Volume 18, Number 2 September 1999

Greetings from the mid-continent (stable craton, etc)!

We, **Barbara John** and **Mary Hubbard**, have taken over the newsletter editorship from the very capable hands of **Greg Davis** and **Scott Wilkerson**, and are trying to learn how all this works. Surely it will take a little time for us to get the knack of extracting juicy contributions from all of you and then meshing them together to create an informative document!!

Before we discuss our vision of the SG&T newsletter, it might be appropriate to introduce ourselves, as some of you know us, and others don't. Barbara (Bobbie) was born, raised, and educated in California, within sight of the Pacific-North American plate boundary. On completion of her PhD at U.C. Santa Barbara, she moved to the UK, taking up a temporary lectureship at Cambridge University. Somehow that stretched for 6 years, during which time she had the opportunity to meet and work with an incredible assortment of earth scientists, both students and faculty, on structural and petrologic problems throughout Europe. She returned to the States in December 1992, to take up a position here at the University of Wyoming….deep in the heart of the

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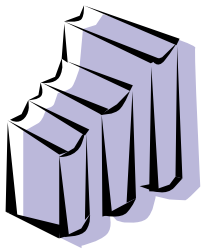

CHAIRPERSON'S MESSAGE

The countdown to the new millennium has begun in earnest, and I've been watching the activity in England, where I'm finishing up a sabbatical. Workers in Greenwich have been rushing like mad to complete the Millennium Dome, a 20-acre structure containing world's fair-like displays that celebrate the past and future. Nearby, the 0° meridian line lies in the shadow of a clock counting off the seconds until the new year. Above the clock a banner reads, "Greenwich Observatory — the Millennium Starts Here!" Newspapers and magazines run story after story about the "100 best" this and that of the 20th century, about the changes in society and technology that we've seen since 1900, and about the shape of the future. In the context of this hoopla, I'd like to devote this letter to a sketch of how structural geology and tectonics evolved in the 20th century, and to a guess of what the beginning of the next century may hold.

At the start of the 20th century, it had been little more than 100 years since Hutton introduced uniformitarianism, and little less than 100 years since Lyell's publication of the first comprehensive textbook on geology. Less than 50 years had passed since Darwin's publication of the theory of natural selection rattled the philosophical establishment of the Victorian world. In the wake of these ideas, geologists realized that the Earth is very old. This new-found sense of time opened the door to the birth of tectonics as a subdiscipline, for the question of how mountains, basins, and other regional features developed and became separate from the question of how the planet itself came into being. A group of researchers began to focus their attention on explaining, specifically, the construction of regional geologic structures and the field of tectonics (from the

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Rocky Mountains. It has taken a little time to get used to the 'stable' craton, but she is adapting to beautiful summers up there on the high plains (7200') !

From Mary's perspective (at Kansas State University), Barbara is still on the active plate boundary – at least when compared to the REALLY stable craton of Kansas! Mary's past includes a childhood in Illinois and later Colorado, a PhD working with Kip Hodges at MIT, a NATO post-doctoral position at the ETH in Zurich, Switzerland, a faculty position at the University of Maine, and now a faculty position at Kansas State University. You may consider Kansas in the middle of nowhere, but Kansans consider their home "half way to everywhere"!!

As for research, Barbara's interest is in deformation of the lithosphere, including field areas in the western United States, the Pyrenees, the Alps, Greece, Turkey, and Ghana. Until 1.5 years ago her research was exclusively within the continental lithosphere. Subsequently, she has been to sea twice along the SW Indian Ridge and realized there is another whole (OK, 80% of the Earth's surface) and an exciting world out there as well - don't limit your observations.

Mary's research generally encompasses mountain belt development (in the geologic sense, not in terms of condominiums). Her work has been in the Himalaya, the Alps, the northern Appalachians, and the Colorado Rocky Mountains.

With the new editorship of the newsletter we hope to carry on the excellent tradition set by Greg Davis (Scott Paterson, and most recently Scott Wilkerson) of informing the community about what is happening- in the division, in the field, and in the world. This is no easy task, so we ask you as members of the division to help us with ideas, suggestions, and comments. We will continue with the existing format (paper copy mailed to each member twice a year). For the moment we won't make any radical changes. See you at the fall meeting in Denver.

Mary Hubbard and Barbara John
Co-editors of the SG&T newsletter

from the chair, continued

Greek "tekton," meaning "to build") came into being. The study of tectonics advanced rapidly in the latter part of the 19th century, so that Edward Suess could publish one of the great master works on the subject, "The Face of the Earth," as the 20th century began. This multi-volume text synthesized tectonic knowledge of the day, and showed how complex an orogeny can be.

But of course, Suess did not know *why* regional structures formed. Geologists struggled with this issue with little success through the first half of the 20th century, largely overlooking the clues implicit in Alfred Wegner's continental-drift theory, published a decade after Suess's work. Only a few pioneers recognized the merit in a mobilist view of the Earth — most geologists continued to subscribe to contraction theory or geoscyncline theory. But these fixist viewpoints were all swept away by the plate tectonics revolution of the 1960s, an outcome of new discoveries about the sea floor. Plate tectonics theory established that we can understand mountain belts in the context of plate-boundary interactions, collisions, and rifting. So in the 1970s, geological journals filled with articles reinterpreting orogens worldwide in the context of the theory. In the '80s and '90s, the understanding of plate tectonics and its implications become well entrenched, and provided a framework in which geologists could turn their focus on understanding specific components of mountain belts. Thus, we saw a new generation of studies detailing the workings of fold-thrust belts, strike-slip systems, core complexes, rifts, accretionary prisms, magmatic systems, orogenic collapse, and on and on.

Much of the history of structural geology intimately links to the history of tectonics. But the nitty-gritty of the subject — studies of fault and fold geometry, rock fabrics, strain analysis, deformation mechanisms, jointing, etc. — should be viewed in its own right. At the beginning of the 20th century, structural geology as a subdiscipline was just developing. Researchers began to recognize the importance of understanding structural geometry, especially for mapping and for resource exploration, and were publishing the results of descriptive analysis. By the 1920s, publishers began to offer textbooks dedicated to structural geology. Contrasts in content and emphasis between these vintage books and modern ones illustrate how far the subject of structural geology has advanced in the 20th century. Our modern understanding of topics like strain analysis, fold interference, cleavage, texture, joints, fault mechanics and geometry, rock rheology, mylonites, kinematic indicators, salt structures,

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deformation mechanisms, detachments, cleavage, folding mechanisms, igneous structures, and sedimentary structures, to name a few, largely appeared in the 20th century. Structural geologists can now go to an outcrop and characterize the conditions and kinematics of the deformation, and the amount of strain the deformation resulted in. The resulting knowledge provides essential constraints on how the crust responds to stresses generated by plate movements, and links back to the study of tectonics.

Much of the content of structure and tectonics has been woven into the core of modern geology, now taught even in secondary schools. This knowledge provides the foundation for modern mineral and energy resource exploration, as well as for academic research in almost all branches of geology. We stand at the end of a century which has seen an amazing knowledge explosion in structure and tectonics. Not surprisingly, this explosion attracted students and led to the expansion of the discipline in academic geology departments. We now can choose among several dedicated journals, we have our own funding panel at NSF, and we have the largest membership of any division in GSA.

But will the growth and excitement of structure and tectonics, as a discipline, continue unabated into the next century? Thomas Kuhn, the science historian, argued that science grows through a succession of revolutions. In Kuhn's model, a revolution destroys the standard paradigm of a field, and replaces it with a completely new one. The field then experiences great excitement for some time as researchers first reinterpret known facts and then explore broader implications of the new paradigm. But after a while, understanding reaches a plateau, excitement subsides, and researchers go on to study other things. How does Kuhn's proposal apply to structure and tectonics?

Thirty-five years ago, structure and tectonics underwent the plate-tectonics revolution, and we now talk of collisions and volcanic arcs instead of geosynclines and volcanic borderlands. We have certainly passed through the first post-revolution stage of reinterpreting previously known facts — the literature contains a "plate-tectonics interpretation" of virtually all Phanerozoic orogens. And we are certainly well into the second post-revolution stage of exploring the implications of plate-tectonics theory. Some argue that we have now reached a "knowledge plateau," and should give up on structure and tectonics. Others say that the plateau still lies above us, or that even if we have attained it, we certainly haven't explored it entirely in that the waiting list of research problems remains full.

Since I'm hopefully too young to retire yet, I'll cast my allegiance with the second camp. There are still vastly exciting subjects in structure and tectonics to explore, ranging from extending our understanding of tectonics and deformation processes back into the earlier history of the earth (so that we can determine if there are long-term changes in the character of orogeny through time), to understanding the links between tectonics and recent climate, to understanding the relation between near-surface and deep-earth movements, to understanding the involvement of fluids in deformation — and there are many more.

It's clear that abundant problems remain, enough to keep researchers in structure and tectonics busy for some time to come. But to address these problems, researchers will need to learn new skills and develop new kinds of collaborations, and thus the training that students receive will have to change. Such change is already underway — we can see it in the kinds of research that funding agencies support, in the kinds of courses that professors teach, in the way that GSA has started to organize its meetings, and in the kinds of skills that industry looks for in new hires. In the age of "Earth system science," researchers must make linkages between structure/tectonics and other disciplines (e.g., geochronology, petrology, geomorphology, and geochemistry) to solve the kinds of problems that remain.

The importance of modifying curriculums in the new century was driven home by a letter that Bob Krantz recently circulated among structural geologists. Bob points out that, with the availability of high-resolution 3-D seismic that allows explorationists almost to "see" the oil underground, industry needs explorationists with more than just a knowledge of traditional structural-geology or tectonics alone. Those students who combine structure/tectonics knowledge with other skills, such as knowledge of geophysics or of sedimentary systems, may appeal more to employers. Clearly, in both industry and academia, geologists in the new millennium will be diversifying their backgrounds and will be seeking new and different collaborations. In the end, we may see a redefinition of the subdisciplines of geology.

The new millennium, of course, will usher in new tools of the trade. Desktop supercomputers will allow geologists to simulate orogenic processes in ever-increasing detail, and will allow us to extend our understanding of structural geometry from the cross-section plane into the third dimension. New high-resolution analytical equipment and techniques will provide more accurate constraints on rock ages and on rock compositions. Improved GPS instrumentation will allow us to measure strain accumulation in real time. Mappers will replace the notebook with a pocket computer and will use lasers to pinpoint locations. Space-

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based remote-sensing will give us information-rich images of Earth's surface. And of course, geologists will likely be able to practice their trade on other planets.

But changing directions, new equipment, and redefinition of subdisciplines does not mean that we should abandon a solid core of training in field-based geology. Geologists gain 3-D intuition, an understanding of Earth materials and their behavior, and an image of tectonic features only by examining them in the field. Certainly, new analytical methods and new computer power provide constraints and insight that field work alone cannot provide — but the inverse is also true. If instrumentation and computer modeling replaces, instead of builds on, field-based research and education, then advance in our understanding of how the Earth works may stall.

Wrap up a golden century of structural geology and tectonics at this year's national GSA meeting. The list of symposia, theme sessions, field trips and short courses that will take place in Denver looks fantastic! And, as always, the Division will be running its business meeting and beer fest. The board looks forward to seeing you there!

-- *Steve Marshak*

As of this writing (June 15, 1999) several things have been put in motion concerning the Earth Sciences Division, but few of them have resulted in permanent changes. The Division Director slot is currently filled by Dr. Herman Zimmerman on an "acting:" basis until a permanent replacement can be arranged. The job announcement closed June 8, 1999, and rumor has it that there was between 15 and 20 applicants. The evaluation, ranking, interviewing, selection, offering, negotiating and hiring processes will hopefully be completed by late fall, but there are numerous possibilities for delay. Stay tuned.

The two "long range" planning groups are progressing in their tasks. A GEO 2000 report is on the web as a draft vision statement (see the GEO directorate web page under the NSF homepage), and the National Academy study has had their second meeting with the final report still projected for the end of the year. Both would appreciate your continuing input.

The last Active Tectonics awards have been recommended and forwarded for funding, and at this writing no further funding for Active Tectonics is scheduled. Of course, proposals in this subject area will continue to be accepted, reviewed and hopefully funded by the regular research programs. Since the last newsletter the Tectonics program had a change in secretarial support staff, but no change in program directors staff... right now, if it is tectonics, its me. Dr. Zimmerman is exploring options to increase the program directors in Tectonics, either by temporary hires or by restoring the "rotator" position, but these options are complicated by his "acting" status as Division Director. With a lot of help from others at NSF and conscientious reviewing on the communities' part we managed to push the paper off the tectonics desk on nearly every proposal submitted last December before the 70 or so proposals from the June 1 deadline rolled in to replace them. Awards have been slower in coming out than I would have liked, but it could have been a lot worse. Thanks to everyone for reviewing promptly and cutting me some slack in getting your proposals through the review process.

This time I've been asked to comment on aspects of NSF's FastLane system of electronically doing many of the tasks done manually in the past. There is extensive information about FastLane available on NSF's web pages (Http://www.fastlane.nsf.gov) and I won't rehash this.

Instead, I'll pass a long some comments and concerns I've heard and what seems to be NSF's current ideas and plans for the project from the research communities' perspective. Basically, there are three main things that the community could (and soon must) use FastLane for: proposal submittal, doing reviews, and filing various reports. There are others, but they involve business office and financial tasks that I'll leave alone. Proposal submittal by fastlane is now optional, and 16 out of 70 of you decided to give it a try for the June 1, 1999 deadline. The intent is to require all proposal to be submitted via fastLane after October 2000. Right now, proposals received electronically via fastLane are sent to the basement where the print shop guys print 20 black and white paper copies and put them in wheelbarrows that they deposit on program desks. The program uses those copies to prepare review packages and send out to reviewers via U.S. mail as always. Of several

potential difficulties, the more obvious is the inability to handle color, format incompatibilities on figures etc. , but in general we were able to sort out the glitches. NSF is working on a way that reviewers can electronically view the proposal as it was sent, or be sent a copy electronically for reviews, but this isn't in place yet. Once you as a reviewer have read and decided what you are going to say in your review, there is a fastLane option to actually send the reviews to NSF. Of the 350 or so electronically submitted review (e-mail to Twright@nsf.gov from the last cycle, 71 were via fastlane. I haven't heard much complaint about this option, and the fact that approximately 20% of reviews came in this way probably means it is perhaps not worse than the old ways. As of now, NSF FastLane planners intend to require all reviews to be sent via fastlane after October 2000. We'll see.

Annual reports and final project reports can be sent via fastLane , and a goodly percentage now are. NSF says filing reports electronically will be required starting in October (October 99). This also seems to be working ok, as many of you are finding it is just as easy as the paper way. From the program perspective it is good, as the electronic filing seems to quickly remove the block placed on any additional funding whenever a report is overdue from the principal investigator or any of the CO – PI's.

The following awards were finalized since the last newsletter. Congratulations!

Tom Wright, Program Director, Tectonics
Earth Sciences Division
National Science Foundation
twright@nsf.com

Tectonics Awards for January 1, 1999 to July 1, 1999

PROP #	PI	INSTITUTION	TITLE
9814779	Axen	U of Cal Los Angeles	40 Argon/ 39 Argon Dating of Pseudotachylyte from Cenozoic and Mesozoic Detachment Faults and Reverse-Sense Mylonite Zones, Southern California: Methodology and Interpretation
9814381	Baldwin	U of Arizona	GSA Penrose Conference Entitled: "Mid- Cretaceous to Recent Plate Boundary Processes in the Southwest Pacific"
9814787	Bartley	University of Utah	COLLABORATIVE RESEARCH: Interpluton Wall Rock Screens in the Sierra Nevada and their Bearing on Pluton Emplacement Processes
9814807	Brandon	Yale University	Strain and Mass Transport Associated with Ductile Exhumation of the Torlesse Accretionary Wedge
9903418	Cashman	U of Nevada Reno	Collaborative Research: Extent, Style and Tectonic Significance of Pennsylvania Deformation in the Great Basin: A Test of Late Paleozoic Tectonic Models for the Western U.S.
9814377	Cole	Allegheny College	RUI: Early Tertiary Volcanism Across the Wrangellia Composite Terrane and McKinley Fault, South-Central Alaska: Influence of Accretionary and Strike-Slip Tectonics on....
9814788	Coleman	Boston University	COLLLABORATIVE RESEARCH: Interpluton Wall Rock Screens in the Sierra Nevada and their Bearing on Pluton Emplacement Processes
9903012	Davis	U of Southern California	Origin of the Mesozoic Yinshan Fold-and-Thrust Belt of Northern China -- An Enigmatic Intraplate Orogen
9814789	Glazner	U of NC Chapel Hill	COLLABORATIVE RESEARCH: Interpluton Wall Rock Screens in the Sierra Nevada and their Bearing on Pluton Emplacement Processes

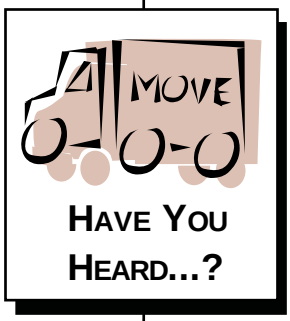
Tectonics Awards for January 1, 1999 to July 1, 1999 (*continued*)

PROP #	PI	INSTITUTION	TITLE
9814889	Hacker	U of Cal Santa Barbara	Exhumation of Ultrahigh-Pressure Rocks in the Scandinavian Caledonides
9902704	Holm	Kent State University	Collaborative Research: Post-Penokean Crustal Stabilization in Lake Superior Region, North-Central United States
9815028	Kleinspehn	U of Minnesota-Twin Cities	Geodynamics and Neotectonic Forearc Deformation: Late Pliocene-Recent Basins, Hellenic Arc (Greece)
9902712	Kodama	Lehigh University	Collaborative Research: An Inclination Correction for the Valle Group Strata: Determining the Cretaceous Paleolatitude of the Southern Peninsular Ranges Terrane
9902968	Lee	U of Cal Santa Barbara	Collaborative Research: Dynamics of Intraplate Fault Systems in the Northern Basin and Range Province
9817962	Mahoney	U of Wisconsin Eau Claire	Support for a GSA Penrose Conference "Terrane Accretion Along the Western Cordilleran Margin: Constraints on Timing and Displacement
9814303	Royden	MIT	Crustal Rheology and Continental Deformation
9903166	Simpson	Boston University	40Ar/39Ar Dating of Metamorphism and Crustral Reactivation in the E. Sierras Pampeanas Arc, Argentina
9903259	Smith	Vanderbilt University	Collaborative Research: An Inclination Correction for the Valle Group Strata: Determining the Cretaceous Paleolatitude of the Southern Peninsular Ranges Terrane
9903006	Snyder	Boise State University	RUI: Collaborative Research: Extent, Style and Tectonic Significance of Pennsylvanian Deformation in the Great Basin: A Test of Late Paleozoic Tectonic Models for the Western U.S
9814669	Teyssier	U of Minnesota-Twin Cities	A Combined Structural-Petrological Analysis of the Origin and Role of Partial Melting in Orogens
9902762	Van Schmus	U of Kansas Ctr for Res In	Collaborative Research: Post-Penokean Crustal Stabilization in the Lake Superior Region, North-Central United States
9903366	Wernicke	California Inst of Tech	Collaborative Research: Dynamics of Intraplate Fault Systems, Northern Basin and Range Province

ATTENTION GRADUATE STUDENTS:

The Structure and Tectonics Division of GSA will provide a few awards of $100 each to help subsidize the cost of Division-sponsored field trips at GSA meetings. If you are interested, send your name, your advisor's name, your institution, what year you are in school, and the title and leader of the field trip that you are interested in attending to Dr. Charles Onasch by email, by September 15, 1999: conasch@bgnet.bgsu.edu.

We plan to continue the "Have you Heard…?" section of the newsletter so keep your contributions rolling in to Barbara or Mary. Congratulations go out to **Win Means** who was awarded the **Bruce Hobbs** Medal by the Geological Society of Australia and then further honored at a meeting in Neustadt, Germany. So much for a relaxed retirement Win! Happy 90th birthday to **Don Blackstone** in Wyoming and happy 80th to **George Thompson** in California. **Greg Davis**, moving up from the newsletter editorship, has been elected to the Vice-Presidency of the University of Southern California Academic Senate, with the Presidency coming up in 2000-2001. Good luck to Greg, we just hope that this doesn't set a precedent for newsletter editors! Congratulations to **Phyllis Camilleri** for her recent promotion to Associate Professor at Austin Peay State University. **Dick Tosdal**, formerly of the USGS, is now director of the Mineral Deposits Research Unit, an industry- UBC consortium focused on training graduate students in economic geology. **Sharon Mosher** is GSA's candidate for Vice-President of the Society.



The SG&T Division extends its thanks to **Ben van der Pluijm**, of the University of Michigan, who started the SG&T Division web page and has maintained it for the past few years. Ben has turned over the responsibility of the web page to **Steve Hurst**, of the University of Illinois. Steve welcomes any items that you wish to have posted. Please contact him at shurst@uiuc.edu. There is an automatic link from the old site to the new one: http://www.geology.uiuc.edu/SGTDiv/. With all of his additional free time now, Ben has decided to take on the co-editorship of GEOLOGY, succeeding Division member **Carol Simpson** from Boston University. Carol is filling her additional free time as the Associate Provost for Research and Graduate Education as well as Chairman of the Department. So much for free time for anyone! Carol has been also involved in depleting the Kansas population by hiring **Terry Plank** and **Geoff Abers**, formerly at the University of Kansas. Geoff looks at how subduction zones shake and Terry looks at how their recycling programs handle sediment. Terry was last year's Donath medalist.

Congratulations to **Shoufa Lin**, **D. Jiang**, and **Paul Williams** for the 1998 Best Paper Award from the Structural Geology and Tectonics Division of the Geological Association of Canada. Their paper is:

Lin, S., Jiang, D., and Williams, P.F., 1998, Transpression (or transtension) zones of triclinic symmetry: Natural example and theoretical modelling: Geological Society, London, Special Publications, No. 135, p. 41-57.

There has been quite a bit of movement amonst the recent PhD's and postdocs. **Aaron Yoshinobu**, a recent student of **Scott Paterson** at USC, took a position at Texas Tech. **Taixu Bai** will move into a Postdoc position at Stanford, where he was also a PhD student of **Dave Pollard**. Other news from Stanford includes two of **Atilla Ayden**'s Master's students, **Judson Jacobs** and **Adeoye Koledoye**. Judson is taking a position with the Mitchell Madison Group of Boston and Adeoye is taking a position with Chevron in Nigeria. **Jason Lore**, a PhD student of Atilla Ayden took a position with BP/Amoco in Houston. **Laurent Maerten** took a job with the Institut Francais du Petrole in Paris after completing his PhD with Dave Pollard. **Bruno Lafrance** is moving to a structure position with Laurentian University in Sudbury Ontario following post-doc positions with **Ron Vernon, Barbara John**, a PhD with **Paul Williams** in New Brunswick and a stint with Sask Energy and Mines. University of Vermont has hired **Keith Klepeis**, who vacates a position at the University of Sydney, Australia. Keith was a PhD student of **Sharon Mosher** and **Ian Dalziel** at the University of Texas and he had been a postdoc with **Lincoln Hollister, Maria Crawford**, and **Krishna Sinha**. **Tanja Zegers** from the University of Utrecht with join the University of Michigan's Tectonophysics group as a post-doctoral fellow working on Archean geochronology and paleomagnetism. **Jan-Cees Blom** from the University of Delft will U. Michigan to work on basin inversion. (Is there some sort of Dutch connection going on?!!!) **Jeffrey Amato** (PhD, Stanford, 1995) will take a structure position at New Mexico State University. **Jan Vermilye** (Lamont/Columbia PhD, 1996, with **Chris Scholz**) has taken the faculty position at Whittier College. Cal State Fullerton has hired **Phil Armstrong**, a PhD student **of Dave Chapman** at the University of Utah. **Jon Caine**, also from U.Utah (PhD student of **Craig Forster**) will do a one-year postdoc with the USGS and then take an assistant professorship at SUNY-New Paltz. **Shoufa Lin** just began an associate professor position at the University of Waterloo. Shoufa will move from Manitoba Energy and Mines. He was a PhD student of **Paul Williams** at the University of New Brunswick. **Tim Paulsen** (PhD at the University of Illinois with **Steve Marshak**, postdoc with **Terry Wilson** at Ohio State) will be an assistant professor at the University of Wisconsin, Oshkosh.

1999 Denver GSA Annual Meeting

October 25-28, 1999

Members of the SG&T Division should make note of the following sessions, symposia, and short courses. Some of these are Division-sponsored and others are just likely to be of interest. We've included a number of the education-related sessions because many of us are in that business as well. The meeting theme is "Crossing Divides" and will address the multi-disciplinary nature of the geosciences. This theme is obviously very appropriate to most tectonic studies. The June issue of GSA Today and the GSA web page have complete listings of symposia, theme sessions, short courses, field trips and other registration-related information.

Organizers for Division-sponsored or co-sponsored symposia or theme sessions should submit reviews of their sessions to Barbara or Mary for inclusion in the March 2000 Newsletter.

K07 The Case for Steady-State Mountain Belts: Observations, Models, and Implications for Global Tectonics Organizers: Peter L. Knuepfer, Frank J. Pazzaglia.

T33 Crossing the Greatest Divide: The Earth Sciences, the Humanities, and the Needs of Society Organizers: Robert L. Frodeman, Eldridge M. Moores.

T56 The Case for Steady-State Mountain Belts: Observations, Models, and Implications for Global Tectonics (poster) Organizers: Frank J. Pazzaglia, Peter L. Knuepfer.

T57 Granite Systems and Proterozoic Lithospheric Processes Organizers: William R. Van Schmus, Carol D. Frost.

T58 Role of Supercontinents in Earth History: Assembly and Dispersal of the Rodinian Supercontinent (1300-750? Ma), and Impacts on Evolution of the Proterozoic Biosphere, Hydrosphere, and Crust-Mantle System Organizers:. Christopher M. Powell, Richard E. Hanson, *SG&T sponsored.*

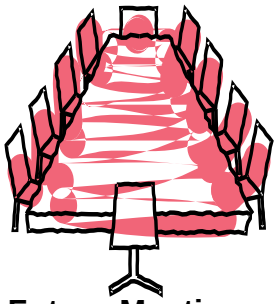
SHORT COURSES

Digital Mapping Methods: Accurate Digital Data Capture and Analysis for the Field Geoscientist
Saturday–Sunday, October 23–24. Kent Nielsen, Carlos Aiken, University of Texas at Dallas. Fee: $385, students $365. C.E.U. 1.6.

Introduction to Remote Sensing for Geologic Applications
Saturday–Sunday, October 23–24. Cosponsored by GSA Planetary Geology Division. Andrea Gallagher, Research Systems, Boulder, Colorado; Rebecca Dodge, University of Texas at El Paso; K. Eric Livo, U.S. Geological Survey, Denver. Fee: $325, students $305. C.E.U. 1.6.

Modern Salt Tectonics
Saturday–Sunday, October 23–24. Cosponsored by GSA Structural Geology and Tectonics Division. Mark G. Rowan, Rowan Structural Consulting, Boulder, Colorado. Fee: $265, students $245. C.E.U. 1.6.

3-D Seismic Interpretation: A Primer for Geologists
Saturday–Sunday, October 23–24. Cosponsored byGSA Sedimentary Geology Division. Bruce S. Hart, New Mexico Bureau of Mines and Mineral Resources. Fee: $280, students $260. C.E.U. 1.6.



Future Meetings, Conferences, & Courses

(Notices of future meetings, conferences, and short courses of interest to Division members are welcomed by the editors. Further information can also be found on the Society Web page.)

1999

Sept. 7-8: The Deformation of Glacial Materials, conf., Burlington House, Piccadilly, London . Contact: Bryn Hubbard, Centre for Glaciology, Institute of Geography and Earth Sciences, University of Wales, Aberystwyth, Ceredigion SY23 3DB, U.K. E-mail: byh@aber.ac.uk, WWW: http://www.aber.ac.uk/~byh/dgm99.html.

Sept. 11-16: The Deep Earth: Theory, Experiment, and Observation, Acquafredda di Maratea, Italy. Contact: WWW: http://www.esf.org/euresco.

Sept. 12-15: American Association of Petroleum Geologists, int'l. mtg., Birmingham, England. Contact: AAPG Conventions Dept., P.O. Box 979, Tulsa, Okla. 74101-0979. Phone: 918/560-2679. Fax: 918/560-2684.

Sept. 13-15: 2nd ESIS TC4 Conference on Fracture of Polymers, Composites, and Adhesives, Les Diablerets, Switzerland. Contact: Amy Richardson: Tel: +44 (0) 1865 843643, http://www.elsevier.nl/locate/esis99.

Sept. 16-18: Gold in Carolina and America: A Bicentennial Perspective, symposium, Charlotte, N.C. (Gold History Corporation) Contact: Bicentennial Symposium, 9621 Reed Mine Road, Stanfield, N.C. 28163. Phone: 704/721-4653. Fax: 704/721-4657. E-mail: reedmine@ctc.net.

Sept. 24-26: Deepwater Channel Complexes of the Brushy Canyon Formation, Delaware Mountains, Texas, Annual Field Trip, by the Permian Basin Section, SEPM, Society for Sedimentary Geology. Contact: Paula Mitchell, Phone: 915/683-1573. E-mail: wtgs@basinlink.com.

Oct. 5-8: American Institute of Professional Geologists, ann. mtg., Anchorage, Alaska. Contact: AIPG, 8703 Yates Drive, Suite 200, Westminster, Colo. 80030. Phone: 303/412-6205. Fax: 303/412-6219. E-mail: aipg@netcom.com.

Oct. 8-10: Event and Cyclic Stratigraphy of Mid-Paleozoic Strata of the Cincinnati Arch, field conf., Cincinnati, Ohio, by SEPM. Contact: WWW: http://ucaswww.mcm.uc.edu/geology/algeo/Fieldtrips/SEPM99_homepage.htm.

Oct. 19-22: AIMEX '99: International Mining Exhibition, Homebush Bay, Sydney, Australia. Contact: George Martin, Red Exhibition Companies. Phone: (02) 9422 2511.

Oct. 25-28: Geological Society of America Annual Meeting, Denver, Colorado. Contact: GSA Meetings Dept.: phone (303) 447-2020, ext. 133.

Nov. 23-24: Petroleum/Geology Conference, Kuala Lumpur, Malaysia. Contact: Geological Society of Malaysia. Barney Mahendran. Phone: 603-7577036. E-mail: geologi@po.jaring.my.

Dec. 13-17: American Geophysical Union 1999 Fall Meeting, San Francisco, California. Contact: www.agu.org.

2000

Mar. 6-9: Society for Mining, Metallurgy, and Exploration, ann. mtg., Salt Lake City. Contact: SME Phone: 303/973-9550. E-mail: smenet@aol.com.

Mar. 8-9: The Nature and Tectonic Significance of Fault Zone Weakening (international meeting), Geological Society, Burlington House, London. Contact: Dr Bob Holdsworth, Dept of Geological Sciences, University of Durham, Durham DH1 3LE. Fax: +44(0)191-374- 2510, R.E.Holdsworth@durham.ac.uk.

Mar. 13-17: 2000 31st Lunar and Planetary Science Conference, Houston, Texas, by the Lunar and Planetary Institute (LPI) and the NASA Johnson Space Center. Contact: LeBecca Simmons Phone: 281/486-2158 E-mail: simmons@lpi.jsc.nasa.gov.

March 27-31: Volcanic Rifted Margins (GSA Penrose Conference), Royal Holloway, University of London, Egham Surrey. Contact: Ian Davison, Royal Holloway, University of London, Egham, Surrey TW20 OEX UK, phone 44-1784-443615, fax 44-1784- 471780, davison@gl.rhbnc.ac.uk.

2000 continued:

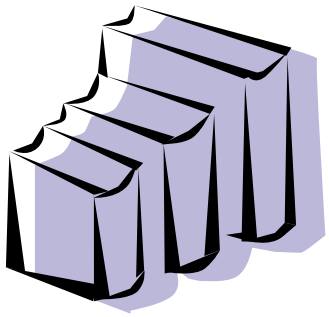
Apr. 16-19: American Association of Petroleum Geologists, ann. mtg., New Orleans, La. Contact: AAPG, 1444 So. Boulder Ave., P.O. Box 979, Tulsa, Okla. 74101-0979. Phone: 918/560-2639. Fax: 918/560-2626.

May 7-11: Salt Symposium, The Hague, The Netherlands. Contact: Secretariat, Phone: 31 74 2443908. Fax: 31 74 2443272. E-mail: Salt.2000@inter.NL.net.

May 15-18: Geology and Ore Deposits 2000: The Great Basin and Beyond, symposium, Reno and Sparks, Nev., by Geological Society of Nevada, Nevada Bureau of Mines and Geology, and others. Contact: Geological Society of Nevada, P.O. Box 12021, Reno, Nev. 89510-2021. Phone: 702/323-3500. Fax: 702/323-3599.

Oct. 11-15: American Institute of Professional Geologists, ann.mtg., Milwaukee, Wis. Contact: AIPG, Phone: 303/412-6205. Fax: 303/412-6219. E-mail: aipg@netcom.com.

Nov. 13-16: Geological Society of America, ann. mtg., Reno, Nev. Contact: GSA Meetings, Phone: 303/447-2020, ext. 164. Fax: 303/447-1133.



Book Review Comment

Principles of Rock Mechanics?

How often have you come across a bookreview which disreputed a book you had read before and liked very much? I have seen it many times. For example, shortly after its publication, one of John Ramsay and Martin Huber's textbooks, now an undisputed classic, was harshly reviewed in a regional journal by my own PhD supervisor. Gerhard Oertel's recent milestone text on stress tensors got overly negative reviews in one place and raving support in others. Surely, you have wondered yourself about similar cases of discrepancy between your perception, reality and the pitch of book reviews. This time I have been taken aback by a particularly bitter review of my own book "Principles of Rock Mechanics," published in the electronic Newsletter of the SG & T Division of the Geological Society of America (Fall Newsletter, volume 17, no. 2, September 1998, by W.C. Haneberg; see also footnotebelow). Starting with a grave error in the title if my book, misnomed by the reviewer as "Fundamentals of Rock Mechanics," things did not get any better as I read on. For example, the review introduced my work as an "idiosyncratic textbook," and concluded with a non-recommendation: "I opened the book unfamiliar with Ruud Weijermars' work"...."and closed it in disappointment." SG & T Division of the Geological newsletter is a resource of authority, and the above review cannot be interpreted other than "destructive." Fortunately, the many years of tedious preparation in writing my book have led to extremely positive reviews in numerous other prominent journals. Take,for example, the review of "Principles of Rock Mechanics," published in EOS, Transactions, American Geophysical Union (Vol. 79, no. 41, Oct. 13, 1988, p.496) by N.M. Beeler, USGS Menlo Park: "This book truly excels in the definition, detailed description of measurement, and discussion of rheological constants..." "The text is well written and often provides fascinating historical perspectives when introducing new concepts." "The book has problem sets and the large majority of the problems are unique..." Beeler's review exudes favourable recommendations and endorsement. And there are many others; you can find a reproduction of all independent book reviews at my publisher's website: http://www.alboran.com . Although, I cannot hope to change the opinion of W.C. Haneberg, he conceded in his review that ".. the approach taken in Part 2 of the book is popular among many structural geologists." But my book was written with intense focus on basic principles. These are the principles which I recognized are important to students. Better listen to Dr. Beeler, who concluded his review with: "At $27.95, it is a bargain."

Ruud Weijermars

Footnote: Lucian B. Platt wrote a very instructive review of "Structural Geology and Map Interpretation," the companion book of "Principles of Rock Mechanics," in the same Newsletter.

TRIBUTE TO PETER J. CONEY [1929-1999]

In May 1998, at The University of Arizona graduation ceremonies, Peter J. Coney was awarded the coveted College of Science Career Distinguished Teaching Award. The very next day, which was Peter's first day of retirement, "The Senior Partner" was diagnosed with lymphoma. He died February 20, 1999 at age 69. On that day the world lost an extraordinarily gifted, deeply-insightful scientist and intellectual. Those personally touched by him lost a dear friend. All of us who have dedicated our professional lives to structure-tectonics lost a major player. Our hearts go out to Peter's wife Darlene, their son Michel, and their daughter Marian.

"Renaissance man" applies to Peter Coney. His intellectual interests and artistic talents covered tremendous scope. His grasp of concepts at fundamental levels in multiple disciplines was uncanny. Peter consumed the literature and exposed the essence of observations and relationships routinely and effortlessly. He always seemed to know what to ignore ('it's a non-problem) or to avoid (that's just mop-up'). Peter had the gift of grasping the core elements of complex systems. He would coin language that would capture the imagination and trigger the reactions of others: "suspect terranes," "metamorphic core complexes," "mid-Tertiary ignimbrite flare-up," "exploding water cushions," "asthenosphere to the grass," "good 'ole Yankee American continental crust." He presented ideas with authority. A student remarked quietly to me during one of Peter's interview lectures: "He looks like a trucker who owns his own rig." On field trips this geologist-trucker always had chocolate-chip cookies on his dashboard.

How could someone have such a reach and be so productive, yet not be a complete geoholic? How did he have time while addressing the special challenges of field-oriented global tectonics to build all of the furniture in his house (with the exception of one leather chair); to construct and operate an HO model railroad line in his backyard; to build from scratch a scaled 5-foot replica of the Queen Mary using the original construction blueprints which he pulled off of the WEB; to paint marvelous landscapes and portraits; to probe the considerable depths of writings of Henry , Noam Chomsky, and others; and to sit around and play guitar or banjo. Never hurried, seldom stressed, rarely impatient, always contemplative, ever well-read, incessantly surprising, Peter invested his efforts and his devotions in things that counted most: family, students, colleagues, and IDEAS. In the way he lived and thought, he ignored fastidiously the goading expectations of popular society. In pursuing ideas he seemed to do his very best to ignore the normal protocol of "how to succeed in science." Certain people in high places recognized Peter's wisdom instantly. One was President James Armstrong, Middlebury College, who drew Peter into his immediate advisory group when Peter was still Assistant Professor.

After earning his BA degree in geology from Colby College and a MS in geology from the University of Maine, Peter went to Paris and earned a petroleum engineering degree from Ecole Nationale Supe rieure du Petrole. As part of this program he carried out field investigations in the French Alps. Peter thought about the earth panoramically, and it was in the French Alps where he really learned to give expression to his panoramic vision through developing the "Coney" touch in artistic and insightful rendering of structure sections. Peter carried out his PhD program at The University of New Mexico, attracted there by the reputation of Vince Kelley, who became Peter's research advisor. The University of New Mexico was also the source of a lifelong treasured friendship with Wolf Elston, who was a member of Peter's research committee and mentor. Peter's PhD research in Cordillera Huayhuash (northern Peru) was a first and deliberative step in coming to experience firsthand the entire Cordillera. His PhD research-goal statement to advisor Vince Kelley was to understand the Cordillera of North and South America...the whole thing. Throughout his career he examined firsthand the "cordillera" of other continents, always cross-comparing. In the field his feet would stand firmly on one continent or geologic province while his mind often would fasten on another. Once we were together with Ken McClay in the Moines near Durness, Scotland. I was on my hands and knees looking at strained worm burrows with my hand lens. Peter stood there, drew on his pipe, stared at the Cambrian pipestone, and said, "Looks like the Potsdam Sandstone."

Peter grew up in Maine. His parents were English, and Quaker, and they arrived to America just three

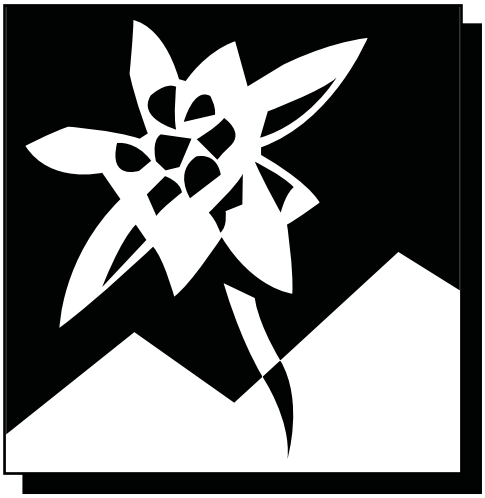
years before Peter was born. Peter fulfilled military obligations by working in an American Friends Service Committee-United Nations project in community development in rural El Salvador. In fact, it was in El Salvador that Peter and Darlene met and became a devoted lifelong team. From El Salvador, the Coneys went to Zion National Park; this was before heading to The University of New Mexico. While working for the Park Service, Peter realized that the public was having a very difficult time visualizing the geographic and geologic relationships between Zion Canyon, Cedar Breaks, Bryce Canyon, and Grand Canyon. Motivated as always by the desire to picture (he always pronounced it "pitcher") and clarify, Peter worked at night on his own time to create the famous panoramic block-diagram that is displayed so prominently and sold so abundantly in the National Parks and Monuments of the Southwest. Only years later did Peter learn that it had been printed and published. I was in fact present when he opened a letter that requested his permission to have the cross section go into a *second* printing! He had not even known that there had been a first printing, one that failed to acknowledge that Peter had conceived and rendered the original. In classic Coney fashion, Peter never answered the letter. I recall him saying: "By simply doing what needed to be done, I created something that will reach and impact more people than anything I have ever written or ever will write in my professional career. That must be telling us something."

There is another Park Service story that tells us a lot about Pete Coney. One of his jobs was to answer the mail. A man in California wrote and inquired about the best time to visit Zion. Peter replied in a long letter describing the glory and essence of each season. One evening, well after dark, Peter returned from his rounds as Ranger Cop back to the main office. A man stepped out of the shadows (he had been waiting for an hour or more), introduced himself as the person who had inquired about the timing of a visit to Zion, and then said: "I have paid taxes to the government for decades, and for the first time in my life I have been given more for my money than I should ever deserve. Your letter was magnificent, and everything this season was as you described it!" This kind of effusive exclamation and praise would be echoed again and again by students in gratitude for what Peter had given them, and the care with which it was given.

Peter and Darlene treasured their experience at Middlebury, often mentioning the selfless generosity and high energy of geology professor Brew Baldwin, and the immense wisdom and heralded leadership of President Armstrong. In the earliest 1970s Peter had transformed introductory courses and the overall curriculum with infusions of the global context of plate tectonics and seafloor spreading. He and his Middlebury colleagues fashioned a flexible set of requirements that left open the possibility of "picking off" bright chemistry, math, physics, and biology majors who would discovery geology (*aka*, tectonics) in their junior year. Peter would be recruited away from Middlebury early in his career, while still an Associate Professor. Yet, his impact there was huge. I once made a presentation to faculty, alumni, and friends of Middlebury College. Nearly 800 people were in attendance. When I stepped to the podium I said: "I have always had a warm spot in my heart for Middlebury College, for my closest friend and colleague is Peter Coney." This was 1990. Peter had left in 1975. At the mention of the name "Peter Coney," there was a roar of applause and standing ovations. At the break in the program, people came up to me to make contact with Peter. President Emeritus Armstrong was among them.

Peter saw opportunities at the University of Arizona. An outside academic review committee had recommended that Geosciences add a senior person in structure-tectonics, an area they saw as one of potential. When Peter was offered the position, he came to me and said: "I would love to come, but if in any way I would interfere with you and your program, I would not consider coming." He meant it. Of course his coming gave me wings. His arrival was soon followed by Bill Dickinson, creating altogether the period that Peter referred to privately as "heroic years" marked by momentum and the thrill and satisfaction of generating ideas that build programs and attract good students. Peter's #1 teaching goal was to create opportunities for students to carry out regional tectonic synthesis. He wanted students to learn how to wade the deep waters of structural, stratigraphic, petrologic, geochemical, geochronologic, and geophysical data, and to emerge on the other side

with something coherent and meaningful. His first-semester course reviewed gloriously the history of tectonic analysis and presented the tools, basic concepts, and methods. His second course was an applied regional analysis, choosing each time a different region of the world. Peter walked the room while teaching. He would bend and peer directly into the eyes of students while continuing to lecture at close range. He was comfortable, even in the classroom, with *long* silences. Peter, from behind, would gently place his hands on a student's shoulder while still talking tectonics. Peter was legendary as a teacher and mentor, often as effusive in language and conversation in classroom and seminar settings as he was taciturn in other settings, notably certain professional meetings and most faculty meetings. There is no one I have ever observed in my career who was more devoted to supporting new faculty colleagues. He would take their classes or seminars. He would affirm their work. He would learn from them. He would provide a presence that no new faculty member could ever anticipate from a busy colleague. Also, Peter was a master of ignoring bureaucracy. One of my contributions to luring him to The University of Arizona was assuring him that the Dean "would have absolutely no affect on your daily life," an expression that Peter apparently loved, for he would feed it back to me at least twice a year.



I do not dwell here on Peter's scientific accomplishments, which are well known to many. Titles of papers with which the Coney name is associated tell part of the story: "Cordilleran Tectonics and North America Plate Motion" (1972), "Cordilleran Benioff Zones" (1977), "Mesozoic-Cenozoic Cordilleran Plate Tectonics" (1978), "Geological Development of Metamorphic Core Complexes" (1979), "Cordilleran Suspect Terranes" (1980), "The Growth of Western North America" (1982), "Tectonostratigraphic Terranes and Mineral Resource Distributions in Mexico" (1984), "The Lachlan Belt of Eastern Australia and Circum-Pacific Tectonic Evolution" (1992), "Syn-tectonic Burial and Post-Tectonic Exhumation of an Active Foreland Thrust Belt, Southern Pyrenees, Spain (1993), Consolidation of the American Cordilleras" (1994), "Plate tectonics and the Precambrian-Phanerozoic Evolution of Australia" (1995), and "Tectonic Setting and Terrane Accretion in Precambrian Orogens" (1996). The Structure and Tectonics Division of the GSA extended to Peter the Best Paper Award for 1984. In Peter's own words (1990): "I had the privilege and good fortune to have been involved in varying degrees of intensity and participation in four exciting ideas in the earth sciences over the past 26 years: the application of plate tectonics to mountain system evolution, the role of calderas and ignimbrites in geologic history, the discovery of metamorphic core complexes and the importance of continental extension in mountain system evolution, and the concept of suspect terranes in the history of the Pacific Rim." Peter placed high value on professional colleagues with whom he worked closely on collaborative projects both in research in teaching, ...colleagues at Middlebury College, The University of Arizona, the US Geological Survey, Royal Holloway University (where he served as Visiting Professor), and BHP Minerals International (where he served as Visiting Research Scientist). Oliver Warin of BHP recalls "the quiet persistence with which [Peter] tried to make scientists of us, insisting on a basis of observed data rather than merely a 'good idea with a lot of enthusiasm' as sufficient reason for a decision. ...I remember this man for his quiet grace."

In an invited lecture (1990) on the "Future Evolution of Geology," which Peter presented to the Department of Geology, University of New Mexico, we see yet another glimpse of the man and his mind: "I have always felt as I pass from the turmoil of urban streets through the gates and onto the campus of an institution of higher learning, anywhere in the world, a sense of relief and comfort, solemnity and freedom. The feeling is not unlike that when one enters a National Park, for that is what Colleges and Universities are – they are sanctuaries, preserves – *of civilization*. They are the only institution in the course of human endeavor whose sole purpose and mission is to know the course, content, and directions of civilization, to understand,

preserve, protect, and transmit these findings, and to seek further advances and new insights into the truth of ourselves and our world." ...We should "try to recognize the kinds of educational environments that might encourage the germination of fresh ideas in the geological sciences. Rigor and the necessity of hard work should be, of course, part of any educational message. But the key is getting the right people, putting them in an environment which gives the time for thought and reflection, and providing the encouragement to pursue the important issues that intrigue them. That environment should also assure exposure to all the necessary skills and the best ideas and conceptual frameworks of the time, and provide stimulation from an active, well-read, thoughtful, positive, innovative, and open faculty, all in an atmosphere of freedom and tolerance. Like libraries that have to have all the books to make sure they have the one somebody needs, we have to have the freedom at universities to tolerate and encourage all sorts of individual diversity, both in faculty and students, so that we can be sure that the best mind gets the exposure to the best cognitive resources which might enable that one in a million new idea that can change the course of a discipline, or civilization."

In 1990 (October 11), I received a letter from Peter: "BHP in Australia is back nibbling at my toes. They have asked me to think about masterminding a new project on the Precambrian of Australia. If it goes it would be a great finale and satisfy a long desire to end up in the murk of basement. I am still debating in my mind if I want to get in so deep again, but the possible opportunity of a summer in Perth, trips to the Pilbara, coming home with Darlene by way of Ireland and Scotland, and more trips back and forth to Australasia is hard to walk away from. We shall see. I will never get my books written."

Peter did not get his books written, for the challenges of the complexities of the murk of basement were simply too fetching. I personally think that Peter may have viewed the writing of his books as "mop up." He was not a man for mop-up. His quest was for fresh and significant ideas, and his desire was to be there first. He did not conform to the popular expectations of American society or scientific societies, but instead was radically individualistic, motivated by something deep that I believe he saw with stark clarity in the human spirit, in human history, in the human condition, and in the natural world. Peter has now moved from the dark murk of basement, has moved beyond the turmoil of urban streets, has moved through the gates to relief, comfort, solemnity and freedom. May he rest in peace.

George H. Davis,
The University of Arizona

1998-1999 Structural Geology and Tectonics Division

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If you have any suggestions, ideas, professional and technical opinions, announcements, career changes, not-for profit offerings, and/or industry news, please send them to us! The deadline for inclusion of materials in the next issue will be January 15, 2000.

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