



Quaternary Geologist and Geomorphologist

NEWSLETTER OF THE QUATERNARY GEOLOGY AND GEOMORPHOLOGY DIVISION



Robert V. Ruhe

(Photos courtesy of P. Birkeland)

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THE 2000-2001 QG&G DIVISION OFFICERS AND COMMITTEE MEMBERS

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MESSAGE FROM THE CHAIR

EVERYONE: It is my pleasure to extend greetings to all of you as we embark on the journey into the new millennium. If uniformitarianism serves us well, this journey should continue in a most exciting and wonderful way within our Division. The Reno Meeting in November marked another year of enormous success and participation for QG&G, with some 300 abstracts presented and numerous theme and Pardee symposia. I believe that the new, streamlined format of the Annual Division Award Ceremony Tuesday evening was embraced by all. It allows us to recognize the distinguished covey of award winners and still permits time for celebration and camaraderie afterwards. I

extend my deepest appreciation for the continued support and efforts of everyone in making the annual meetings so exciting.

Division membership continues to increase, enabling us to retain our position as the second largest of GSA. What I find remarkable, however, is the amazing diversity and quality within our Division. There are so many exciting new advances in Quaternary Geology and Geomorphology, and a tremendous number of interconnections are being made between our field and allied sciences and other areas such as policy and the environment. Our Division is strong in size, and the science being done continues to be rich and solid. As noted by previous chairs, QG&G's endowment exceeds all others at GSA, giving us the unique position, through our ever-growing array of awards, to encourage exciting new research by students and to reward records of outstanding work by established professionals during their careers.

Our new awards reflect this excitement. Now coming into its third year, the Farouk El-Baz Award for Desert Research is given to the top nominee doing research on processes in warm deserts. The Don Easterbrook Distinguished Scientist Award, entering its second year, honors a significant body of work in any area of QG&G by an established scientist and carries with it opportunity for the winner to apply for a significant grant to continue this research. The caliber of winners of these two awards has set the bar quite high, giving great expectations and anticipation to the future of these well-endowed awards. Shortly, we will have more detailed explanations of the nature of the awards on the Division website - please check back soon. As mentioned in my last e-mail in February, the award deadlines for the Easterbrook, El-Baz, and the Distinguished Career Awards are all on April 1 this year and will likely remain so in the foreseeable future. The Kirk Bryan Award deadline is typically on December 1, as it has been for many years.

In short, our Division is healthy, financially solid, and exciting. We owe this to the quality of leadership bestowed upon us over the years, the generosity of our members and friends, and the dedication and hard work of all. A short look over the programs at the annual and sectional meetings and a few hours of casual conversation at the annual Division Awards Ceremony makes it difficult to sleep anticipating all the exciting things happening in our Division. This excitement continues to attract a record number of new student members each year. We hope that the Mackin and Howard Awards for outstanding

graduate research will continue to promote high caliber student growth, as well as some potential new initiatives that may be forthcoming in the next years.

I recently attended the annual meeting of Division Chairs in Boulder. News from Headquarters is filled with some changes and many exciting new initiatives. Staff continues to see significant change at Headquarters, but GSA always provides us with competent leadership and liaisons to our Division. Beginning with the 2002 meeting in Denver, GSA will shift its format to a Sunday through Wednesday schedule. This means, among others things, that pre- and post-meeting fieldtrips will have to adjust their planning schedules accordingly. Many of you have expressed concern over the increasing cost of GSA field trips. I share this concern, as it is becoming increasingly difficult for professionals, and next to impossible for students, to engage in these wonderful activities. In talking with Headquarters about this topic, it appears that the cost of the trip depends upon how much we want GSA to be involved in the trip. Costs increase in proportion to their services, such as registration, guidebook publications, publicity, etc. One of the most significant costs appears to be related to liability. Liability issues make running the trips outside the official GSA sponsorship very difficult. I feel we need to give more thought to this in the coming months, as field trips are essential in our Division. Your ideas and suggestions on ways to lower expenses are certainly welcome.

On a related note, GSA recently initiated a new program called "Field Forums". This is a program similar to the longstanding Penrose Conferences but aimed explicitly at having focused initiatives for invited participants to study specific geological problems in the field. Thus far, two Field Forums have occurred, and both have been met with resounding success. I refer you to comments on this program by President Mosher in the March issue of *GSA Today*. Field Forums offer unparalleled opportunities for professional development, which seem ideally suited for QG&G. Many other new initiatives are being discussed or are already in progress from GSA Headquarters in the areas of education and outreach. Of particular interest to QG&G may be the intern program in the National Forests and National Parks. More than 30 positions will be available for students this year and at least one for senior members. This program promises to grow rapidly in the coming years and may offer wonderful opportunities to spread the word about Quaternary Geology and Geomorphology to the public and to Park

and Forest personnel. Finally, now that GSA has their finances in order, they are investigating the possibility of increasing modes and types of publications. Anyone interested should contact Headquarters to see what may be in the works.

Even the most successful organizations find challenges before them as they embark into the future. QG&G is no exception. As the diversity of backgrounds and interests of our membership continue to increase, we must search for venues that reach and bring diverse groups together to share their expertise and insight into areas of mutual research and interest. Along related lines, we need to continue to make connections between our organization and other professional societies and organizations in the geosciences and environmental sciences arenas. Many members of organizations such as the American Geophysical Union, for example, share research interests in systems and processes operating at the Earth's surface. It would be to the mutual benefit of GSA and other organizations to strengthen the connections between them as we search for understanding of complex processes and increase our awareness and concern for the future health of our planet and society.

Even though our Division has seen unprecedented levels of activity in recent GSA Annual Meetings, apathy for the operation of Division affairs continues to be a problem. I urge you to become more proactive in all aspects of Division affairs by nominating individuals for our various awards and offices and by taking the time to vote for Division officers. It's not too early to be thinking about nominations for officers, such as the new Second Vice-Chair, due this summer. The Division is always looking for individuals who would like to contribute their time to improving the Division, specifically as Secretary, Treasurer, and Newsletter Webmaster. With the resources of such a large and diverse Division, there are many opportunities before us. Please do not hesitate to let the officers know your feelings and ideas and wishes. We can serve you best by hearing from you.

As you know, the funds associated with our two new awards are absolutely outstanding. We could not be happier at the boost these have given to our Division. However, I would like to take this opportunity to make a plea for your assistance to raise the level of support for the longstanding Kirk Bryan and Distinguished Career Awards. Although these two awards carry tremendous recognition and distinction, the funds associated with them need to be increased

substantially. We would like to increase the endowment of the Kirk Bryan Award. Donors should send gifts to the Geological Society of America, specifically restricting your gifts to the Kirk Bryan Memorial Award. Gifts for the Distinguished Career Award (DCA) should also go to the GSA, specifying them to go to the QG&G Division for the DCA Award. Currently, the amount that these winners receive is less than 1/6 of what winners receive from our two new awards, despite being offered for many years (since 1958 for KBA and 1986 for the DCA). We would like to build the funds of these awards to the point where they could pay for the winners to attend the Annual Meeting and offer a prize commensurate with their stature.

Don't forget the deadlines for Abstracts for the Annual Meeting in Boston this November - July 17 for paper and July 24 for electronic submission. The number of theme symposia was down significantly from the record levels set in Reno last year, but the quality appears to be high. Several symposia are being sponsored by QG&G again this year, including one Pardee symposia on issues related to sustainability. Be sure to submit your abstracts to the discipline sections and help give QG&G a strong showing in Boston! It is not too late to think about proposing a special session in Boston, normally held during the noon hour, in the Forum of GSA's Hot Topics and debates. Finally, with regard to the Boston Meeting, there has been a suggestion to consider having a QG&G Booth at the Expo Hall. Similar booths in past years by Divisions such as Planetary Geology have been met with tremendous success in highlighting Division activities and encouraging new membership with all kinds of bells and whistles such as selling Division T-shirts and distributing pins and postcards. A booth requires considerable planning and continuous staffing at the meeting. Let me know right away if you are interested in such a venture; deadlines are approaching. If there is sufficient interest, I will look into this matter further.

Finally, I would like to take a few moments to address an issue that is near to my heart, and reflects much of the reason why many of us may have chosen a career in the Geosciences - our concern for the environmental welfare of our planet. The expertise in the QG&G Division is especially well-suited to address the issues that deal with systems and processes operating at and near the surface of the Earth. Among these concerns that fall into the general umbrella of sustainability are: 1) geologic hazards; 2) water resources and contamination (surface and subsurface);

3) global climate change; and 4) land use issues such as the alarming lack of control on landscape alteration and ecosystem fractionation. Quaternary Scientists may be uniquely suited to make enormous contributions toward the success of charting the future environmental quality of the Earth and to help influence policies concerning issues related to landscape use, design, engineering, and water-related issues of sustainability. Geologists need to more fully integrate our knowledge of the science of earth surface processes into applied and technological operations. I believe that it is our professional responsibility, as earth scientists who specialize in the processes responsible for shaping the planet's surface, to become proactive in areas where policy is being set and to educate the general public on these issues. The Pardee session in Boston represents a small effort in this regard, but I urge all of you to give careful thought to how you can become more proactive in sharing your expertise with the public and governmental sectors that will ultimately make a difference in the quality of life for future generations and for the struggling ecosystems of our planet. They need our help!

I wish you all productive and safe Spring and Summer sessions. Thank You again for your help and support, your attention, and your kindness.

Sincere Regards,
R. Craig Kochel, Chair

QUATERNARY GEOLOGY AND GEOMORPHOLOGY DIVISION AWARDS

DISTINGUISHED CAREER AWARD

The Distinguished Career Award, established in 1985, is presented to Quaternary geologists and geomorphologists who have demonstrated excellence in their contributions to science.

*** 2000 Recipient ***
Peter W. Birkeland

Citation by Don J. Easterbrook

Pete Birkeland has had a profound effect on Quaternary sciences, having successfully melded Quaternary geology, geomorphology, and pedology together in a unique fashion. His many successful

students dot the faculties of numerous universities, and their names appear regularly on published papers all over North America. Although these students undoubtedly know far more about Pete's work in pedology than I do, few have known him as long. Pete and I were undergraduates together at the University of Washington in 1955 where Hoover Mackin greatly influenced both of our lives. After finishing his undergraduate degree at the University of Washington in 1958, Pete went off to Stanford for graduate work with Art Howard. However, Art shortly thereafter went off to South America on a long project, and Pete relied on Mackin for guidance in his thesis work.

Upon finishing his PhD at Stanford in 1962, Pete joined the University of California at Berkeley faculty in the Department of Soils and Plant Nutrition, where he began a fruitful association with noted soil scientist Hans Jenny. At Berkeley, Pete was not in the geology department, and much of the study of soils centered around various agricultural aspects. In 1967, Pete moved to the geology department at the University of Colorado, where he spent the major part of his career. At Colorado, Pete began to blend together geology, geomorphology, stratigraphy, and soils as a geochronologic tool.

From the very beginning, Pete emphasized the importance of field studies, especially the origin and evolution of soils and their temporal and spatial patterns during soil development. His unique combining of geology, geomorphology, and soils led to new applications of soils as a geochronologic tool in studying Quaternary events.

In 1974, after years of experience in soils work, he published his first book, *"Pedology, Weathering, and Geomorphological Research."* This was followed in 1984 by, *"Soils and Geomorphology,"* which in 1988 became the only textbook ever to win the Kirk Bryan Award of the Quaternary Geology and Geomorphology Division of GSA. Textbooks are not usually candidates for such an award because most summarize large amounts of material derived largely from the research of others. However, Pete's book contained so much of his own original research that it warranted the award. The text has become one of the most significant publications in soils in the past several decades and is read by virtually every soils student. The third edition of the book was just published and incorporates the results of much new soil research.

Students flocked to Pete with his easy-going, jovial style and they soon came to respect the scientific rigor that he demanded. He required honest

documentation of evidence used to reach geologic conclusions, and he challenged students mentally and physically. Many of his favorite photos were of students, head down, in deep soil pits digging away. His students developed a keen love of field work and had fun doing it. In the process they learned never to take themselves too seriously. Pete's impact on the soil sciences is apparent in the work carried on by his students who spread the concepts and methodology learned in their association with him. Pete possesses a firm dedication to studying soils thoroughly, with no easy shortcuts or mental laziness. He holds himself to the same tough standards to which he holds his students.

In addition to his expertise in soils, Pete also has an abiding interest in glacial geology. The aim of much of his soils research was in using soils to correlate and date Pleistocene glaciations. His research in the early 1960's was centered around Pleistocene glaciation of the Sierra Nevada and the relationship of glaciation to pluvial lakes in the deserts of eastern California and western Nevada. Students and former students became deeply involved in this work, leading to publication of some 30 papers.

In the early 1970's, Pete began to branch out into new areas, both geologically and geographically. In addition to his publications on soils, he published papers on eustatic sea level changes in southern California and on rock glaciers in the Colorado Rockies. His horizons broadened to include publications on Baffin Island in the Canadian Arctic, New Zealand, the Peruvian Andes, and Israel.

During the 44 years that I've known Pete, I have met few geologists who have combined excellence in research, outstanding teaching, rigorous field work, and love of geology the way Pete does, all of which I believe warrants conferring on him the Distinguished Career Award of the Quaternary Geology and Geomorphology Division.

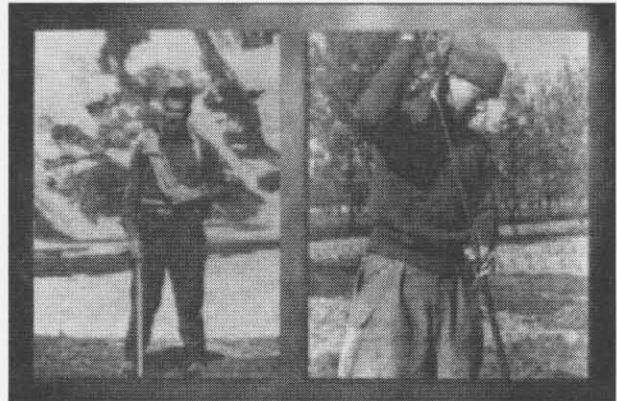
Response by Pete Birkeland

Thank you Don and the Division; this is an honor I never expected. I looked up the previous awardees and am truly humbled to be in their company. I will use this address to honor some of the people who helped me get to this place in life. They helped me pursue the things I did, in the manner I did them, but I take the blame for most of my behavior.

My parents come first, a Norwegian immigrant father, and a mother with Irish immigrant parents. From them I got such traits as steadfastness and stubbornness,

as well as humor, and such diverse interests as academics and skiing.

Although I was only 11 years old at the end of World War II, the returning veterans had a profound impact on me. Being an avid skier, the veterans of the 10th Mountain Division had an especially strong presence in my life, one being my university coach, Karl Stingl, a Czechoslovakian immigrant. These individuals are epitomized by the painting on the cover of the March 23, 1943, *Saturday Evening Post* of a soldier in white, kneeling on skis. Little did I realize then that I would be training and skiing in the Army a decade later in the same mountains at Camp Hale where they trained. The model for the painting was Horace Quick, who became a good friend of mine at the University of Colorado. Two veterans of the 10th should be familiar to some of you. One is John Montague, who went on to become one of the leaders in the academic study of snow avalanches. The other is John Imbrie, wounded in the push over the Apennines, co-editor of a stirring book on that campaign, and later a prominent paleo-oceanographer.



John Montague

John Imbrie

Tom Brokaw, in his book, "The Greatest Generation", said it best what these returning soldiers did for this country. They got right down to school and work while exemplifying such attributes as purpose, responsibility, duty, values, honor, and faith. Several of our geomorphological group fit into this mold, and I want to honor them for what they did for our country, our field, and me.

Dwight (Rocky) Crandell was a 21-year-old Army officer who led a heavy weapons platoon of the 63rd Infantry Division in Europe. He entered the campaign south of the Battle of the Bulge and was near

Munich at the end of the War. He had a distinguished career with the USGS, helped develop the successful volcanic hazards program, and is a former Kirk Bryan Awardee. During my Ph.D. research, Rocky showed me the new secret weapon of Quaternary stratigraphy....soils! He also showed me, by example, the necessary discipline for successful field work and helped me with my writing with detailed USGS-style editing; my writing needed all the help it could get.



Dwight "Rocky" Crandell



Bob Ruhe

Bob Ruhe turned down a tryout with the Chicago White Sox to join the Marines in 1941 at the age of 23. He was a gunnery officer on the battleship USS Iowa before he knew he would spend a large part of his professional life in the state of Iowa. In 1943, the ship took President Roosevelt across the Atlantic Ocean to the Tehran Conference. In 1944-1945, the USS Iowa was part of the famous Task Force 58 and participated in many campaigns across the Pacific Ocean. Toward the end of the War, he volunteered for Marine flight school. Bob was one of the first to incorporate soils into geomorphology research in a quantitative manner, and for this he received the Kirk Bryan Award. He was known as one tough taskmaster and was almost impossible to better in an argument. His arguments surely kept us on our toes. I admired him for his high standards, especially in the field, and appreciate what I learned from him.

Bill Bradley was drafted into the Army as he left high school and, because he was a competitive ski jumper, trained with the 10th Mountain Division in Colorado. He later went to Officer Candidate School. Bill entered the War during the Battle of the Bulge as an officer leading an infantry platoon of the 7th



Bill Bradley

Armored Division; at the end of the War, they were on the shore of the Baltic Sea. In spite of contracting polio in the early 1950's, Bill became an outstanding university teacher and a highly respected field geomorphologist; he also pursued such outside interests as downhill skiing and river rafting. He is a former recipient of this award. Bill helped set the standard for

quality in our department, was a great help to my students, and taught me to be tough grader, but also fair. You can bet there was no grade inflation on his watch.

These and other veterans, still in their 20's, set the standards of the day. We gladly followed their example of hard work, discipline, quality, and focus, and these stuck with me through life. One example was my grading. Once my Standard was set, it basically remained the same for the next 4 decades.

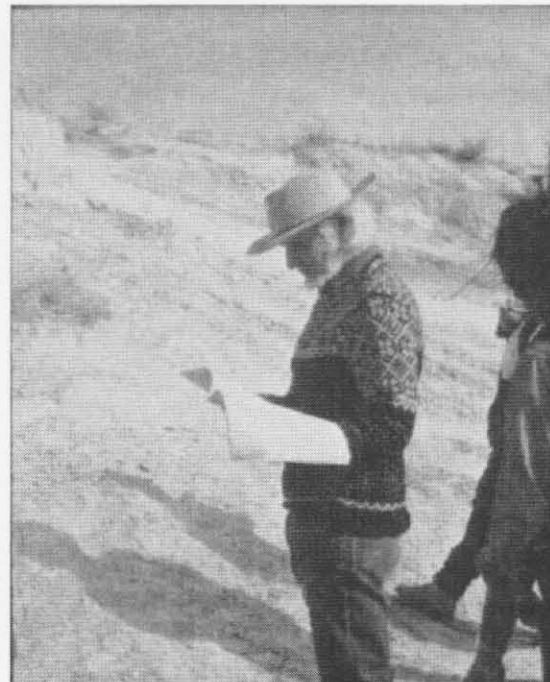
Wars are not won by guns alone. During the War, the WSGS formed the Military Geology Unit (MGU) to prepare maps and reports on the geology and soils of the terrain expected in various combat areas. Charlie Hunt, a geomorphological giant I never met, headed the unit. Eleven soil scientists were included in that unit, and one was Jim Thorpe, a top scientist of that day, who was originally trained as a geologist. Eighty-eight geologists were in the MGU, and made up a "who's who" of the top people of the field. They included Roger and Harriet Morrison and Gerry Richmond. The unit produced a colossal amount of work - 5000 maps, 2500 tables, and 313 reports and folios. Both Roger and Gerry got the big dose of soils and geomorphology, went on to become exceptional mappers, and helped set the standard for soil mappers and for soil stratigraphy. Both of them helped me understand this newly emerging field.

I can list three academic people who greatly influenced me. J. Hoover Mackin took a liking to me when I was an undergraduate in his demanding classes. He got me interested in going to graduate school and as an outsider helped me with both the field interpretation and dismal writing of my dissertation. I am especially proud of my former students, and other students I know well, who have been honored by the Division award in his name.

Hans Jenny had enough faith in my abilities to hire me as a geologist in the soils department at the University of California-Berkeley. When I asked my task, he answered "whatever you want to do". That became my marching order throughout my career. Soils and geomorphology were a perfect match, so I pursued the soil-forming factors around the world. It was an excuse for travel, as soils are everywhere. I do not think I let Hans down, even though I left that university. Clyde Wahrhaftig was a colleague at Berkeley, in geology, and took much interest in my work around Truckee and Reno. He included me in many of the geomorphological activities at Berkeley, including a 1965 INQUA field trip and a trip with Alan Cox to see



Charlie Hunt



Roger Morrison



Gerry Richmond

my first rock glaciers. He continued the work of fine tuning my writing. Clyde is a former recipient of both Kirk Bryan Award. Many close long-time colleagues helped me keep my focus, standards, humor, and helped with my work. At Boulder these included John Andrews, Jim Benedict, Bill Bradley, Suzanne Larsen, Ed Larsen, John Pitlick, and Ted Walker. A more recent colleague, Shemin Ge, helped bring my computer skills to the level where I could complete the third edition of my soil book. Despite this technological advantage, the third edition took about three times as long to finish as the first hand-written edition! Finally, you can be sure I tried to keep the quality of my work acceptable to national and international colleagues, too numerous to name here.

My career also was shaped by my students. I had an outstanding group of students, as one can see by my plagiarizing of their work in my soil books. Jim Clayton, a prominent USFS soil scientist, was my first thesis/year, and a USBR tectonic geomorphologist will be my last. Their record is excellent: 70% of their theses were published, 49% of the students led thesis-

related field trips, 95% work in geology, and many have performed great service to the Division and our profession. Around ten published papers resulted from the field projects required in my graduate classes. They kept up the humor, such as the time when two students informed me that their unpublished research indicated that my nose drips when field temperatures drop below 40 degrees, to some circles, a ritual that takes place late at night during FOP's. We had a great time with the students, and surely some of the best were checking up on their research across the USA and in some foreign countries, even though much of it was accomplished with little outside funding.

What can we in the Division do for the future? I can think of nothing better than becoming good examples of an environmental life style. Many of us study the results of cold-climate processes. However, global warming has become an international problem, and the results could diminish this aspect of our field. Unfortunately, the USA seems to contribute greatly to it, but the average citizen does not seem to care. I think many of us would prefer to let Nature take its course. A second problem is that the Earth's surface is being ripped up at an astonishing rate. Roger Hooks estimates that the volume of material moved in the past 5000 years is equivalent to a mountain range 4 km high, 40 km wide, and 100 km long; this will be repeated in the next 100 years. We should serve as examples to fellow citizens by addressing sustainability and by decreasing our ecological footprint (see recent thoughtful articles in *GSA Today* by Peter Palmer and E-an Zen). In this time of unprecedented prosperity, we can well afford to improve the environment, decrease our impact on the Earth, as well as financially support useful social, environmental, and geomorphological causes. I am especially proud of the philanthropy of two close friends: Don Easterbrook, a fellow undergraduate at the University of Washington and Roy Shlemon, whose dissertation committee was the first one I sat on in soil-geomorphology.

Born in 1934, I came through life at a very fortunate time, especially when one considers the world events that have taken place. I was the right age at the right time, and the right guy in the right place. One of my best decisions was to marry Suzanne Franzke, an adventurous woman interested in the outdoor life. She and the kids enjoyed the travel and helped with the work by digging holes, recording data, and hauling heavy loads many miles on their backs. It was not always easy and could not have been done in the style it was, without their support and humor. This Division

and the individuals within it, too, have been a large part of our lives, and my family joins me in thanking you for this honor. [Accompanying photographs provided by P. Birkeland.]



Don Easterbrook, Pete Birkeland, and Peter Clark

KIRK BRYAN AWARD

The Kirk Bryan Award, established in 1951, is given to the author or authors of a published paper of distinction advancing the science of Quaternary geology, geomorphology, or a related field.

*** 2000 Recipients ***

Brian Atwater and Eileen Hemphill-Haley

Citation by John J. Clague

The Kirk Bryan Award recognizes an outstanding contribution in the field of Quaternary geology and geomorphology. It is my distinct pleasure, on behalf of GSA's Quaternary Geology and Geomorphology Division, to present the award this year to Brian Atwater and Eileen Hemphill-Haley for their splendid monograph, "Recurrence intervals for great earthquakes of the past 3,500 years at northeastern Willapa Bay, Washington" (U.S. Geological Survey Professional Paper 1576, published in 1997).

I can think of no more important and influential publication in Quaternary science in recent years than USGS Professional Paper 1576. It is a summary of a decade of careful, innovative research by Drs. Atwater and Hemphill-Haley on the geologic record of great earthquakes in southwestern Washington. If you wish to show students how science should be done, have

them read USGS Professional Paper 1576.

I remember Brian commenting to me in 1985 or 1986, after one of his first forays into the muddy tidal marshes at Willapa Bay, that he thought he had found evidence for repeated sudden coseismic subsidence of the land, but that he wasn't sure he believed the implications of what he had seen. Brian Atwater is not a scientist who jumps to conclusions or cuts corners testing an hypothesis. He spent summer after summer in the late 1980's and 1990's documenting in extraordinary detail physical evidence of recent, very large earthquakes. To do this, he enlisted the help of Eileen Hemphill-Haley, a diatom paleoecologist. At first blush, Atwater and Hemphill-Haley would appear to be an "odd couple" scientifically speaking, yet their collaboration proved to be critical to demonstrating that the region had experienced repeated large earthquakes. Eileen showed, through analysis of fossil diatoms and comparison of fossil and modern diatom assemblages, that the buried marsh and forest soils that Brian mapped in tidal channels at Willapa Bay had subsided abruptly 1-2 m during earthquakes. She also showed that the sand layers that directly overlie some of the soils contain marine diatoms, indicating landward transport and deposition of coarse sediment. This proved to be a critical piece of evidence for a tsunami origin for the sand layers.

USGS Professional Paper 1576 is a comprehensive document, far exceeding in scope what can be presented in a journal paper. To their credit, Brian and Eileen took the time to present the wealth of their findings in a single publication rather than slicing it up, salami-style, in a series of shorter, less complete journal papers. The monograph is, however, more than thorough, well-argued science; it's a great read – the writing is elegant and the illustrative material beautiful.

I can't overly emphasize the impact that Brian's and Eileen's research has had on our understanding of earthquakes in the Pacific Northwest. Improved public awareness of earthquake hazards in the region is rooted, in part, in their work. Brian was one of only a few geologists working on earthquakes in the Pacific Northwest when the U.S. Geological Survey transferred him to Seattle in 1985. Today, scores of government and university researchers, private-sector geologists, and students are working on Cascadia earthquakes, and most of them have been encouraged and supported by Brian.

USGS Professional Paper 1576 exemplifies how seamless basic and applied geoscience can be and,

further, how important Quaternary geoscience is to society. I can imagine how some misguided politician might point to Eileen's research on diatoms as a waste of taxpayers' money. What could be further from the truth? Eileen's contribution to our understanding of Cascadia earthquake hazards has proved to be vital. All the more surprising and troubling then that the U.S. Geological Survey recently was not willing to accommodate Eileen's wish to remain in Eugene, forcing her to leave the organization.

Let me close with a few anecdotes of a more personal nature. Brian is a well known figure in the communities around Willapa Bay. Most local residents remember the man with the white hat paddling his canoe up and down every tidal channel around the bay. This man went out of his way to tell people what he was doing and why, and he explained to them how all those tree stumps rooted in tidal muds in the bay came to be. Another thing – anyone who has ever done field work with Brian learns very quickly to either stand back as he cleans off an outcrop or be hit by flying mud – he's a human backhoe. Also, if you stay in Brian's field camp, you will at some time be included in the bread-baking detail. Brian turns up his nose at the store-bought stuff, and late in the evenings somebody, often Brian, bakes fresh bread for sandwiches the next day. Finally, Brian always has chocolate on hand to make cocoa on cold mornings. God help you if you get between Brian and his chocolate!

Eileen met Brian at the first special session on Cascadia earthquake research at the American Geophysical Union meeting in San Francisco in 1987. At that time, she was a graduate student at UC Santa Cruz and was employed by the USGS. Up to then, all her research experience had been in Quaternary paleoclimatology working with the Marine Branch of the USGS. Her original plans for Ph.D. research weren't working out, and she was shopping for another project. She introduced herself to this forceful scientist with what many people at the AGU session considered outlandish ideas. Brian suggested that perhaps Eileen would like to look at a few samples from Willapa Bay, and the rest, as they say, is history. Eileen liked the idea of applying paleontology to paleoseismology, so she began working full time on the project the following summer. Eileen no longer works for the USGS, although she continues her collaboration with Brian to this day. There is, however, life after the USGS. After leaving the government, Eileen has pursued a career in music, with a busy schedule of performing and recording. She is an accomplished singer and

songwriter. Her songs are unusual and beautiful; check them out on one her CD's or on her website at <http://www.h2tunes.com/>.

With "Recurrence intervals for great earthquakes of the past 3,500 years at northeastern Willapa Bay, Washington", Drs. Atwater and Hemphill-Haley have shown what Quaternary scientists can contribute to both science and society. I present to you, our Society and Division, the 2000 recipients of the Kirk Bryan Award, Brian Atwater and Eileen Hemphill-Haley.

Response by Eileen Hemphill-Haley

It is my great honor, along with Brian Atwater, to receive the 2000 Kirk Bryan Award. My sincerest thanks to the Quaternary Geology and Geomorphology Division of the Geological Society of America for this recognition. As wonderful as it is to receive this award, the greatest joy for me has been the opportunity to participate in about a decade's worth of research on problems I have found engaging, and with people I admire. My work with Brian Atwater along Willapa Bay represents our initial attempts to apply micropaleontology to aspects of Quaternary paleoseismology and helped to lay the groundwork for a series of additional studies focusing on earthquakes and tsunamis along the Cascadia margin. I have nothing but the highest regard for Brian and won't embarrass him by expounding about it too much. But it is significant that, at his request, I have slogged through knee-deep mud in search of the perfect sample and have on many occasions gotten up before God to beat the tides. Believe me, these are not things that I would do for many people. But I'm happy for the work we've done together in the past and have no doubt that we will continue to figure out ways to work together in the future.

Looking back over the past years, there are a number of people who helped me along the way, and for whose support I am grateful. I had several mentors at the USGS, including James V. Gardner, Michael Field, and John Barron. Denise Armstrong and Carter Borden made important contributions to the project. But of the many people with whom I have worked or conferred, there are two whom I especially want to acknowledge for their help and friendship. The first worked with me through a student appointment at the USGS, and the second was a volunteer in the diatom department at the California Academy of Sciences.

Roger Lewis came to work for me on a student appointment at the USGS in 1992, and soon became

my right-hand man in both the lab and field. During his years in the USGS micropaleontology lab in Menlo Park, he greatly refined our diatom sample-processing techniques and always maintained a good attitude, although the work could be very tedious at times. His skills in the lab were surpassed only by his abilities in the field, where he maintained the same dependable, upbeat attitude, and clear excitement for the science. Roger has since moved on to pursue graduate studies in marine geochemistry, but I am happy to thank him here for all his past contributions to paleoseismology and paleoecology in the Pacific Northwest.

Mr. Albert Dell Mahood is a former high school biology teacher, who in his retirement worked as a volunteer in the diatom department at the California Academy of Sciences in San Francisco. I spent many afternoons researching diatom taxonomy and ecology with Dell and depended greatly on his help - and humor - during his research. As a volunteer for science, he shared knowledge and experience that helped us to better understand the results of our diatom analyses, and I'm pleased to have the opportunity to formally thank him at this time.

My thanks once again to the Geological Society of America for the Kirk Bryan Award, and my deepest gratitude to the friends and colleagues who helped Brian Atwater and me to achieve this honor.

Response by Brian Atwater

In Cascadia paleoseismology, Eileen Hemphill-Haley is known for careful and productive work with fossil diatoms. I hope the Kirk Bryan Award brings this work the wider recognition it deserves.

I join Eileen in thanking our co-workers. Many of them were volunteers or low-paid assistants. Others provided tough reviews of a long manuscript, in the case of an outstanding reviewer. Still others worked as administrators, accountants, and editors. In the few moments remaining, let me mention some of the additional work that contributed to our report.

Much in Cascadia paleoseismology depends on analogies with great earthquakes at other subduction zones: 1944 and 1946 in Japan, 1960 in Chile, and 1964 in Alaska. These examples provide a basis for recognizing earthquakes from geologic signs of their land-level changes and tsunamis.

Geophysicists were probably the first to think about great earthquakes at Cascadia. Some of them did so as regulators of nuclear power plants in the early 1980's.

By the early 1990's, "marsh jerks" had

identified geologic signs of subsidence and tsunamis at bays and river mouths in British Columbia, Washington, Oregon, and California. Later in the 1990's came exact dating of Cascadia's most recent great earthquake, to January 26, 1700. This dating, like so much else in Quaternary geology, is founded on the radiocarbon time scale. Also essential were ring-width pattern matching at Cascadia and historical scholarship in Japan.

These efforts, among others, built the giant on whose shoulders Eileen and I stand.

DON J. EASTERBROOK DISTINGUISHED SCIENTIST AWARD

The Easterbrook Distinguished Scientist Award, established in 1999, is presented to an individual who has shown unusual excellence in published research, as demonstrated by a single paper of exceptional merit or a series of papers that have substantially increased knowledge in Quaternary geology or geomorphology.

*****2000 Recipient *****

Wallace S. Broecker

Citation by Alan Mix

It is a great honor for me to introduce Wallace S. Broecker as the first recipient of the Don J. Easterbrook Distinguished Science Award of the Geological Society of America. To say that Wally's work has led to significant advancements in the field of Quaternary geology is a gross understatement. It is hard to imagine Quaternary geology without Wally as a source of ideas beyond measure, a voice to bring paleoenvironmental studies to the forefront of public policy, and a spirited antagonist who goads the rest of the community to work both more creatively and more rigorously.

This award is supposed to be for a series of papers. In Wally's case, this is almost impossible to summarize. The breadth and depth of Wally's ideas are stunning, documented in nearly 400 published papers and six books.

Wally's work starts with an attitude. Many scientists seek to explain a specific dataset or system. Wally seeks to explain the World. His career started in the 1950's in the early days of isotope geochemistry, with key contributions in radiocarbon and uranium series dating and the development of Quaternary chronology. This provided key evidence in favor of the astronomical theory of glaciation, a theory then out of

favor but now broadly accepted as one of the cornerstones of Quaternary science. Ironically, some of the limitations of the theory are now coming forward based on advances in uranium-series dating, which Wally began in his thesis days.

Although the Easterbrook award is for Quaternary science, we can't escape without mentioning chemical oceanography. Wally's famous kinetic model of ocean chemistry, which 30 years ago got everyone to think of the ocean as a dynamic system defined by inputs and outputs rather than one at equilibrium, defines a theme that carries through the rest of Wally's work. The concept also provides a way of thinking about long-term climate changes studied by Quaternary scientists.

More than any other scientist, Wally took on the task of understanding the mechanisms of natural CO₂ variations. He promoted the idea that understanding such changes and their relationships to natural climate oscillations in the geologic record can provide insights into the future consequences of polluting our atmosphere with greenhouse gases. Wally's inference of multiple stable states of the ocean-atmosphere system suggested the possibility of "unpleasant surprises" in global greenhouse warming should the system shift toward a new mode of operation. These findings provide a stark warning to policy makers of the uncertain and perhaps irreversible consequences of humanity's propensity to pollute.

Wally continues to publish more papers in a year or two than many good scientists complete in a lifetime. Many wonder how he accomplishes so much. This secret was revealed a few years back during a public talk on ocean chemistry and carbon dioxide. Wally's first sentence was, "This morning in the shower I had an idea..." After the laughter died down, he said, "Well, what do YOU think about in the shower?" Clearly the rest of us can learn to be more efficient with our time.

In addition to his own publications, Wally has inspired (some might say driven) generations of students and fellow scientists to work harder, faster, and better. Few of us in the field have escaped a battle with Wally at one time or another. He is often right, but again revealing his greatness, he is the first to admit publicly when he is wrong.

In, short it is hard to imagine any scientist who has more impact on Quaternary science than Wally Broecker. His uniqueness comes from his breadth of interests and a uncanny ability to integrate diverse sets of information both intuitively and through the

application of simple quantitative models. For evidence of Wally's impact on the field, do two things. First, do a web search for the phrase "conveyor belt" and see what comes up. Second, look around you. There is not one person in this room who has not been influenced in some way by Wally's ideas.

With great pleasure, I introduce Wallace S. Broecker.

Response by Wallace S. Broecker

It is indeed a great honor to be the first recipient of the Easterbrook Award. I am particularly delighted that it carries with it a research grant and will especially enjoy writing the proposal. The reason is that instead of the now standard 15 percent NSF acceptance rate, this one will be a sure thing. It's like buying a lottery ticket when you already know that yours will be the winning number.

I thank Alan Mix for his excellent citation. He did a better job of capturing the essence of my career than others who have been faced with this chore in the past. I have fond memories from Alan's graduate school days at Lamont. While he labored on this thesis under the tutelage of Bill Ruddiman, as a side project, he worked with me to launch an effort to determine the age difference between coexisting benthic and planktonic foraminifera from deep sea sediments and thereby to nail down the rate of deep sea ventilation during late glacial time. An exciting interlude!

I would like to thank three people who helped launch me in science. When I entered Wheaton College, I was assigned a sophomore big brother to help me through registration. Paul Gast (later of lunar science fame) took this responsibility seriously and watched over me like a hovering angel. When in my junior year, Paul's frustration over my lack of career goals boiled over, he arranged for me a summer intern in Larry Kulp's Columbia University radiocarbon dating lab. On the last day of this summer stint as I was packing up to return to Wheaton for my senior year, Larry took me aside and suggested that I transfer to Columbia College. In two days, he produced a miracle by twisting important arms to allow me to enroll in Columbia College as a senior transfer student. Forty-eight and one half years later I'm still at Lamont!

The third of this guiding group was the late Phil Orr, curator of archeology at the Santa Barbara Museum of Natural History. He came up to the podium after my first scientific lecture and said to me "I can tell that you are well versed in math and physics, but I also see that you don't know a gosh darn thing about the

earth." He followed this by saying "come with me for three weeks, and I'll change your life." I came and he did.

At 69, I remain as active as ever. I love what I do and wake up every morning raring to go. But, were it not for the efforts of my three mentors, heaven knows where I would have ended up.



Alan Mix, Wally Broecker, and Peter Clark

FAROUK EL-BAZ AWARD FOR DESERT RESEARCH

The Farouk El-Baz Research Award, established in 1999, is given annually for outstanding work in the field of warm desert research by earth scientists; it is intended to encourage and reward arid land studies.

*****2000 Recipients*****

Stephen G. Wells and Leslie D. McFadden

Citation by Y. Enzel, T. Bullard, F. Pazzaglia

The Farouk El-Baz Award for Desert Research was established to reward excellence in research in desert geomorphology worldwide. The purpose of the award is to stimulate research in desert environments by recognizing an individual or individuals whose research has significantly advanced the understanding of the Quaternary geology and geomorphology of deserts.

This year, Dr. Stephen G. Wells and Leslie D. McFadden are honored as the co-recipients of the Farouk El-Baz Award in Desert Research. These two distinguished researchers are recognized both for excellence in their individual quests for knowledge of desert geomorphology and as a collaborative team that

has furthered our knowledge of geomorphic process and evolution of desert landscapes.

For the past 20 years Profs. Stephen G. Wells and Leslie D. McFadden have studied the arid regions in the world in general, with particular focus on the deserts of the American Southwest. Their work has substantially reshaped our thinking on the geomorphology and Quaternary geology of arid land alluvial fans, with particular insights on alluvial surfaces, soil and desert pavement development, arroyos, slopes, lava flows, scoria cones, and the variability of these landforms over space and time. The individual achievements of these two scientists do not fall short of phenomenal, and the synergism created when they joined forces, beginning at the University of New Mexico, resulted in new and exciting ways to view and understand semiarid and desert geomorphic systems and past climate changes that shaped the landscapes. Their publications on these subjects are cornerstones in landscape research in the Mojave, Sonoran, and Great Basin deserts of the American Southwest and set the standard for research in other arid and semiarid environments.

Steve's and Les's contributions to desert geomorphology initiated in their PhD research on the alluvial fans of the Harquehala Mountains of southwestern Arizona (Wells) and arid soils and landforms of southern California (McFadden). Their graduate advisors, Larry Lattman and Bill Bull, had a major impact on the direction these two excellent young students chose for their major field.

Shortly after Les' arrival at UNM, Steve and Les were already a team and becoming deeply involved in desert research. They advanced scientific knowledge of desert environments through their research on soil-geomorphic relations common to alluvial fans and volcanic landforms in the Mojave Desert, considered one of the major contributions to the understanding of arid soil development through time. They provided fundamental advances about surface processes in desert environments through innovative collaboration with ecologists, geochemists, and geochronologists. Results of their research have provided new insights into the relation between desert landforms and desert plant ecology, application of stable and cosmogenic isotopes for testing models of soil and surface processes in deserts, and the chemistry of calcium carbonate and gypsum in development of desert soils.

Together, they formed one of the most successful, creative, and productive teams in the study of desert landforms, their evolution through the

Quaternary Period, and the environmental processes that control this evolution. They contributed to the deciphering of past environmental conditions, volcanic activity, desert pavement development, paleoclimate-paleohydrology relations, and eolian activity. Together they influence many students, colleagues and researchers around the world.

They produced voluminous results, early portions of which were published in *Quaternary Research* in 1987. That article stands as the best example of desert Piedmont evolution. In addition, their work demonstrating lacustrine-alluvial fan interactions has led to a field methodology used elsewhere in the world's arid zones in settings where age control of geomorphic surfaces and deposits is limited. The integrated collaboration of Les and Steve led to the development of a unique and radically new model for the origin and evolution of desert pavements, one of the most ubiquitous features of the world's deserts. Their studies on the relationships among lava flows, alluvial fans, and cinder cones, and of surface morphology and modification, all conducted in the eastern Mojave Desert, are among the most thorough and highly respected studies in volcanic geomorphology.

Their work has been the basis for many tests validating new quantitative exposure-age dating techniques applied to the arid environment, for example. In turn, many of their ideas on the inflationary model for the development of desert pavements have been confirmed by recently developed dating techniques such as cosmogenic-nuclide analysis. The use of cosmogenic isotopes to prove a model of desert pavement formation and maintenance stands clear as an excellent marriage of novel sophisticated laboratory methods applied to field-based research.

Steve's and Les' contributions to desert research should also be noted in terms of their inspiration and mentoring of students. Their work with colleagues and graduate students during their tenure at the University of New Mexico, and later while Steve was at UC-Riverside and currently at the Desert Research Institute, was especially productive. During their careers, they edited seven volumes, authored and co-authored 140 papers and 65 guidebook articles, and supervised about 45 Master's theses and Ph.D. dissertations on arid and semiarid environments. The many students who were scientifically trained in this rich blend of mentoring, research, lectures and field classes continue arid-environment research efforts in many parts of the world. Congratulations, Les and

Steve.

Response by Stephen G. Wells and Leslie D. McFadden

Thank you, Yehouda, for your kind words. We are sincerely grateful to you and our colleagues, the Quaternary Geology and Geomorphology Division, and the Geological Society of America for this honor. We are indebted to Dr. Farouk El-Baz and his generosity for this award and its emphasis on geologic studies of arid lands. We stand humbly in the shadow of Dr. El-Baz because of his accomplishments in the geosciences and remote sensing, as well as his concerns for worldwide humanitarian issues. Dr. El-Baz is a man who conducted fieldwork in some of our planet's harshest deserts, and at the same time, pioneered the application of space-borne data to groundwater exploration. As an indicator of his vision. Dr. El-Baz was appointed to the World Bank/UN World Commission for the 21st Century and serves on the Council of the Third World Academy of Sciences.

I (Steve) was fortunate to take my first steps in the world of desert geomorphology under the able guidance of Larry Lattman and in 1972, a time during which geomorphology was experiencing an incredible and exciting revolution. A generation of young geomorphologists was growing up under the leadership from giants such as Larry, Bill Bull, Luna Leopold, Asher Schick, Victor Baker, and Peter Birkleland. With training from geomorphologists and diverse approaches, these young students were inacting and exchanging different views on process geomorphology, soil genesis, and landscape evolution. Two of these individuals, Les McFadden and I, first met at the 8th Annual Geomorphology symposium on "Geomorphology in Arid Regions" in 1977 at Binghamton, New York. We shared our ideas and enthusiasm for arid land geomorphology, but little did we realize that in less than 5 years, we would be side-by-side as colleagues in soil pits and scorching stone pavements contemplating the interactions among arid surficial processes, soil development, and the evolution of desert pavement landscapes. It is my sincere belief that we share this award tonight because of a unique chemistry between Les and me that allowed us to blend different skills, views and approaches in a remarkably collegial manner. Equally important, we worked as colleagues while in the field, discovering and examining the same geologic and pedologic features under a blazing sun. So I cannot think of any more fitting honor than to share this award with my life-long

colleague and friend, Les McFadden. Sharing this with Les is the high point for me in the receipt of this award.

My (Les) first steps in the world of deserts began relatively early in life, when my father, a U.S. Marine, was transferred to Santa Fe, New Mexico. I gradually learned to appreciate the many wonderful qualities of deserts and even ended up attending graduate school (The University of Arizona) in the beautiful Sonoran desert. I am also lucky enough to be able to live and work in the desert landscapes of New Mexico. Above, Steve mentioned a couple of researchers that have had a significant impact on research in Quaternary geology and geomorphology. I was very fortunate to have studied under one of them, Bill Bull. It would be difficult to exaggerate the impact that Bill has had on so many aspects of my career as a desert researcher. In fact, it was Bill who enthusiastically encouraged me to take my first course in soils very early in my graduate years at Arizona, because he recognized, through his own research in the deserts of the Southwest U.S. and southern Israel, the many ways in which an understanding of soils in various landscapes could greatly benefit geomorphological research. The textbook used in that first soils course was the very recently published first edition of "Soils, Weathering and Geomorphology", by Pete Birkeland. Suffice it to say the philosophical approach to the application of pedological research in geomorphology that forms the core of this book also has a great impact on my approach to soil geomorphologic research in deserts, and I am honored to have some of my research results included in the later editions of this book. Bill Bull was also able to attract prominent Israeli soil scientists and geomorphologists to Arizona for their sabbaticals, including Dan Yaalon and Ran Gerson, from whom I took classes, both in the lecture hall and in one of the best classrooms - the field. Many of our ideas concerning the co-evolution of rocky surfaces and soils in deserts that culminate in the development of desert pavements reflect the body of research produced by these scientists.

After leaving the University of Arizona, I was able to start interacting with Steve at the University of New Mexico - and as he mentioned above - the chemistry that characterized our relationship as colleagues and friends is a large part of the reason we are here this evening. I am also deeply honored to share this award with him.

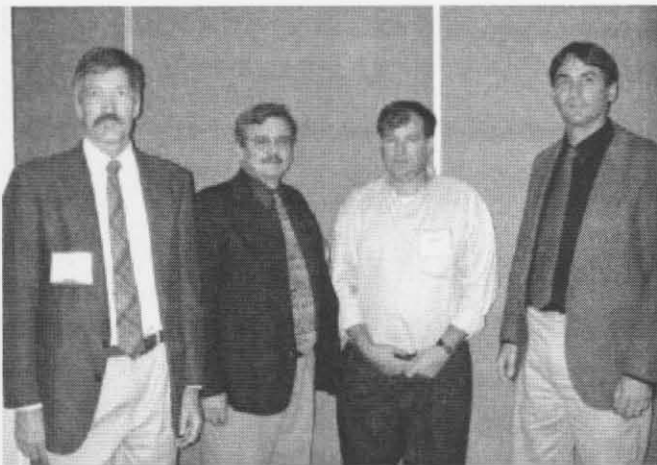
It has been said that geomorphologic research in deserts during the past few decades suffered from

one or more of the following conditions: either (1) a preoccupation with unusual landforms at the expense of representative landforms, (2) rapidly changing ideas on landform genesis being formulated with little supporting reliable data, or (3) research focusing on different geographic regions where processes may differ significantly. Stone pavements form one of the most significant and ubiquitous landscapes of deserts throughout the world, and in fact, are one of the few planetary scale desert landforms that can easily be recognized by space-based remote sensing platforms. Numerous hypotheses have been formulated on the origin of these landscapes using short-term measurements or focusing upon a given geographic region. Unlike the numerous hypotheses on desert pavement origins, ours was informed by the ability to integrate geomorphological field data with the results from detailed analysis of soil formation. Of course, this begs the question of how we could conclude something so alien to previous concepts. Simply, previous models offered no explanation consistent with field observations on the origins of the most common feature of pavements, the silt-rich "stone-free zone" stratigraphically below pavements. All of our observations and data supported a complex model of genetically linking the deposition of eolian fines on desert surfaces, soil formation within these fines, and the maintenance of clasts at the surface and formation of pavements from the inception of the landform. Through many field sessions, detailed explanations, and strange looks from our colleagues as if we were following an "X-File" script, our idea has been generally accepted and is working its way into geomorphology texts as well as introductory geology texts.

Our desert research also resulted from a unique opportunity afforded to both of us. In 1982, a multi-year program of the U.S. Geological Survey under the leadership of John Dohrenwend gave Les and me the opportunity to examine stone pavements across broad tracts of the Basin and Range, as well as to conduct a sustained research program on pavement formation on volcanic landforms. Without the broad view, sustained effort, and multidisciplinary approach, we may not have followed the path that led us to our conclusions. We also express our loving gratitude to our wives and family for the opportunity that they afforded us as they often experienced their own form of "desert solitude".

Finally, it should be noted that both of us continue to share a profound appreciation for the stark beauty of rugged desert landscapes. Unfortunately, this

appreciation is all too typically not shared by many others in our society. Van Dyke observed over 100 years ago that "man has in measure changed the desert conditions by storing the waste waters of the mountains and reclaiming the valleys by irrigation ... his success has been phenomenal." As large urban areas have arisen in desert regions, with their attendant problems, much of humanity views deserts as "wastelands", and therefore a place only to be reclaimed or suitable as a repository of society's waste. The intrinsic values of deserts are countless and should not be so rapidly ignored. "They are the breathing spaces of the west and should be preserved forever" (Van Dyke, 1901). We hope our research might, in some small way, raise people's awareness of and appreciation for deserts and the complexity and fragility of their landscapes.



Les McFadden, Steve Wells, Yehouda Enzel, and Peter Clark

GLADYS W. COLE RESEARCH AWARD

The Gladys W. Cole Research Award is awarded each year to a GSA member or Fellow between 30 and 65 years of age who has published one or more significant papers in geomorphology. It is for investigation of the geomorphology of semiarid and arid terrains in the United States and Mexico.

Joel L. Pederson

Utah State University

Quaternary incision and geomorphic evolution of eastern Grand Canyon.

STUDENT AWARDS

J. HOOVER MACKIN RESEARCH AWARD

The J. Hoover Mackin Research Award, established in 1974, provides support for Ph.D.-level graduate research in Quaternary geology or geomorphology.

Martha Carey Eppes

University of New Mexico

Soil development control on geomorphic processes and long term landscape evolution: A case study along the north flank of the San Bernardino Mountains, Transverse Range, California.

Tammy M. Rittenour

University of Nebraska

Late-Pleistocene to Early Holocene evolution of the Lower Mississippi River Valley: Fluvial response to external forcing.

ARTHUR D. HOWARD RESEARCH AWARD

The Arthur D. Howard Research Award, established in 1992, provides support for Master's-level graduate student research in Quaternary geology or geomorphology.

Christopher M. Moy

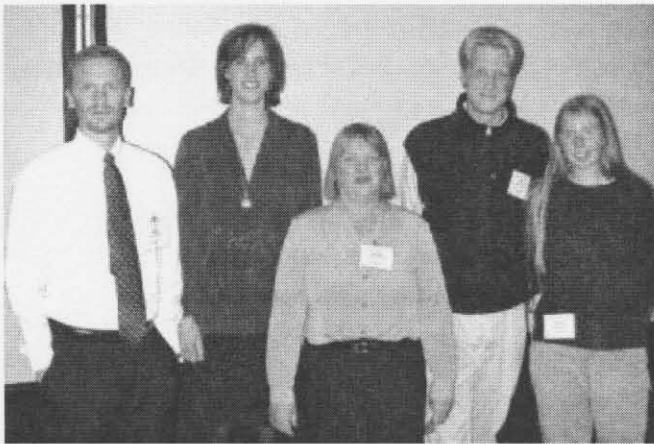
Syracuse University

A reconstruction of Early to Middle Holocene El Nino/Southern Oscillation activity in South America: A paradigm for projected greenhouse warming.

James C. Sutherland

University of Nevada - Reno

Eighteenth-century logging and the geomorphic stability of a selected watershed in the Carson Range, Western Nevada: Implications for impact of land-use changes on Lake Tahoe.



L-R: James Sutherland, Martha Carey Eppes, Debbie Harden, Christopher Moy, and Tammy Rittenour

ROBERT K. FAHNESTOCK MEMORIAL AWARD

The Robert K. Fahnestock Award is presented to the student with the best application in the field of sediment transport or related aspects of fluvial geomorphology.

Karen L. Willey
University of Kansas

Modeling the timing of erosion and deposition events in the loess canyons of the Arikaree Breaks, Cheyenne County, Kansas.

ANNOUNCEMENTS

INQUA 2003 PROGRAM

The Program Committee for INQUA 2003 (Reno, Nevada) is looking for ideas for oral and poster sessions. The committee is particularly interested in receiving proposals for sessions that will be of interest to a range of Quaternary scientists and that deal with new developments in Quaternary science. Proposals should be sent to John Clague, Program Committee Chair (jclague@sfsu.ca).

DEATH VALLEY FOP GUIDEBOOK

The guidebook is about 255 pages and contains roadlog and stop descriptions for the three-day trip, which traversed the valley from Uebebebe Crater to Mormon Point. In addition, the volume contains 14 papers describing various aspects of Quaternary (and late Pliocene) geology in Death Valley.

Printed copies: Death Valley Natural History Assn.
P.O. Box 188
Death Valley, CA 92328-0188
760-786-2236

USGS on-line: geology.cr.usgs.gov/greenwood-pubs.html

FOP SCHEDULING?

I would like the FOP trip leaders to PLEASE consult with one another when choosing dates for their annual trips. That was routine practice until recently. In particular, the eastern and midwestern groups had separate weekends in mid to late May. For the last three years, however, they have been on the same weekend in early June. Surely this is not a major problem to solve these days with the greater ease in communication now available.

Paul Karrow (Pfkarrow @sciborg.uwaterloo.ca)

FLUVIAL GEOMORPHOLOGY AT THE UNIVERSITY OF DELAWARE

Jim Pizzuto has funding for a variety of projects including: 1) the effects of dam removal on fluvial morphology and sedimentation, 2) evaluating how changes in land use influence channel form and process, and 3) an experimental study at St. Anthony Falls Laboratory exploring how flood hydraulics and sedimentation influence the width and depth of alluvial rivers. Students wanted!

Jim Pizzuto (Pizzuto @udel.edu) 302-831-2710

GEOMORPHORUM

**Newsletter of the Geomorphology Specialty Group
Association of American Geographers**

The Spring 2001 edition is available at:
<http://www.cla.sc.edu/geog/gsgdocs/Newsletter/News-index.html>

Bernard Bauer, Editor (bbauer@usc.edu)

**THE COASTAL AND MARINE SECTION
NEWSLETTER
Association of American Geographers**

The latest newsletter may be viewed at:
aag-coma. Homestead.com

Harry Jol, Editor (jolhm@uwec.edu)

R-M FOP

**Preliminary Announcement: Late Pliocene and
Quaternary Stratigraphy and Geomorphology of
the Central and Northern Albuquerque Basin,
New Mexico**

The 2001 Rocky Mountain Cell of the Friends of the Pleistocene will be held in the Albuquerque area this fall. Trip dates have not been determined, pending special access arrangements, but will be held during one of the first three weekends of September. The trip will begin on a Friday and continue through Sunday afternoon. Participants will examine stratigraphic and geomorphic relationships among the Rio Puerco and Rio Grande, piedmont deposits and geomorphic surfaces associated with rift-margin uplifts of the Sandia and Manzano Mountains, and assorted volcanic deposits and flows that are used to reconstruct the late Pliocene to Pleistocene geomorphic and tectonic evolution of an extensional intermontane basin. We will examine the Quaternary stratigraphy of the piedmont-slope of the Sandia Mountains, the fluvial terrace sequence of the Rio Grande, and landscape responses to tectonics along rift-border and intrabasinal faults of the active Rio Grande rift during the late Cenozoic. Participants will also examine evidence constraining the transition from widespread aggradation of the upper Miocene to lower Pleistocene upper Santa Fe Group to incision and development of the Rio Grande Valley. This trip will have a Pliocene component as a result of recent dating and stratigraphic constraints for geomorphic surfaces suggesting that some regionally significant geomorphic surfaces are 2-5 times older than originally estimated. The final day will be divided into two sub-trips. The first sub-trip will be led by Bruce Allen, who will present recent research on late Pleistocene Lake Estancia, which is just east of the rift-bounding Manzano Mountains. The second sub-trip, led by Dave Love, will examine the early Pleistocene Los Lunas volcano, just south of Albuquerque.

Camping will be at a wooded Forest Service group campground (elevation of about 6500 ft amsl) along the eastern dip-slope of the Sandia Mountains, just south of Tijeras, New Mexico. Many of the field trip stops will be on private or Pueblo land. We plan to use large-capacity vans for many of the stops in order to reduce traffic congestion. Because of access limitations, we must limit the number of participants to no more than 75 people for the first two days. Participation for the concurrent final-day excursions will be limited to no more than 30 registrants. Cost has not been determined, but should be inexpensive.

Field Trip leaders are Sean D. Connell, New Mexico Bureau of Mines and Mineral Resources (NMBMMR) - Albuquerque Office, New Mexico Institute of Mining and Technology, 2808 Central Ave., SE, Albuquerque, NM 87106, (505) 366-2534, fax: (505) 366-2559, email: connell@gis.nmt.edu; David W. Love (dave@gis.nmt.edu) and Bruce D. Allen (allenb@gis.nmt.edu), NMBMMR; and Bruce Harrison (bruce@nmt.edu), Dept. of Earth and Environmental Sciences, New Mexico Institute of Mining and Technology, Socorro. A website containing additional information will be operational in June, 2001, at: ([http:// geoinfo.nmt.edu/staff/connell/FOP2001.html](http://geoinfo.nmt.edu/staff/connell/FOP2001.html)).

64th ANNUAL NORTH EAST FOP

**64th annual reunion of the North Eastern Friends of
the Pleistocene**

**June 1-3, 2001, along the north shore of the middle
St. Lawrence Estuary,
between Québec City and Tadoussac**

**Stratigraphy of the Pleistocene units on land and
below the St. Lawrence Estuary,
and deglaciation patterns in Charlevoix**

The trip conference will focus on the new glacial, marine, estuarine and fluvial units discovered in the middle estuary area, either on natural exposures, man-made sections, or on drilling cores and by seismostratigraphy. These units record two pre-Illinoian major episodes, the Illinoian Glaciation, the marine invasion (Guettard Sea) related to the Illinoian-Sangamonian transition (6/5 transition), and the climatic optimum of the Sangamonian (substage 5e). An intermediate estuarine-fluvial-glaciolacustrine-glacial sequence indicates an early upper Pleistocene climatic deterioration and glaciation. Fluvial sediments

and peat record an interstadial event (St. Pierre Sediments Event) followed by the classical Wisconsinan glaciation. The post-glacial sea-level regional curve will be presented. Laterally to the St. Lawrence main corridor, the small Saint-Tite basin record a detailed sequence of short-lived glacio-lacustrine and fluvial events intercalated between Wisconsinan glacial phases. We will look at the landscape related to the Charlevoix Astrobem inherited from the Devonian. We will examine the glacial striations pattern, the eastern extent of the Saint-Narcisse Moraine, ^{14}C ages, units and forms related to the regional deglaciation. The calving bay ice retreat model will be challenged. Sequence analysis will be applied to the seismic units observed at the mouth of the Saguenay and at the head of the deep Laurentian Trough downstream Tadoussac. The St. Lawrence Estuary is the new frontier of Pleistocene stratigraphic studies in Québec.

For additional information on FOP meetings, see the AMQUA Newsletter and website (www4.nau.edu/amqua).

UPCOMING MEETINGS

2001

- **Symposium on Land Degradation and Desertification**
May 6-13, Mexico
Topics: Land degradation in historical times, the Teotihuacan Valley, regional development and degradation, water supply to Mexico City, environmental applications in Toluca Valley, degradation and recent vulcanism and Paricutin Volcano.
- **GAC-MAC/CANQUA Symposium**
May 27-30, St. John's, Newfoundland
Quaternarists from around the northern Atlantic Ocean, working in terrestrial, coastal, or marine environments and successions are cordially invited to participate.
- **Canadian Association of Geographers**
May 29-June 2, Montreal, Quebec
- **American Geophysical Union Spring Meeting**
May 29-June 2, Boston, Massachusetts
www.agu.org
- **64th North Eastern Friends of the Pleistocene**
June 1-3, Quebec City, Quebec, Canada
Stratigraphy of the Pleistocene units on land and below the ST. Lawrence Estuary, and deglaciation pattern in Charlevoix
www.geo.uqam.ca/fop2001/fop2001.htm
- **47th Midwest Friends of the Pleistocene**
June 1-3, Thunder Bay, Canada
The meeting will focus on the deglaciation of the borderland region between Rainy River ice, the ice of the Marquette readvance, eastern outlets of Lake Agassiz and the sequence of lakes in the Superior basin will be highlighted.
Brian Phillips (bphillip@mist.lakeheadu.ca)
- **International Symposium: Climate Change and Variability in Northern Europe**
June 6-8, Turku, Finland
Interdisciplinary symposium to bring together scientists studying dynamics in a broad sense and to foster communication between scientists and interest groups applying scientific knowledge on mitigation and adaptation for climatic changes.
figure.utu.fi/notice.html
- **Millennial-Scale Events in the North Atlantic Region During Termination 1**
June 13-18, University of Ulster, Northern Ireland
The conference will focus on evaluating the timing, signatures and correlation of high-frequency hemispheric-scale climate and environmental changes during Termination 1.
www.ulst.ac.uk/termination1.html
- **6th International Drumlin Symposium**
June 17-23, Torun, Poland
www.inqua.au.uk
Wojciech Wysota (wysota@cc.uni.torun.pl)
- **Earth System Processes Global Meeting**
June 24-28, Edinburgh, Scotland
GSA in partnership with the Geological Society of London.
www.geosociety.org/meetings/edinburgh/ESP2nd.pdf
- **7th International Conference on Fluvial Sedimentology**
August 6-10, University of Nebraska, Lincoln
The conference, held every four years since 1977, seeks to stimulate the exchange of ideas between scientists with common interests in rivers and their deposits, both modern and in the geological record. The scope of the meeting will encompass geomorphology of modern rivers, sediment

transport and deposition. Quaternary fluvial history, fluvial facies models, alluvial basin analysis and sequence stratigraphy, economic aspects of fluvial deposits, and river management.
www.unl.edu/geology/ICFS.html

- **Ground Penetrating Radar (GPR) in Sediments: Applications and Interpretation**
August 20-21, London, England
This international conference will be the first to bring together geologists, geomorphologists, geophysicists and engineers with an interest in the application and interpretation of GPR in sediments and sedimentary rocks.
Charlie Bristow (c.bristow@ucl.ac.uk)
- **5th International Geomorphology Conference**
August 23-28, Tokyo, Japan
wwwsoc.nacsis.ac.jp/jgu/icg-hopa/indexicg.html
- **1st International Conference on Sustainable Development in Karst Regions**
August 24-27, Beijing, China
Wang Wei (CAGSDIC@public.bta.net.cn)
- **Functions of Soils in the Geosphere system**
August 26-29, Russian Academy of Sciences, Moscow State University, Moscow
The main topics include soil function in ecosystems, soil-atmosphere relationships, soil influence on the hydrological and hydrochemical cycles, soil functions in the lithosphere, soil as a record of geosphere-biosphere interactions, and soil as a natural resource for human society.
Alexander Makeev (makeev@fadr.msu.ru)
- **Dryland Change 2001**
August 30-September 2, Upington, South Africa
An international interdisciplinary conference exploring the nature of environmental change in drylands and opportunities for an improved understanding of future changes and their impacts on dryland societies.
www.shef.ac.uk/~igcp413/
- **INQUA Subcommission on European Quaternary Stratigraphy**
September 9-14, Kyiv, Ukraine
The conference will focus on loess stratigraphy, paleopedology, paleontological sequences (pollen, mollusks and mammals), glacial phenomena, Paleolithic archaeology and Quaternary dating methods; a main issue will be the inter-regional east-west correlation of the European Quaternary.
mmcgeo@nbi.com.ua
- **Uplift and Erosion: Driving Processes and Resulting Landforms Conference**
September 20-21, Siena, Italy
The meeting, which will consider dynamic relations between crustal and surficial processes in orogenic evolution, will include presentations from, amongst others, Phillip Allen (Dublin), Franck Audemard (Caracas), Douglas Burbank (Penn State), Hiroo Ohmori (Tokyo), and Mike Summerfield (Edinburgh).
inqua.nlh.no/commpl/shore01.htm
- **The Significance of Soil Surface Characteristics in Soil Erosion Workshop**
September 20-22, Strasbourg, France
www.qub.ac.uk/geog
<http://soilerosion.net>
- **British Geomorphological Research Group Annual Conference**
September 21-23, University of Nottingham, Nottingham, United Kingdom
www.geog.nottingham.ac.uk/newgeog/noticeboard.htm
- **Geomorphology and Tourism Symposium**
September 21-23, Fribourg, Switzerland
Emmanuel Reynard
(emmanuel.reynard@igul.unil.ch)
- **Seismically Induced Ground Ruptures and Large Scale Mass Movements - Field excursion and meeting (INQUA)**
September 21-27, Rome, Italy
Alessandro Maria Michetti (michetti@fis.unico.it)
- **International Conference on Carpathian-Balkan Geomorphology**
September 24-27, Krakow, Poland
<http://main.amu.edu.pl/~sgp/news42.html>
- **International Symposium and Field Workshop on Paleopedology**
October 7-16, Mexico City, Mexico
Themes of the meeting are expected to include paleosol sedimentary sequences, magnetic properties of Quaternary paleosols and sediments as paleoclimatic indicators, polygenetic change, biomorphs in paleosols, and paleopedology and archaeology. Three field trips are planned.
Elizabeth Sollerie-Rebolledo
(solleiro@geologis.unam.mx)

- **1st International Meeting in Sea-Level Changes and Coastal Evolution and Neotectonics (INQUA)**
October 17-24, Taipei, Taiwan
Ping-Mei Liew (liewpm@gl.ntu.edu.tw)
- **32nd Binghamton Geomorphological Symposium**
October 19-21, Chapel Hill, North Carolina
The topic is Mountain Geomorphology—
Integrating Earth Systems.
David Butler (db25@swt.edu)
512-245-7977
- **ASA-SSSA-CSA Meeting**
Symposium on Deep Regolith: Exploring the
Lower Reaches of Soil
October 21-25, Charlotte, North Carolina
Bill Zanner (bzanner2@unl.edu)
- **Geological Society of America**
November 5-8, Boston, Massachusetts
- **Rocky Mountain Cell of the FOP**
TBA, Albuquerque, New Mexico
Late Pliocene and Quaternary Stratigraphy and
Geomorphology of the Central and Northern
Albuquerque Basin.
Geoinfo.nmt.edu/staff/connell/ FOP2001.html

2002

- **7th International Coastal Symposium**
March 25-29, University of Ulster, Northern
Ireland
Themes include coastal change (Quaternary to
historical), contemporary coastal processes, coastal
engineering and management, and coastal
ecosystems.
www.science.uslt.as.uk/ics2002
- **10th International Conference on Luminescence and Electron Spin Resonance Dating**
June 24-28, University of Nevada-Reno, Reno,
Nevada
www.dri.edu/DEES/LED2002/led2002-home.html
- **17th World Congress of Soil Science**
August 14-21, Bangkok, Thailand
The main focal points of the symposium are to
increase understanding of the genesis of arid and
semi-arid soils—especially the formation of calcic,
gypsic, and salt horizons; their use in paleoclimatic
reconstructions and archaeological interpretations;
find solutions to management problems; and to
better understand their role in the carbon cycle.

- **International Symposium on the Structure, Function and Management of Fluvial Sedimentary Systems**
September 2-6, Alice Springs, Northern Territory,
Australia
duke.usask.ca/~deboer/ICCE/

For other listings, see the “calendar” at
www.Geotimes.org

DIVISION WEBSITE

Please take a minute to visit the Division website. It is redesigned and finally contains up-to-date information. Your suggestions will be very much appreciated.

FROM THE EDITOR

Requests to the membership:

- 1) Send news and announcements that you think might be of interest to the readership (e.g., upcoming meetings, new publications, recent grants and contracts, and so on).
- 2) I would like to feature a research facility/center in the next issue of the newsletter—let me know if you are interested.
- 3) Send along any color or B&W photographs (digital versions or hardcopy) for inclusion in the newsletter; i.e., those that you think would appeal to the membership.

E-issue of the newsletter:

All members will be getting a blast e-mail via GSA asking if they would like to start getting the QG&G Newsletter electronically. This overdue move will save the Division a fair amount of money and will offer color to those receiving the e-version.

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GSA
QUATERNARY GEOLOGY AND
GEOMORPHOLOGY DIVISION
Minutes of the Management Board Meeting
Sunday, November 12, 2000
and
2001 Annual Report to GSA Council

1. Attending:

Peter Clark, Past Chair
Craig Kochel, Chair
Debbie Harden, 1st Vice-Chair
Steve Kite, 2nd Vice-Chair Elect
Alan Nelson, Secretary
Scott Burns, Treasurer
William Johnson, Newsletter /Website Editor

2000-2002 Panel: Carrie Patterson, Grant Meyer,
Dave Dethier
1999-2001 Panel: Art Bettis, Peter Knuepfer,
Marith Reheis
1998-2000 Panel (retiring): Jim E. O'Connor

2. The draft of Duties, Policies, and Bylaws of the Quaternary Geology and Geomorphology Division of the Geological Society of America submitted to the Management Board on Groundhog Day, 2000, was approved with some revisions. The Secretary will update this document each year and give copies to new MB and Panel members.

3. The following topics were discussed:

- Division policy on four major Division awards
- Division policy on Mackin-Howard Awards
- Policy on Division records and document depository
- Review of election nomination process
- Division apathy
 - Consistent 15% voter turnout
 - Nominations received from 8 of 1463
 - No nominations for DCA this year
 - One nomination for FEBA this year despite e-mail and *GSA Today* and *EOS* ads
 - Very few comments to MB from membership during the year

4. Secretary's Report (Alan Nelson)

2000 Election Results:
The percentage of returned ballots was about

the same this year at 15% compared with 16% last year. This, however, is not close to return rates of 29% in 1996 and 23% in 1997. For the 2000 election, Bill Johnson and Kimberly Shudlow arranged for an optional interactive ballot form on the GSA website. Two-thirds of the ballots received were electronic. GSA Headquarters is pushing for all Society business to be handled electronically.

Special thanks to other QG&G candidates: Dennis Dahms, Milan Pavich, Steve Personius, and G. Richard Whittecar. And thanks to Kimberly for arranging the website balloting and tallying the ballots. Many thanks to the 2000 Election Nominating Committee - Les McFadden (Chair), John Andrews, and Alan Gillespie - for selecting the 2001 ballot.

Membership:

The Division's steady growth continues. GSA shows 1463 members as of 17 Oct 2000, 4% more than the 1401 members in Oct 1999. We had 1354 members in 1998, 1330 members in 1997, and 1245 members in 1996. QG&G remains the second largest GSA Division.

Kirk Bryan Award:

Atwater, Brian F., U.S. Geological Survey, Seattle, and Hemphill-Haley, Eileen, Dep't. of Geosciences, University of Oregon

For: Atwater, Brian F., and Hemphill-Haley, Eileen, 1997, Recurrence intervals for great earthquakes of the past 3,500 years at northeastern Willapa Bay, Washington: U.S. Geological Survey Professional Paper 1576, 108 p.

John Clague, Citationist

Special thanks to the 2000 KBA Panel: Julie Brigham-Grette, Peter Knuepfer, Donald Rodbell, Marith Reheis, and Jim O'Connor.

Retiring Panel members are reminded that they each agreed to nominate a paper for the KBA before 1 Dec.

Gladys W. Cole Memorial Research Grant

Joel L. Pederson, Utah State University
Quaternary incision and geomorphic evolution of eastern Grand Canyon

5. Newsletter Editor/Webmaster's Report
(Bill Johnson)
-Newsletters and website development update: costs of newsletters, costs of website
-Complaint from GSA Headquarters that a majority of Division websites are not current
-Encouraging divisions to go to all electronic Division newsletters (website)

6. Second Vice-Chair's Report (Debbie Harden)
J. Hoover Mackin Award

Martha Eppes, Ph.D. candidate, Univ. of New Mexico (Les McFadden, Frank Pazzaglia), Soil development control on geomorphic processes and landscape evolution, San Bernadino Mountains, California.

Tammy Rittenour, Ph.D. candidate, Univ. of Nebraska (Mike Blum), Late Pleistocene to Early Holocene evolution of the lower Mississippi River Valley: Response to external forcing.

Arthur D. Howard Award

Christopher Moy, M.S. candidate, Syracuse University (Geoff Seltzer, Don Rodbell) Reconstruction of Early to Middle Holocene El Nino/Southern Oscillation activity in South America: Paradigm for greenhouse warming?

James Sutherland, M.S. candidate, University of Nevada-Reno (Steve Wells, Kyle House) Eighteenth-century logging and geomorphic stability in the Carson Range, western Nevada: Implications for Lake Tahoe.

Special thanks to the 2000 Mackin-Howard Panel: Debbie Harden, Alan Busacca, Peter Clark, Dave Dethier, Craig Kochel, Bill Mode, and Dorothy Sack.

7. First Vice-Chair's Report (Craig Kochel)
Distinguished Career Award:
Peter Birkeland, University of Colorado, Boulder
Don Easterbrook, Citationist

Farouk El-Baz Award:
Stephen G. Wells and Leslie D. McFadden, Desert Research Institute and University of New Mexico
Yehouda Enzel, Citationist

8. Chair's Report (Peter Clark)
Donald J. Easterbrook Distinguished Scientist Award:
Wallace S. Broecker, Columbia University,
Alan Mix, Citationist

Special thanks to the nominating committee: Peter Clark, Tom Dunne, and Steve Porter.

Yet another special thanks to this year's Panel for helping to set the standards for the decision on this new award: Peter Knuepfer (EDSA Committee Chair), Art Bettis, Julie Brigham-Grette, Donald Rodbell, Marith Reheis, and Jim O'Connor.

Geological Society of America and Geological Society of London present

Earth System Processes

June 24–28, 2001

Edinburgh International Conference Centre



An innovative gathering of geoscientists, anthropologists, astrobiologists, botanists, climate modelers, hydrologists, ecologists, oceanographers, chemists, physicists, and other scientists will explore:

- Relationships among the solid Earth and its hydrosphere, atmosphere, cryosphere, and biosphere.
- Earth system evolution and how processes controlling the nature of our planet have changed since the birth of the solar system.

For information and registration, see

www.geosociety.org or www.geolsoc.org.uk

Partial funding provided by The NASA Astrobiology Institute