hydrology and hydrogeochemistry.

Pertinentia ad professionem

Quaestiones, Opera et Scripta: Siegel's diverse interests, work and publications cover more than the two areas mentioned above, and include: carbon cycling; isotope hydrology in systems ranging from crustal boundaries to shallow springs;fate and transport of hydrocarbons, solvents, landfill and fly ash leachates; environmental policy; geological education; well-head protection, and most recently, hyporheic interactions.

Res gestae: Achievements and contributions not necessarily prominently listed above that also influenced hydrogeology and hydrogeochemistry are the first discovery that organic acids and bacteria weather silicates - work done in cooperation with Phil Bennett (my nepos academicus), and studies on the interaction of peatland vegetation with hydrology and geochemistry with Paul Glaser, who covers the eco-biologic aspects of the subject.

Of great satisfaction to Don is his guiding of two score graduate theses and advising seven score and ten undergraduate students at SU.

Praemia accepta: Siegel is not new to distinguished awards (of course none as prestigious as the OEMA). He holds Syracuse University's Wasserstrom Graduate Mentoring Award, the Distinguished Service Award of the Hydrogeologic Division, the Birdsall Distinguished Lectureship in Hydrogeology, and is a Fellow, Geological Society of America.

Labores inter colleges: Siegel's professional advice and help is sought by many and gladly given. Among other contributions, he is a Councilor of the Geological Society of America, has served on six committees of the National Research Council, National Academy of Science, actively participates in professional societies as a member or chair of committees, and is also on editorial boards.

Pertinentia ad Morem et Vitam Ingenium et ars:

One of Don's innate gifts is presence of mind. In my first telephone contact with Siegel I had no idea that I was talking to future O.E. Meinzer material, but rather the contrary. While carrying on a fairly normal conversation about the hydrogeology graduate program at the UMN, he suddenly asked me out of the blue, to what degree open hole drill stem tests could be correlated to normal spaced resistivity deflections in a well log penetrating the I don't remember what oil-bearing formation in Oklahoma, and then hung up. What kind of a nut is this, I thought. He later explained that his supervisor was walking by and he didn't want him to know he was intending to leave for graduate school.

Studia: Siegel extends his range of interest to epistemology and ethics of the profession by giving advice to young geologists aspiring to academe. He makes time for interests other than those narrowly defined professionally. He plays a mean game of chess; but his son Micah beats him. His culinary interests range from eggs Benedict to his new cookbook: " From Lokshen to Lo Mein, the Jewish Love Affair with Chinese Food," which clearly derives from his hydrogeochemical background.

Hospitalitas: Known for the legendary parties at his house, these flow directly from his interest in food and food preparation and his love for people. But we cannot pass without mentioning Bette, his wife, who is as much part of the hospitality as he is.

Amicitia: I must take notice that Don has accomplished the rare feat of remaining in longtime contact with his advisees, collaborators and co-authors. The authors on his publication list are essentially a list of his friends. He is loyal to old colleagues and new alike, makes friends easily, and keeps them for life.

Hilaritas: One of the most striking observations to be made about Siegel in his laboratory (and in field work, if you will) is the laughter that emanates from it. It is not the laughter from a jocus, nor the risus of a sneer, nor the mindless laughter on sound tracks of even more ridiculous TV shows. It is the shared laughter with his professional and student colleagues that comes with the "aha" moment of having found new insights, of having completed an experiment, or solved a problem in common. It is the true laughter of cheerfulness, hilaria or laetitia that follows successful intellectual inquiry. It is also the laughter of someone who loves his work and approaches it with rigor, but who does not take himself too seriously. May this laughter continue in aeternum.

Perorem: With this I shall bring the citation to a close: Gratulemur igitur collegae quem summa laus consecuta est, discipulus, scholasticus, doctus in res hydraulica, professor, amicus, filius academicus, Siegelius.

Footnote: faber DIV adjuvit

Response from Donald I. Siegel

Wow. What can I say to this citation? Latin is a subtle and beautiful language, yes? But it isn't exactly in my cultural background. But I can say in Yiddish, when I got the call from Janet Herman about the Meinzer, I became quite *farblondzhet*, confused and bewildered, while almost *hetsken zich*, dancing with joy.

No accomplishment comes without significant support and mentoring. To this end, I'd like to briefly thank a few people.

First, there is Bette, my wife, sitting next to me here. Through fully 30 years of marriage, Bette has stuck with me as my best friend and confidante, and always puts me on emotional track when I become *mashugganah*, crazy, from multitasking and campus politics. Without Bette, I'd not be here. I'd probably still be in the Oil Patch somewhere in the Deep South.

Second, I have to thank my Latin mentor, Olaf Pfannkuch. Please come to the symposium in his honor tomorrow morning. I am flattered indeed by the academic lineage that Olaf derived for me. Now I know why he forced me to learn the Laplace Equation so well. Del squared H = 0. Olaf taught me how important it is to couple sound conceptual and theoretical models to hydrogeologic practice, and I do this by cartooning my ideas on napkins when I first discuss a possible thesis topic with a new student, usually at a local tavern. I'm told my students sometimes save these food stained napkins or scan them to remember the moment.

Academic lineage not only intellectually passes from generation to generation but also passes with respect to personal styles, something that people forget. As the song from South Pacific says, "You have to be taught."

Olaf showed me how to be a professorial *mensch*, a guy who tries to do the right thing without looking for personal gain. I look for *menschlicheit* in every person I work with, student or established professional. I even look for it in lawyers with whom I work—a longer search at times. Without being surrounded by *menschlicheit*, I would spend inordinate emotional time covering my back. I don't like covering my back. I'm not Wild Bill Hickok, although I have been accused by scientific detractors of sometimes shooting from the hip.

Olaf and his wife Georgette also showed me there is nothing better to foster *menschlicheit* than hosting dinners and parties to celebrate individual and group academic achievements and other milestones. And it doesn't hurt the process if you like to cook and entertain—hence Bette's and my parties.

Third, I must acknowledge how much Paul Glaser has been instrumental to my career. He and I work so closely on wetland hydrology and biogeochemistry, that part of this Meinzer Award, de facto (that's latin), goes to Paul too. We even look more and more alike, as our beards become the color of distinction and the hair on our heads migrates elsewhere.

My final acknowledgment goes to dozens of people—no, I won't say all their names—the incredible folks in the USGS Water Resources Division (WRD), particularly those in the Reston and Denver National Research Program. I worked for WRD before coming to SU 24 years ago. If you look at my cited papers, you'll notice that the work in them was mostly done when I was with the USGS or shortly thereafter.

The congenial, collegial and caring professional culture throughout the WRD then and now is something unheard of in any university or other setting of which I am aware. My eight years with WRD made it my disciplinary home, a place of intellectual sanctuary for me even today.), I would not be up here today without colleagues ranging from Mark Hult, formerly of the Minnesota district, to Mary Jo Baedecker (former director of the NRP. And there are many more and you know who you are. Thank you so very much!

Finally, to close, I'd like to say a short word on the process of science for the younger scientists here—something to take away from this boring awards meeting. We have no dancers and music, so I'd like to leave you at least this.

Here it is. I'm told we are hard-pressed to find citations more than 10 years old in most papers published today. I'm grateful that at least some of my papers have lasted longer in the collective scientific memory; but I hold no illusions. Science is a process. Even papers in *Nature* and *Geology* constitute but basement bricks for the larger edifice of knowledge to be built on top.

It gives me great satisfaction knowing that I've contributed some bricks to my subdisciplinary basement, which is where I like to do my science—more in the dark than the light. But all science, be it digging in the basement or crafting the filigree on the wood interiors, has merit in the doing. And all science paves the way for the next generation to modify and change with technology and understanding, again and again. So I charge you to continue the building and enjoy it every moment of the way. Prove my science wrong. Confirm it is right; but do it as a *mensch*!

G. K. GILBERT AWARD

Presented to Lionel Wilson

Lionel Wilson
Lancaster University, UK

Citation by James W. Head, III

Lionel Wilson's scientific contributions have been in the field of Earth and planetary volcanology. In the area of terrestrial volcanology, his body of work has substantially altered the fundamental perceptions and approaches in the field, transforming volcanology from a largely descriptive and qualitative science to a rigorous and quantitative one. Using this background as a basis, Lionel then went on to define the emerging new field of planetary volcanology. Lionel was one of the first to appreciate that the basic principles of physics could be brought to bear on these complex and diverse features and processes. Interestingly, his early work focused on some of the more complex interactions in explosive eruptions, but gradually turned to treating volcanism as an end-to-end system. He successfully used basic physical principles to treat the generation, ascent and eruption of magma, and to show that many of the individual deposits and landforms, while appearing strikingly different from an observational standpoint, were actually points along a physical continuum. In the true spirit of G. K. Gilbert, Lionel Wilson's treatments spanned the disciplines of field geology, petrology, geophysics and volcanology.

Lionel soon realized that the Solar System, and the planets and satellites within it, offered a natural laboratory for the analysis of fundamental variables in the process of generation, ascent and eruption of magma. In a series of foundational contributions, he explored the effects of planetary gravity, thermal structure, density structure, presence or absence of an atmosphere, and characteristics of the atmosphere (composition, temperature, pressure, etc.) on the basic processes of magma ascent and eruption. His contributions in this area literally defined the new discipline of comparative planetary volcanology. He has treated magmas ranging from water to komatiitic in composition, and environments ranging from asteroids to outer planet satellites. Typically, his planetary work has found application back on Earth, as the emerging increased understanding of planetary variables has been applied to submarine eruptions, dike emplacement at mid-ocean ridges, plinian eruptions on continents, and mantle-derived kimberlitic eruptions.

Indeed, as attested to by over 100 publications in prestigious journals, Professor Wilson has contributed fundamentally to the following major areas: Earth explosive eruptions, subaerial basaltic eruptions, submarine eruptions; planetary volcanism on Earth-like planets and icy satellites; and volcanism on asteroids.

In summary, Professor Wilson's work has formed the foundation of the relatively new field of quantitative physical volcanology, and his work has applications throughout the Solar System. No research in this field is undertaken without reference to the foundation represented by his publications. Lionel Wilson's contributions are characterized by their originality, rigor, comprehensiveness, and their fundamental nature. Lionel sees volcanism through eyes that are different from those of most other scientists, and he has the laser-like perception to define and describe the key elements of the process, and to translate his findings into a language that can be shared by scientists with a wide diversity of backgrounds. These abilities, and the resulting contributions to the field and literature, more than qualify him to be the recipient of the G. K. Gilbert award.

Response by Lionel Wilson

I would like to express my sincere thanks to the Planetary Geology Division of GSA for this award, and to my good friend and valued colleague Jim Head for his excessively kind words of citation. I must say that I feel a little strange about being honoured in this way by a geological society, because I rather blundered into this field. Following a childhood interest in "things to do with space" I found that university astronomy courses in the UK dealt with galaxies and stars, not planets, and so read physics and maths for my first degree as a basic science foundation. I even managed to select electrical engineering instead of geology as a minor course!

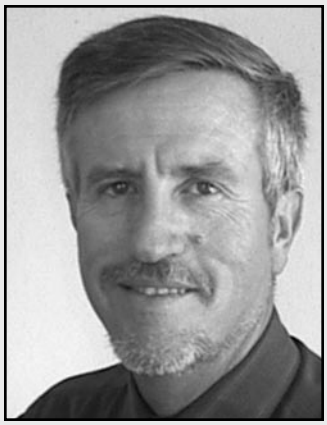
But hearing a talk by Gilbert Fielder, the only UK scientist at the time very much interested in the lunar surface, got me focussed, and I started graduate work with him in London aimed at trying to decide if the Moon's surface consisted of volcanic rocks that would be strong enough to support a landed spacecraft—the Apollo programme was imminent at the time. It was only when the Orbiter spacecraft showed evidence for lava flows in Mare Imbrium that I started thinking about the geology of rocks rather than their engineering properties, and contacts with John Guest and George Walker in London got me focussed on what I regard as the main theme of my research since then, applying physical principles to understanding how volcanic eruptions work, and making simple mathematical models of these processes that attempt to capture the most important aspects of the physics. I hardly imagined, in the late 1960's, that I would have the chance to apply these concepts to so many Solar System objects!

In 1970 I got married, and I cannot overstate the support that my wife Dorothy has given me. That year I also moved to Lancaster University, which has been my base since then, and began a long series of collaborations with US scientists. The longest-lasting and most prolific of these has been with Jim Head at Brown University, but I have also had the pleasure of working with numerous other scientists, especially at the University of Hawai'i. I have also had the very great stimulus of interacting with my colleagues at Lancaster, not least the 38 graduate students whose work I have helped supervise. My only words of advice to young scientists are to develop and make the most of interdisciplinary collaborations. My only regret from the last 35 years is seeing the extent to which standards in the use of the English language have declined, both in the US and the UK. Languages evolve, but that does not mean that they have to degrade, and it is we, the science community, that need to be the guardians of clarity of written communication.

KIRK BRYAN AWARD

Presented to John C. Gosse and Fred M. Phillips

John C. Gosse
Dalhousie University



Fred M. Phillips
New Mexico Institute of Mining & Technology

Citation by Ed Evenson

John Gosse and Fred Phillips have been awarded the 2005 Kirk Bryan award for their seminal paper entitled "Terrestrial in situ cosmogenic nuclides: theory and application" (*Quaternary Science Reviews*, 20, 1475-1560). This comprehensive review paper provides a remarkable, in-depth summary of all aspects of terrestrial cosmogenic nuclide (TCN) research from both theoretical and applied perspectives. Don Easterbrook and I nominated the Gosse and Phillips paper because we thought any team that could write a paper that is almost universally referred to as "the bible" is deserving of the Kirk Bryan award. But we may be a bit biased—John was my student (M.S. and Ph.D.) and the four of us are research collaborators and close friends. So perhaps we should see what others have had to say about the winning paper? Twelve pre-eminent scientists wrote letters of support and I would like to quote from just a few. David Bowen calls the article "not only a state of the art paper … but one of the major papers of the new century". Don Rodbell says, "This paper, which could easily have been a book (at 85 journal pages), is remarkable". Pete Knuepfer says Gosse and Phillips "have written a paper that is monumental, not because of its length, but because of the breadth and depth of its coverage". Steve Wells states that the paper "highlights the accomplishments of two of the nation's top scientists." Frank Pazzaglia asserts "The Gosse and Phillips paper is akin to a rudder that steadies a ship during a storm. It is both a solid reference on the subject, as well as a guide in how, when, and where cosmogenic techniques can be used to solve geologic problems." Susan Ivy-Ochs says "This paper is a generous gift of the years of experience of both John Gosse and Fred Phillips" while Richard Alley simply calls the paper "monumental".

Anyone who reads "the bible" will be similarly impressed. In this invaluable paper John and Fred guide us through everything from hadron flux to how to read a "banana diagram"—and everything in between. These two leaders in the field of surface exposure dating are outstanding geologists richly deserving of our divisions highest award. It is a great pleasure to present the 2005 Kirk Bryan award to John Gosse and Fred Phillips.

Response by John C. Gosse

I will never forget this day when I stand in front of so many friends to be honoured by the Kirk Bryan Award. It is with sincere appreciation to the Division and the Society that I accept it with Fred Phillips, a scholar and my advisor, co-author, and friend for 13 years. Thank you Ed and Don for nominating our paper which pales in comparison with the 46 others before it. Our article simply integrated the accomplishments of physicists and earth scientists over the past century. The cosmogenic nuclide method could have an impact on just about every field of earth sciences, and I like to think that Kirk Bryan would have applied the technique to help solve some of his many geomorphology and archeology questions.

The honour of this award should rightfully be shared with several others who are not co-authors of the paper, but who helped direct my research and inspire my work in cosmogenic isotopes. At Memorial University of Newfoundland I was enticed into geology when Martin Batterson convinced me that a great glacier, not my shovel, had made the striations in central Labrador. Rod A. Klassen of the GSC hired me for three more summers of Labrador field work and instilled in me the excitement of pursuit of knowledge—any knowledge. Ed Evenson, my Ph.D. supervisor and close friend, honed my field skills in glacial geology and provided the opportunity to delve into the world of exposure dating. The integrity of these mentors motivated me to co-author this paper. I owe a great deal to Jeffrey Klein at U. Penn. for his impact on my career and life. His ability to reduce complexities to simple physics and then explain it to a field geologist is a beautiful gift. My contributions to the paper are too often incomplete echoes of Jeff's distillations. Chuck Harrington at Los Alamos and Eric McDonald at the Desert Research Institute lured me from glacial geology and into

Response by Fred M. Phillips

It is with deep gratitude, and awareness of the honor being conferred, that John and I accept the Kirk Bryan Award. We both recognize that through this award the community that has worked to make cosmogenic nuclides a routine tool for the sciences of geomorphology and Quaternary geology is being honored. I must acknowledge my debt to numerous individuals who have contributed to this goal. First is my co-awardee, John C. Gosse, whose enthusiasm and accomplishments in applying cosmogenic nuclides I have always admired and who is one of the few persons I know with the perseverance and work ethic to actually complete a methods paper of the scope of the one cited for this award. Other individuals who have helped me greatly toward this accomplishment include my Ph.D. advisor, Stanley N. Davis, Devendra Lal, Harold Bentley, David Elmore, Marek Zreda, Mitchell Plummer, John Hawley, William D. Stone, David Q. Bowen, and June Fabryka-Martin. Finally, I thank my wife, Lois Phillips, whose steadfast love and support have sustained me throughout all of my endeavors.

I would like to take a moment to reflect on our journey as a scientific field. I remember vividly one day 25 years ago when I was a brand-new assistant professor at New Mexico Tech. I was standing in the department office scanning the contents of the journal "*Geomorphology*". One of the senior professors in the department (he happened to be an economic geologist) took me aside and warned me "I hope you don't do that kind of thing. Back at Cal Tech, we never considered geomorphology to be a real science." This incident might be dismissed as no more than the prejudice of a crotchety old man, but let us remember that upon Kirk Bryan's death in 1950, Harvard did not replace him with another geomorphologist, but instead

Response by John C. Gosse *(continued)*

arid region surface processes. The breadth of the paper would not have been possible without their contagious love for desert landscapes and soils. Frank Pazzaglia at Lehigh had just begun to teach me classical geomorphology and the intricate balances of nature when the revisions of the paper were due. I hope that advances in cosmogenic nuclide techniques might help spawn more collaborations with these geologists and others of their calibre.

Although Annette Murphy, a hydrogeologist, may understand why I leave for the field or laboratory so often, our three children probably cannot. The paper was written during two years of many that my selfless wife and kids provided me the luxury of working on landscapes and papers of my choice.

Response by Fred M. Phillips *(continued)*

completely abandoned that discipline. By the time of Bryan's death, geomorphology had evolved from being a centerpiece of geology to being shunted to its fringes. What had happened? The answer is that other geological fields had developed quantitative conceptual models and experimental or observational methods that yielded data to test those models. *Geomorphology*, for the most part, had neither. It was drifting into a descriptive backwater.

Most fortunately, the situation of that day no longer pertains. Geomorphology and Quaternary geology are vibrant fields with growing numbers of scientists and a palpable level of excitement. Publications in our specialty are expanding into the pages of journals such as *Journal of Geophysical Research* and *Water Resources Research*. Part of the reason for this transformation is that we now have a much more rigorous theoretical framework, and computer programs to apply that theory to real landscapes. But the complementary key development is that we can now go out into real landscapes and quantify erosion rates and ages of landscape events. John and I are gratified that cosmogenic nuclides have contributed greatly to our ability to quantify the dynamic landscape. Knowing rates and knowing dates makes all the difference. Today is the new golden age of geomorphology and Quaternary geology. Let's go out and enjoy it.

LAURENCE L. SLOSS AWARD

Presented to Teresa E. Jordan

Teresa E. Jordan
Cornell University

Citation by Peter B. Flemings

In 1984, Terry Jordan was at the start of her faculty position at Cornell and I was a graduate student struggling towards a thesis topic. Every graduate student knows that one way to get ahead is to read your advisor's papers. The one that struck me was her 1981 paper "Thrust loads and Foreland Basin Evolution." This seminal paper links crustal-loading in the Idaho-Wyoming thrust belt with subsidence and infill of the bounding Cretaceous foreland through a quantitative basin model. Only a field geologist who both sees stratigraphy at the grain- and the basin-scale, and who has the courage to describe this vision quantitatively could write this paper. Terry's work led a renaissance that focused on linking quantitative descriptions of erosion and deposition over long times scales to understand how stratigraphy formed. This renaissance continues today. Her special gift is her ability to envision how modern processes integrate over time and space, to capture these processes with quantitative models, and to marshal the data to show how theory and observation intersect. It is appropriate that Terry has received the Sloss award: her contributions have illuminated and enriched the work of Sloss, Wheeler, Grabau and others.

Terry will claim that she is only a small part of a big community. It is a community that she has helped to build. Students and colleagues are all familiar with Terry's exhaustive, polite, and painfully constructive reviews. She has played a special role in strengthening collaboration and interaction between North and South American scientists. Today, she leads new growth as Chair of Cornell's Earth and Atmospheric Sciences Department. Terry has an uncanny ability to wait patiently for the very best, which she knows is in every one of us, to surface. If you know Terry, you don't want to let her down. By her example and more importantly, her support, she makes our field more collaborative and more supportive, and all of us are better for it. I am honored to present to you Terry Jordan.

Response by Teresa E. Jordan

In addition to a enormous gratitude that my colleagues would consider me deserving of an award, a very special sense of honor comes from the fact that I was acquainted with Larry Sloss, who was a dear person who always challenged me while making me laugh. I'm only allowed space to thank a few among many wonderful collaborators. From Bill Dickinson, my graduate advisor, and Max Crittenden (USGS), I learned that one can be simultaneously detail oriented, a field geologist, and enthusiastic about many-thousand-meter-thick basins. Noye Johnson illustrated that we must think critically about time, the completeness of preservation of time, and rates. Tim Cross got me into the field to look at stratigraphic sequences, and posed questions that connected sequences to measures of time. Tim Lowenstein taught me to make sense of evaporites and transformed my long-term paleoclimate interest into action.

I am deeply indebted to South American colleagues. Ricardo Alonso taught me to look at evaporite history in the framework of the system of volcanoes, groundwater, drainages, and climate. Victor Ramos started us in Andean field work, forced us realize the necessity of learning Spanish, and was a fountain of geologic knowledge. Constantino Mpodozis inspired me to seek answers to regional tectonic problems through study of Chile's basins. Nicolás Blanco, who demonstrates daily that sedimentary geology applies to exploration for copper and gold deposits, collaborates in most of my current studies. Apolo Ortiz, and other petroleum geologists with YPF-Repsol in Argentina and ENAP-SIPETROL in Chile, provided subsurface data, asked questions of a scale and nature that surface geologists did not, and opened the door to study of basins and non-marine sequence stratigraphy. Antonio Díaz, like other professional drivers, converts our outrageous field plans into successes, like the most skilled laboratory manager.

Cornell, especially our Andes Project, is a wonderful intellectual home. Bryan Isacks, seismologist turned geomorphologist, illustrated that there is fertile ground for research across disciplinary boundaries. Among my graduate students, all of whom were inspirations, I especially acknowledge my first and most recent groups of students. The first, Carol Lee Roark, Peter Flemings, Jim Beer, and John Damanti, earned me tenure. The most recent, Greg Hoke, Brian Ruskin, Pete Nester, and Katie Tamulonis, have kept me feeling like a respectable researcher while being in administrative positions for 4 years.

Lastly, I thank another Cornell colleague, my husband Rick Allmendinger. If I have succeeded, it is to a large degree because I have had Rick to draw upon. It is a joy to share life with him and our daughter, Carrie.

Enormous challenges face our society. For the well being of our communities, sedimentary geologists must describe the environmental states of which the planet is capable and we must participate in securing adequate supplies of two vital natural resources: fresh water and fossil fuels. Beyond quality research in itself, we have to better insure that the public and those who make decisions are really well informed. I look forward to tackling these challenges with you and your students.

STRUCTURAL GEOLOGY & TECTONICS DIVISION CAREER CONTRIBUTION AWARD

Presented to Jan Tullis

Jan Tullis
Brown University

Citation by Jane Selverstone

It is truly a pleasure to cite Professor Jan Tullis of Brown University for the Structural Geology and Tectonics Division's Career Contribution Award. One experiment at a time, Jan's work over the last 35 years has quantified relationships between stress, strain rate, pressure, temperature, chemical environment, deformation mechanisms, flow laws, and deformation microstructures in common crustal materials. Water weakening in quartz; the brittle-ductile transition; development of mylonites; development of lattice-preferred orientations; documentation of dislocation creep and diffusion creep regimes; causes of ductile strain localization; chemical influences on deformation mechanisms; the list goes on and on. Taken together, this body of work is astonishing in its significance—much of what we know today about crustal rheology and fabric development is built on a foundation of Jan's experiments.

In my mind, there are two aspects of Jan's work that set her apart from the crowd. First is that all of her experimental studies are motivated by—and aimed at explaining—field observations on natural samples. It is not idle curiosity that leads Jan into the lab, but rather an effort to answer fundamental questions about processes active at depth in the earth. Second, although Jan professes to know no chemistry—deferring to Dick Yund for chemical expertise—her experiments are carefully designed to elucidate the influence of chemical parameters on the mechanical properties of rocks. Each of Jan's papers has made sense out of chaos by asking key questions, carrying out cleverly designed experiments, and then tying the results together in such a way that new doorways are opened in our science. Jan's publications have been cited more than 2000 times, testament to their importance across a wide swath of the earth sciences.

I first met Jan at a short course in 1979, where she made an indelible impression on me as the only "big name" scientist to ask what I, a lowly MS student, was working on. She seemed genuinely interested in my work and was full of gentle suggestions about new directions to pursue and questions to ask. More than 20 years later, I was fortunate to spend a sabbatical with Jan and experienced first-hand her legendary energy and enthusiasm for her work. Most impressive, though, were her scientific generosity and open-mindedness. In the course of my sabbatical, we realized that some "well-established" interpretations of quartz deformation behavior were flawed because one of the key quartz standards contained carbonic fluid inclusions that significantly affected its strength. I can imagine many scientists wanting to sweep such results under the rug in order to preserve a long legacy of prior work. Not so with Jan. She immediately became excited about new ways to interpret old experiments, and about new experiments that could be run. I have never known so prominent a scientist with so little ego invested in her work. Jan seems to be motivated entirely by learning what's right, and not by advancing her own reputation. We could all learn some lessons from her.

In addition to influencing the field through her own work, Jan has played an invaluable role as a mentor to many young scientists from the U.S. and abroad, and as a dedicated advisor to legions of Brown University undergraduates. Her former students all comment on the importance that her "mothering" had on their scientific development. Her ability to ask important questions, along with her passion for her work, scientific rigor, and deep concern for others guarantee that her legacy will be a lasting one. I can think of no more fitting person to be the first woman to receive this prestigious award.

Response by Jan Tullis

Thank you Jane for your warm and generous words. I am honored and deeply humbled by this amazing award, and it has occasioned much reflection. Overall I feel so very fortunate: lucky to have discovered geology at Carleton after almost flunking freshman math, physics and chemistry; lucky that Terry urged me to go to grad school and supported me through many crises of self-confidence; lucky to have done research in Griggs' and Christie's lab with an amazing group of fellow grad students and post-docs; and ever so lucky to have become part of the Geology Department at Brown University.

I got into experimental work at UCLA accidentally, after it became clear that I was quite incompetent at field work. I think the experimental approach better suited my nature (as an impatient person and a control freak): there is the illusion that one can pose a question, do an experiment and get 'the answer'. Of course, it is not quite so simple; most often you discover the question was not well-posed, or the starting material or experimental conditions were inappropriate. However, it is an addictive pursuit, and I am still just as excited to see the thin section from my latest experiment as I was almost 40 years ago.

My initial research was on crystallographic preferred orientations in quartzites, and I shudder to remember the tens of thousands of U-stage measurements I made, but my research broadened over the years at Brown thanks to a series of amazing students and collaborators. My long collaboration with Dick Yund was key: his expertise in kinetics, feldspar mineralogy and TEM allowed us to document the processes responsible for optical scale microstructures and for different mechanical behaviors, and to elucidate the effects of chemical environment and phase changes on deformation.

Also of enormous importance over the years have been my education by and collaborations with so many of you in SG&T who are field-based geologists. Griggs was a physicist who never went in the field to look at real rocks. When I got to Brown Bill Chapple was a wonderful role model: a theoretical structural geologist who went into the field at every opportunity. I remember an early trip with him to Pennsylvania, where I collected samples of folded Tuscarora sandstone and made thin sections, expecting to find microstructures like those I had produced experimentally—but they were totally different! That experience began to

open my eyes to the variety and complexity of deformation mechanisms in the crust.

Another important experience came when Art Snoke called me in the late 70's to ask if I would like to help organize a Penrose Conference on mylonites. I learned so much from the participants, and still remember the spirited discussions on the outcrop about brittle vs ductile; pure shear vs simple shear. That conference stimulated me to undertake many new experiments on polyphase aggregates.

Today I feel that we have made enormous progress in bridging the gap of some 8 orders of magnitude of strain rate between the lab and nature. But whenever I start feeling a bit complacent about this progress, I have only to look at a few more thin sections of natural rocks to be humbled again. For example at a recent short course Jane showed me a thin section of a quartzite deformed at over 500 °C that was brittle! Borrowing the phrasing of this morning's symposium, we have turned that challenge into an opportunity and are currently collaborating to seek some explanations.

As John Bartley commented this morning, the big increase in interdisciplinary collaborations in recent years is very smart science, but it also makes for increased fun and friendships. I have benefitted enormously from recent and on-going collaborations with Holger Stunitz and Renee Heilbronner of Basel University. They have brought new expertise and perspectives, new questions as well as new approaches. And Renee has brought me back to preferred orientations in quartzites, but this time with greater applications to the real world (and much greater esthetics!).

Probably the most important component of my research has come from my grad students. I have had relatively few Ph.D. students—after all the world does not need too many rock squeezers!—but all of them have been exceptional: Glen Shelton, Andy Kronenberg, Lisa Dell'Angelo, Greg Hirth, Gayle Gleason, Alice Post, and Caleb Holyoke (who is here). All of them went well beyond my own knowledge and expertise, and I learned just as much from them as they did from me.

I also want to mention the joy of teaching and learning from undergraduates. At Brown we are fortunate to have no distribution requirements; students in my introductory course are there because they want to be, and I delight in having music as well as physics majors. We are also fortunate to have a strong tradition of very talented geology majors, and I am so happy that a number of them are here this evening.

In a related vein I would like to celebrate the increased attention in our community to improvements in teaching. I have always appreciated the opportunity at GSA meetings to talk to colleagues about teaching as well as research, but that is rather inefficient. I would like to thank people who have played major roles in providing teaching resources to our entire community, including Mike Mayhew at NSF; the Cutting Edge group of Cathy, Dave, Barb and Heather; and all the amazing techno-savvy people who are making incredible visualizations of geological phenomena and processes on all scales available to all of us—as illustrated for example in this morning's symposium.

I do want to mention another transformative experience for me, which is also related to a big change in our community over the years, and that started with another phone call, in the early '70s, from Terry Schwarzer of Exxon, asking if I would join the just-formed Women Geoscientists Committee. I was dubious, but fortunately said yes—and thus for the first time in my life had the opportunity to interact with other professional women, including Weecha Crawford. The experience made me aware of things I didn't know I had been missing. Our committee didn't just chat: we worked hard, in a very personal and grassroots way, to encourage young women interested in geology and to try to make a more welcoming environment for them. I could tell you lots of stories about the bad old days—when I was one of 2 women Ph.D. students out of 78; when there were no other women in the smoke-filled meeting rooms at AGU; when the 'jokes' were far from funny. However, it is much better to focus on the present. Recently at Brown and probably many other places, more than half the undergrad and grad students in geology are women, and it pleases me greatly that even my male colleagues tell me how much they enjoy the shift from a more competitive to a more collaborative atmosphere, from just loud talking to actual listening.

The climate has definitely warmed, but it is important to continue to work for positive change, so that women (and men) will not feel they have to choose between career or family, and so that other under-represented groups are truly welcomed into our science. One lesson that comes when an impatient person like myself looks back is that each of us does play a role; the choices we make every day do influence the world around us.

Let me close with my heartfelt thanks to the SG&T community—working together over all these years to try to interpret the grand experiments that the Earth has done has been tremendously exciting and satisfying, and the future is bound to be even better!