



STRUCTURAL GEOLOGY AND TECTONICS DIVISION Newsletter

Volume 20, Number 1

March 2001

TWO OF THE WORLD'S OLDEST EARTH SCIENCE ORGANIZATIONS COLLABORATE IN

"STUDY OF PLANET EARTH AND BEYOND"

The Geological Society of America (established in 1888) and the Geological Society of London (established in 1807) will co-convene "Earth System Processes" June 24-28, 2001, in Edinburgh, Scotland, to take an updated look at how the Earth works. Recognizing the rising importance of holistic approaches to the study of our planet, they're also inviting colleagues from other scientific disciplines to join them.

Scientists will explore Earth system linkages, the relationships among solid Earth and the hydrosphere, atmosphere, cryosphere, and biosphere. They will also examine Earth system evolution and how processes controlling the nature of the planet have changed since the birth of our solar system 4.5 billion years ago.

continued on page 2

Table of Contents

Chairperson's Message	1-2
'Study of Planet Earth'	1-2
SG&T Board Minutes	3
NSF News	4-5
Career Contribution Award	6-7
Best Paper Award	7-8
The Resource Bin	8
Student Announcements	9
Meetings	10
Have You Heard...?	11
Thanks to Charlie Onasch	11
Division Contacts	12

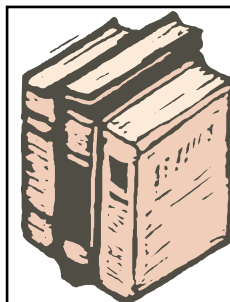
I wish you all a productive and successful year. First and foremost, I'd like to thank the former Chair, **Jane Selverstone** who gave a lot of her time and energy to make sure that things happened, and in a timely manner (thank you Jane from all of us!). Fortunately, Jane is still on the SG&T board, and I am sure I will be drawing on her experience as this year unfolds. **Charlie Onasch**, Secretary/Treasurer and Division's long-term memory was happy to pass on his memory to **Peter Vrolijk**; thanks a lot, Charlie, for your great efforts with bookkeeping and words of wisdom, and Peter, welcome on board! Welcome also to **Martha Withjack** who has been elected second-vice Chair.

I would like to also recognize a number of people who just retired from committee duties. They have made great contributions to the Division, after having served some of the most important goals of the Division for several years: **Kip Hodges** (Career Contribution Award Committee), **Steve Wojtal** and **Joanne Stock** (Best Paper Award Committee), and **Meghan Miller** (Short Course Committee). The health of the Division is very dependent on your efforts, and on behalf of all the members, I thank you for a job well done! This also means that we have a number of people who have accepted to chair or become new members of key committees. **Ron Bruhn** is chairing the Career Contribution Award Committee; he is assisted by **Margi Rusmore** and **Jan Tullis**, who has just been appointed to the committee. The Best Paper Award Committee is led by **Sandra Wyld**; present members **Mike Williams**, **Sue Agar** and **Gary Axen**, have been joined this year by **Rick Law** and **Paul Umhoefer**. The Short Course Committee is chaired by **Marcia Bjornerud**, assisted by **Andrew Meigs**, **Basil Tikoff**, and **Martha Withjack**.

For all of us Division members, the best way to thank these people is to make their jobs easier, which means we need to participate. In their search for awards, the people on these committees will be proactive: they'll contact us by e-mail or other means within the next few months to solicit nominations. Please take a moment to think about a few good papers and names of colleagues who you think deserve to be on the roster for career contribution awards. Or, if you have ideas for short courses, to organize or to request, please contact Martha or me. With the ease of communication these days, all members should feel free to "be in touch" with us regarding the Division's affairs. A list of addresses of members of the board as well as committee members is available at the web site currently maintained very nicely by **Steve Hurst** (<http://www.geology.uiuc.edu/SGTDiv/>).

The Division's business meeting in Reno was well attended in spite of difficulties finding the room, because of construction. It is always a pleasure to participate in presentation of awards on behalf of the Division. The Student Research Awards were presented to **Alexander Bump** (University of Arizona) and **Emily Onasch** (University of California at Santa Barbara). **Brad Hacker** gave the citation for the Best Paper Award that went to **Cees Passchier** and **Rudolph Trouw** for their

continued on page 2



CHAIRPERSON'S
MESSAGE

comprehensive book *"Microtectonics"*. Cees accepted the award, reminiscing on their student days in **Henk Zwart's** classes. I liked the bit about the habit they had to cut rocks perpendicular to lineation until once, by accident, they made a section parallel to lineation and saw a wonderful display of rotated grains! **Clark Burchfiel** (in collaboration with **Chris Powell**) gave the citation for the Career Contribution Award, which was presented this year to **S. Warren Carey**. **David Groves** gave the acceptance on behalf of Carey, whose insight into geological processes went far beyond the expanding Earth theory. Carey championed continental drift in the 50's and gave a series of lectures at Yale University in the 60's that were influential in the development of plate tectonics theory. I would like to thank the members of the committees (see list above) that worked hard and thoughtfully to come up with these awards, and also all of the members who helped in the selection process.

The Division board also meets for lunch at the GSA meeting to discuss budget, items of business, and anything that has come up in the last year. In Reno, **John Bartley** visited to follow up on the idea of promoting the inception of a nonprofit journal in structural geology and tectonics. John had already expressed the opinion in the Newsletter last year that University libraries are being bled to death by sky-rocketing subscription rates for journals, particularly from Elsevier Press. I think it is an idea that we need to pursue, particularly in the context of growing web-based journals. Our discipline is intrinsically visual, and the possibility to publish color and even animated illustrations is very appealing. As with all initiatives, it will take the courage and commitment of a few individuals for this to see the light of day; I am convinced this would be very good for our community. I hope this debate continues in the pages of the Newsletter and that some energetic geoscientists will decide to devote the effort necessary to turn this idea into reality.

One last item I would like to address is the state of the EarthScope initiative, which has the potential of crystallizing a lot of geological-geophysical activity around it. There was a lot of enthusiasm last year as the project moved quickly through NSF and was about to go to Congress for approval. Unfortunately, the House Appropriations Subcommittee that deals with NSF was unable to support the full Major Research Equipment request that included EarthScope "because of budget restrictions" and thus EarthScope was not included in the initial budget report. However, at the NSF Town Meeting in Reno, NSF officials were hopeful that Earthscope will be funded, possibly this coming year. Writing to our congressional delegations can only help, I would think.

In closing, I would like to again encourage all members to participate in the many Division activities, to volunteer to serve, and to help committees through their work. The health of the Division is very dependent on this degree of connection and participation. In addition, I would like to encourage everyone to help build the membership of the Division (currently over 1,500), particularly among students, junior colleagues, and scientists in related fields.

-- *Christian Teyssier*

"STUDY OF PLANET EARTH AND BEYOND"

continued from page 1

"Sessions will be of interest to everyone from anthropologists, astrobiologists and botanists, to climate modelers, hydrologists, ecologists, and oceanographers," said Ian Dalziel of the University of Texas, Austin. Dalziel, the technical program co-chair and Secretary of GSA's International Division, also expects that applied scientists, including those involved in petroleum exploration and production, will be attracted to the sessions on fluid reservoirs and petroleum degradation. Sessions will involve a combination of invited and submitted papers.

The technical program for the conference will transcend traditional geology and include thematic and general sessions relating to atmospheric, oceanic, and life sciences. The program will include other planetary systems and key extraterrestrial influences. The Scientific Programme Committee overseeing the technical program consists of prominent scientists from both the U.S. and U.K.

It's fitting that we meet in Edinburgh, where James Hutton's *Theory of Earth* was first published in 1788," explained Ian Fairchild of Keele University, Staffordshire. (Hutton, a former medical doctor, became a self-taught geologist and is recognized as the founder of modern geology. He held the vision of a self-renewing, self-repairing earth.)

"Hutton, Darwin, and their contemporaries were naturalists, considering all aspects of the natural and physical sciences," Fairchild said. "At this meeting, a group of scientific specialists will come together and, like modern-day naturalists, explore complex, integrated system questions and problems." Fairchild is the co-chair of the technical program.

Two eminent University of Edinburgh scientists, Aubrey Manning and Geoffrey Boulton, will deliver the keynote addresses. Manning, Emeritus Professor of Natural History, has won new fame for his role in the acclaimed BBC documentary series, "Earth Story." Boulton, Regius Professor of Geology, is known for his holistic view of Earth processes and history.

Other plenary keynote speakers include: Andrew H. Knoll, Fischer Professor of Natural History, Harvard University, who will discuss the geological consequences of evolution; Michael Gurnis, Professor of Geophysics at the California Institute of Technology, who will address the connection between Earth's deep interior and evolution of its surface; and James M. Franklin, President of the Society of Economic Geologists (Denver, CO), who will speak on mineral resources and the changing planet.

Field trips and field workshops round out the meeting.

For additional information and registration, visit:

<http://www.geosociety.org/meetings/edinburgh/index.htm>
or contact -

Ian Dalziel, University of Texas, Austin, ian@utig.ig.utexas.edu
Ian Fairchild, Keele University, i.j.fairchild@keele.ac.uk

GSA Structural Geology and Tectonics Management Board Minutes

Reno, Nevada - November 14, 2000

Board members present: Steve Marshak (past-Chair), Jane Selverstone (Chair), Christian Teyssier (1st Vice Chair), Laurel Goodwin (2nd Vice Chair), Charlie Onasch (Secretary/Treasurer), Martha Withjack (2nd Vice Chair-elect), Peter Vrolijk (Secretary/Treasurer-elect) Guests: John Bartley (Former Board member), Mary Hubbard (Co-editor, SG&T Newsletter)

1. Jane welcomed new board members, Martha Withjack (2nd Vice Chair-elect) and Peter Vrolijk (Secretary/Treasurer-elect).
2. Budget: The budget stands at \$12,088. This is an increase of approximately \$1,000 over last year.
3. Membership: The membership was up by 120 from last year, giving a total of 1,624. The Division continues to be the largest in GSA.
4. Committee assignments:
 - a. John Bartley agreed to represent the Division on the GSA External Awards Committee.
 - b. Christian and Laurel will represent the Division on the JTPC (Joint Technical Program Committee).
5. Short courses for the 2001 meeting (Laurel). Four courses had been proposed:
 - a. Earthquakes and faulting (no commitment for organization);
 - b. Tectonic geomorphology (organized by Dorothy Merritts and Roland Bergmann);
 - c. Thermochronology (organized by Mark Harrison);
 - d. Recent developments in computer modeling of crustal deformation (no commitment for organization).

The board agreed to go forward with Tectonic Geomorphology and Thermochronology at next year's meeting. Jane will urge the membership at the business meeting to submit more proposals (to Meghan Miller).

6. Newsletter (Mary Hubbard): There were a number of difficulties in producing the Division's newsletter this year. These included an inordinate amount of work for Mary and Barbara and late deliveries of the newsletter to the membership. Most of the problems were related to communicating with GSA headquarters and the staff turnover therein. Several possible solutions (and potential problems) were discussed:

- a. Going to a totally electronic format: Problems with dissatisfied members who want to know what they were getting for their dues and those who have no electronic connection;
- b. Publishing the newsletter entirely within the Division would generate more work for the newsletter editors;
- c. Purchasing software so that the copy produced by the editors could be more compatible with what is being used at GSA Headquarters.

The board agreed that the last option would cause the least increase in workload for the editors and voted to use Division funds to purchase the necessary software (Adobe Illustrator). The board also agreed to coordinate more closely with Headquarters on submitting and editing copy.

7. Selection of Career Contribution Award (CCA) and Best Paper Award (BPA) winners (Steve Marshak). Steve related how he had concerns about the selection process for both awards. He had received a number of comments about the BPA going to a book and the CCA going to overseas geologists for the last two years. He felt that most of the problems with the awards stemmed from the small pool of nominations. Discussion followed on how the number of nominations could be increased. The board concluded that both the board and the nominating committees should take a more active role in soliciting nominations from the membership. Also, the board agreed to announce the winners of both the BPA and CCA in the division newsletter prior to the annual meeting. This is a break with past policy of keeping the BPA secret until the business meeting.

8. Communication on the possibility of starting a new journal in Structural Geology (John Bartley). John addressed the board on his desire to seek input from the Divisions' membership on the possibility of starting a new journal in structural geology. It would be a not-for-profit journal, possibly published by GSA. This journal might be a conventional paper publication or totally electronic. He felt that there were two problems with the current situation: 1) for-profit journals were becoming so expensive that libraries could not afford them and, 2) there might be a need for an additional outlet for papers in the field of structural geology. John requested that he be allowed to poll the Divisions' membership to see if there were enough interest. The board felt this was a good idea and asked John to address the membership at the business meeting.

In August, David Fountain arrived as the long-awaited second person in the Tectonics program. He brings considerable knowledge and experience to the program director's job, and I'm sure that I am not alone in welcoming him. With David's help, we should now be able to improve our response time to your requests.

The status of the program for fiscal year 2001 is now reasonably well known. The Tectonics budget, which we received in January, was \$8.615 million, representing a 1.5% increase over what was available to spend last year. This budget covers two cycles of proposed submission – the proposals received for the June, 2000 deadline and the ones received for the December 1, 2000 deadline. Up to now, this year's decisions were made without knowledge of the 2001 budget, but fortunately we "guessed" pretty well, and there will not be a significant change in the success rate between the June 2000 and the December 2000 deadline group of proposals.

109 proposals were received for the December deadline. There were 24 "collaborative" projects represented by two or more proposals each, thus continuing the trend of increasing research that involves collaboration between groups of investigators. The grand total of requested funds is about \$17.4 million, and we expect to fund about \$3.8 million on this panel.

The December deadline was the first cycle to fall under the new NSF-wide requirement that all proposals be submitted electronically. Looking back on it, it actually went reasonably smoothly, although we had a lot of phone calls and e-mails in addition to doing a fair amount of "repair work" like inserting replacement figures for those that came out poorly, etc. Let me know if you had difficulties submitting a proposal – we are sure that the system can be improved but need to know what problems you experienced. Also be aware that NSF now requires that all proposal reviews be submitted via FastLane.

Note: NSF recently announced a change in FastLane that you may like - "FastLane now supports file uploads in a variety of formats including Word, WordPerfect, PostScript and TeX (MiKTeX 1.20e). You should continue to use standard fonts to avoid font substitutions, and you will need to proofread and accept the uploaded files. PDF files will continue to be accepted if properly created (e.g., ensuring that all fonts are embedded, the files are in Acrobat 3 format and that PDFWriter was not used to create the file)."

In light of considerably better access to award information, especially on the web, we decided to stop listing awards made by the Tectonics panel in this newsletter. Instead we will pass along a list of useful web pages. Other useful web sites include;

List of awards: http://www.nsf.gov/home/grants/grants_awards.htm

[select "List of Awards by Program" and enter Tectonics in the query window – you will have a choice of Active Tectonics (no longer an active program) or Tectonics]

FastLane: <https://www.fastlane.nsf.gov/fastlane.htm>

NSF: <http://www.nsf.gov/>

Geosciences Directorate (GEO): <http://www.nsf.gov/home/geo/>

--Tom Wright (Program Director, NSF Tectonics)



Thanks, Tom, for the welcome, and thanks to all the people here in the Earth Sciences Division for taking me in and showing me the ropes. Many of you know me, my interests, and background, but I thought I would introduce myself to those of you who don't. My interest in the earth sciences goes back to elementary school days spent collecting minerals in the Adirondacks and fossils in the quarries of western New York State. As an undergrad at University of Michigan, I planned for a career in paleontology only to be derailed into earthquake seismology and tectonics by the plate tectonic revolution. After my MS research on transform faulting in the Aleutian Trench, I went on to study rock properties in Nik Christensen's high pressure labs at the University of Washington. There, I developed an interest in the structure, composition, and evolution of the lower continental crust, an interest that took me to the Ivrea zone in the Italian Alps for part of my PhD dissertation. My continuing interest in this subject broadened and deepened my education in structure, tectonics, petrology, geochemistry, and geophysics – and I feel that I am still on the learning curve every day!

I spent 8 years teaching tectonics, geophysics, Earth history, and intro geology, among other things, at the University of Montana before moving to the University of Wyoming, where I continued to teach an even wider smorgasbord of courses, adding plate tectonics, mineralogy, structure, and a variety of tectonics and tectonophysics seminars. My research in lower crust expanded to exploration of crustal cross sections in the Ivrea zone, Kapuskasing structure (Ontario), and Pikwitonei-Gods Lake domains (Manitoba) and, more recently, the fascinating granulite/eclogite facies terrain on Holsnøy in the Bergen arcs, Norway. I use high-pressure measurements of seismic velocities on samples of these terrains to interpret the structure and composition of the continental crust. I also worked on mylonites from core complexes, eclogite shear zones, and volcanic rocks. My broad background served me well when I was editor for GSA's *Geology* for a six-year stint. I got to know many of you while in that capacity and, when you open that envelope with a proposal for review, you probably hoped that I had forgotten you.

Since arriving at NSF, I've been involved in several initiatives beyond the Tectonics program: EarthScope, MARGINS, and Geosciences Education Team. I discuss recent developments in EarthScope and MARGINS below because these initiatives hold special interest for the structural geology and tectonics community. I will discuss Geoscience education issues in a future newsletter.

continued on page 5

I hope to meet and talk with you at conferences or if you visit NSF headquarters. Please feel free to contact me via e-mail or phone in the meantime.

--David M. Fountain (Program Director, NSF Tectonics)

EarthScope

Many of you are probably wondering about the current status of EarthScope, the large-scale initiative to improve our understanding of the structure, evolution, and dynamics of the North American continent. As currently envisioned, EarthScope is a three-phase project involving NSF, USGS, and NASA (see <http://www.earthscope.org/> for details):

- **EarthScope 1:** USArray - a continental scale seismic array to provide a coherent 3-D image of the lithosphere and deeper Earth; and SAFOD (San Andreas Fault Observatory at Depth) - a borehole observatory across the San Andreas Fault to directly measure the physical conditions under which earthquakes occur;
- **EarthScope 2:** PBO (Plate Boundary Observatory) - a fixed array of strainmeters and GPS receivers to measure real-time deformation on a plate boundary scale;
- **EarthScope 3:** InSAR (Interferometric Synthetic Aperture Radar) - synthetic aperture radar images of tectonically active regions providing spatially continuous strain measurements over wide geographic areas.

Phases 1 and 2 would require about \$170 million from NSF's Major Research Equipment (MRE) account for equipment and installation over a ten-year span and an estimated \$180 million in operations, science, and management in the same time frame. EarthScope 1 MRE funds were in the President's fiscal year 2001 budget request but were eliminated in Congress. The wording from Congress - "Budget constraints have forced the conferees to not approve funding for two new starts for fiscal year 2001 under major research equipment, the U.S. Array and San Andreas Fault Observatory at Depth, and the National Ecological Observatory Network. This decision was made without prejudice and does not reflect on the quality of research proposed to be developed through these two programs" - gives us hope for the future. We can't say anything about the fiscal year 2002 budget yet, but we are encouraged that EarthScope 1 should be represented in the budget and that EarthScope 2 would, hopefully, follow in future years.

Consequently, EarthScope remains a high-level priority for the Earth Sciences Division and the community is proceeding with planning. EAR intends to continue funding pre-EarthScope activities, such as workshops, planning, etc. Participants at a PBO workshop held last Fall, for example, began the difficult task of refining goals, scientific objectives, and experimental design. Future workshops are in the mill and we urge you to participate in these as appropriate. EarthScope has a lot to offer the structural geology and tectonics community and vice versa (e.g., Teyssier, *Geotimes*, July, 2000). Additional information about EarthScope workshops and activities show up on the web pages of IRIS, SCEC, and UNAVCO in addition to the EarthScope web site listed earlier. You will also find a list of steering committee members on the latter.

MARGINS

MARGINS, a research program to understand continental margin evolution, is another program of interest to the structural geology and tectonics community (for details, see <http://www.ldeo.columbia.edu/margins>). Funding for MARGINS is provided by EAR and Ocean Sciences Division (OCE). David Fountain is the program officer for EAR. Four special focus experiments constitute the centerpiece of MARGINS:

- **Subduction Zone Factory:** Investigation of processes (e.g., dewatering, metamorphism, melting) involved in formation of familiar subduction zone products (e.g., magma, volatiles, ore deposits, new continental crust). Focus sites are the Izu-Bonin-Marianas and Costa Rica/Nicaragua subduction systems.
- **Source-to-Sink Experiment:** Understanding, quantifying, and predicting interactions between sediment production and dispersal system from eroding continental highlands to the oceans. Focus sites are in Papua-New Guinea and New Zealand.
- **Rupturing Continental Lithosphere:** Understanding processes that determine how, why, and when continental lithosphere ruptures to form continental margins. The Gulf of California and central/northern Red Sea are the focus sites.

Anticipated funding is about \$4.3 million for this year's competition. The deadline was January 16, 2001 for fiscal year 2001 support, and about 75 proposals were submitted to OCE and EAR. It was good to see proposals from many structural geology/tectonics folks. The deadline for fiscal year 2002 support is November 1, 2001. There are several meetings and workshops planned for MARGINS, and a complete listing can be found on the MARGINS web site listed above.

Geological Society of America Structural Geology and Tectonics Division 2000 Career Contribution Award

Samuel Warren Carey

Citation by B. Clark Burchfiel and Christopher Powell

It is with great pleasure that we present to you Prof. Samuel Warren Carey as this year's recipient of the Career Contribution Award of the Structural Geology and Tectonics Division of the Geological Society of America.

Professor Carey has a long and distinguished career spanning more than 60 years as a professional scientist, and one can truly say he is an individual who has lived life to the fullest. He graduated with a BSc (1st Class Honours) from The University of Sydney, Australia, in 1933, and a year later he was awarded his MSc. From 1934 to 1938 he worked as a petroleum geologist for Oil Search Ltd in New Guinea, during which he completed his DSc on *"Tectonic Evolution of New Guinea and Melanesia"*. Those were the days when there were no roads in New Guinea outside the major towns; Carey and his exploration team took to the jungle on foot.

During World War II, Carey was a captain in a Special Unit of the A.I.F. (Australian Imperial Forces) behind Japanese lines. He served his country with distinction, showing incisive intellect and bravery in the face of appalling conditions. His will to succeed at all costs is a distinctive mark of his public life, in academic, military and civilian spheres.

As an undergraduate student (1930's), Carey became convinced of Wegener's concept of the gross dispersion of the continents of the Earth through time, and later developed continental drift concepts by extending Wegener's ideas to mountain belts, which he analyzed in detail and with precision. The rheid concept (Carey 1954a) was a major contribution to tectonic thought as Carey introduced time as an essential component of our mechanical view of geological materials. Carey's ideas of folded mountain belts was published in the Proceedings of the Royal Society of Tasmania in 1955 but not widely known to the world until the 1958 publication of "Continental Drift: A symposium". A steady stream of papers in the mid-1950s and early 1960s introduced concepts such as the strength of the earth's crust (Carey 1958), the necessity for décollement below concentric folds (Carey 1960), the asymmetry of the earth (Carey, 1962a) and the scale of geotectonic phenomena (Carey 1962b). In rebutting Sir Harold Jeffrey's assertion (1929) of a 15° misfit between South America and Africa, he published (1955) a precise continental reconstruction which has become known as the Bullard (1962) fit.

Carey's main international reputation came from the Continental Drift Symposium held in Hobart, Tasmania, in 1958. Chester Longwell, who wrote the introduction to this symposium, was so impressed by Carey's work that he suggested Carey come to Yale University as a one year replacement for John Rodgers who was scheduled to go on sabbatical leave (1959-60). This was a crucial period in the development of geological thought because the first puzzling pieces of information from the ocean were beginning to trouble the minds of people like Hess and Dietz. Carey's oratory was arguably a catalyst that sparked the widely accepted theory of plate tectonics. His influence on scientists such as Harry Hess, J. Tuzo Wilson and numerous others was significant in the development of their then revolutionary ideas on plate tectonics. In John Rogers' own words (1989, p. 1163) when he accepted this award eleven years ago, "...North American geology has never been the same since".

As students of Carey's, we must comment on his commitment to teaching and students. Within and outside of class he promoted totally free-ranging academic thought. He challenged every student to think and followed this up with copious handwritten notes on any piece of work handed to him. Ideas and concepts were thoroughly debated, and one had to defend their position competently. No Carey graduate student has ever forgotten the essential survival skills that Carey taught.

In the 1958 Continental Drift Symposium, there is one diagram (Fig. 39d, p. 280) which differs from all others in that it is only drawn in outline. Here Carey tried to fit Pangea onto a globe of present-day size, but could not close India in Gondwanaland back to Asia or North and South America into their Pangean fit against Africa without forming a major gap. The diagram marks the time when Carey first concluded that the Earth had expanded. His work on the expanding earth since then has been published in a long essay (Carey 1975) and a book (Carey 1976) and has been followed by investigation of the implications for the Earth and the Universe (Carey 1988) and, more recently, of the Earth, Universe and Cosmos (1996).

Samuel Warren Carey is a truly remarkable man, perhaps the most mobilist tectonician of his time, who has made more impact on our science and scientists than almost any other person of his era. He is a man of courage, clarity of thought, and above all, a man who pursued every idea to its logical conclusion. We can think of no worthier candidate for the Career Contribution Award of the Structural Geology and Tectonics Division of the Geological Society of America.

continued on page 7

Response on behalf of S. Warren Carey
by David Groves

I am delighted to accept the Structural Geology and Tectonics Division Career Contribution Award on behalf of Professor S. Warren Carey. I had the great fortune to be an undergraduate and postgraduate student at the University of Tasmania at the height of Professor Carey's career. His flamboyant lecture style, innovation, lateral thinking and global perspective made him a giant of his time. His classes were always full, and audiences sat on stairs or crushed into doorways and available spaces in packed lecture theatres to hear his inspirational, and often theatrical, public lectures. His students gained an unparalleled breadth of knowledge on structure and tectonics, headily inhaling new concepts of rheidity, sphenochasms and oroclinal on a dynamic Earth. In the post-war era, he was one of the few lateral thinkers who paved the way for many of the global tectonic concepts that were to revolutionize the Earth Sciences in the last three decades of the twentieth century. Not only did he leave his indelible mark in the structural and tectonic literature, but he inspired those around him. Tasmania is a small island of about 0.5 million people, but the reputation of its geologists, in terms of high positions in academia and industry, is out of all proportion to this population. Such is the legacy of a great man and an outstanding geoscientist.

Geological Society of America
Structural Geology and Tectonics Division 2000 Best Paper Award

Cees Passchier and Rudolph Trouw

Citation by Bradley Hacker

'*Microtectonics*', written by Cees Passchier at the Universität Mainz and Rudolph Trouw at the Universidade Federal do Rio de Janeiro, was published in 1996.

The *magic* of this book is rooted in a veritable cornucopia of riveting, stupendous, and beautiful micrographs that are woven into a comprehensive tapestry of rock microtextures. The *power* of this book derives from its unusually detailed and clear illustrations and underlying text that integrates experimental studies on metals, rocks, and analogue materials, on theoretical studies, and on the abundant geological literature to lay out a conceptual and practical framework for understanding the form of and processes behind rock microstructures. The result is a state-of-the-science textbook to cherish.

'*Microtectonics*' is dedicated to Henk Zwart and exists only because the authors TA'd a Henk Zwart course together at Leiden University. Chapter 1 contains the reason why this book has been so well received: "It is interesting to page through old publications on microstructures...to see how...understanding of the processes...[has] increased." In other words, *Microtectonics* illuminates the considerable progress made over the last few decades in squeezing the kinematic blood from rock microstructures.

Persuasive analogies are used judiciously in the text to streamline acquisition of advanced concepts; e.g., the use of vertically oriented paddle wheels in a stream to explain the difference between vorticity and spin. As an example of the excellent use of line illustrations, I draw your attention to the graphical renderings of the displacement + strain + rotation components of the displacement gradient tensor viewed in different spatial reference frames.

It is the chapters on Deformation Mechanisms, Foliations, Lineations, Preferred Orientations, Shear Zones, Dilatation Sites, and Porphyroblasts where the orchestration of micrographs, text, and drawings rises to a crescendo and the book really sings. These sections cover cataclasis, crystal plasticity (including a clear distinction between subgrain rotation and grain-boundary migration), how various deformation mechanisms contribute to foliation formation (with an excellent explanation of how lattice preferred orientations develop), pseudotachylites and mylonites (including exemplary explanations and pictures of the fabrics produced by noncoaxial progressive deformation and how to assess sense of shear), very detailed explanations of the development of strain fringes, and an absolutely exhaustive section on porphyroblasts.

If this were not enough, the book concludes with nineteen exercises in interpreting microstructures (complete with full explanations), a comprehensive list of nearly 700 references, and a nicely written glossary. There is also a compact disc containing the complete book with all the drawings in color, all the micrographs (some in color), and animations of microstructure development. In closing, I wish to read you the note on the back of the title page. It says: "The publishers cannot guarantee the accuracy of any information about dosage and application contained in this book." In my own case, I can testify that high dosages of this wonderful book have done me a world of good and I look forward to future applications with great anticipation.

Response by Cees Passchier and Rudolph Trouw

First of all, we would like to express our thanks to the Society for receiving this award for the "Microtectonics" book. We also thank Brad Hacker, who discovered so many qualities in our book that it makes us blush.

We have both been students of Henk Zwart, one of the pioneers in the field of Microtectonics. Henk Zwart set up a course in microtectonics in Leiden in the 1960's which we attended as students, about eight years apart. We later supervised the same course independently in Leiden and Utrecht. Henk Zwart infected both of us with his enthusiasm for structural geology, and we dedicated the book to him; this award is therefore also his award.

The idea for the book was conceived when we first met in 1992 when Rudolph came to Utrecht on a sabattical leave. We found that we had both spent two decades collecting thin sections of beautiful microstructures, trying to impose our enthusiasm for these features on our students. We are both teachers and have learned, over the years, that the best way to transmit knowledge to students is to make them enthusiastic. We wrote the book with much pleasure but feared that the interest in microstructures might be a bug that only bit us. We were therefore surprised and happy that the book found resonance in a wide audience. In his citation, Brad Hacker claims that the power of the book is in the large number of illustrations. We put these in because geological reality is far too complex to be captured completely in words or simple models. A photo of a thin section is part of reality like an outcrop, and we can always come back to these "parts of reality", with other models in our head, to become aware of details not noticed before. Exactly these details may be important for a better understanding of the evolution of that particular piece of rock.

Our book is mostly concerned with structures visible in thin section, still the most important way to gather information on microstructures. New observational tools have become available, such as advanced SEM techniques, but simple geometries in two dimensions remain the principal data source. Geologists have a strange profession in which we have to interpret sequences of events from a final structure where the relative age of components is not always clear. Most info has certainly been lost, and we do not always know what is old and what is young. Experimental work is needed and is now, for the first time, widely available in microtectonics with the advance of analogue and computer modelling.

However, careful and critical study of geometries both through field work and thin section study should continue to be the cornerstone for the understanding of how geology works. There is a sad tendency, at least in Europe, to judge scientific merit of a project by the expense of the research involved, as if Universities were meant to increase their financial turnover like a company selling cars! Fieldwork and microstructural studies are cheap, and we would like to point out that it is still possible to do fundamental research and to obtain a large quantity of unique data on complexity of geological history with very simple, cheap techniques, which are also available for scientists in countries with smaller science budgets.

In finishing, we express once more our sincere thanks and our hope that this award will stimulate an increasing focus on microtectonic studies.

RESOURCE BIN

* **Steve Reynolds** (Arizona State University) has developed a new website featuring geologic maps draped over digital topography. These are QuickTime object movies that the user can rotate with the mouse. They show geologic maps in a way that students get! See the links on his home page at -

<http://geology.asu.edu/~reynolds/home.htm>

* **Lou Maher** (University of Wisconsin) has put a number of digitized photos taken from the air on his web site. They are available free for noncommercial educational use. Point your browser to:

<http://www.geology.wisc.edu/~maher/air.html>

The photos include: Badlands, Black Hills, Devils Tower, Great Sand Dunes, San Juan Mtns and Basin, Mesa Verde, Shiprock, Hopi Buttes, Meteor Crater, Sinkholes of Chevelon Fork, San Francisco Peaks, Canyons of Little Colorado, Colorado, and San Juan Rivers, Rainbow Bridge, Arches, Bingham Copper Mine, Bonneville beaches on Stansbury Island, Craters of the Moon, Yellowstone Park, Tetons, moraines along the Wind River Mtns, Sheep Mtn. folds, Mammoth Cave area, Lake Michigan shores and raised beaches, Midwestern rivers and glacial landscapes, tornados and floods, Baraboo area, and others.

Look over the 640-pixel-wide index photos. If you see any you would like, record the ID number. There is a provision for downloading 2000-pixel-wide versions from our FTP site that are suitable for slides or video projectors.



STUDENTS

Travel Grants are available to students planning to attend the GSA-GSL "Earth System Processes" meeting in Edinburgh, Scotland, June 24-28, 2001.

Applicant must be a GSA student member, traveling from the U.S. and presenting a paper or poster at the Earth System Processes meeting. The grant must be used for travel and/or conference expenses related to the Earth System Processes meeting.

Application forms must be received at GSA by April 10, 2001. Abstract acceptance notices will be sent by April 2, 2001. Travel grants award notification will be sent by April 30, 2001. A copy of your accepted abstract must accompany the application form.

see -
<http://www.GEOSOCIETY.org/meetings/>

Three student scholarships are available for geologic field work in the northern Rocky Mountains:

BELT ASSOCIATION RESEARCH GRANT
\$250-\$1000 to senior undergraduate and graduate students working on geologic research related to the Mesoproterozoic Belt Supergroup.

For more information, visit the Idaho Geological Survey website (www.idahogeology.org) and look for "The Belt Association" under Adjunct Sites.

Proposals due March 1, 2001.

TOBACCO ROOT GEOLOGICAL SOCIETY FIELD SCHOLARSHIP

\$500 to a student working on a field-based project in the northern Rocky Mountains. Preference will be given to mapping projects in Montana, Idaho, and northern Wyoming.

Visit the TRGS website (www.trgs.org).

Proposals due June 1, 2001

THE HARRISON SCHOLARSHIP, TOBACCO ROOT GEOLOGICAL SOCIETY

\$500 to a student working on any project involving Precambrian rocks. The scholarship is in memory of Jack Harrison and is to be used for field expenses.

Visit the TRGS website (www.trgs.org) for more information.

Proposals due June 1, 2001.

FUTURE MEETINGS, CONFERENCES AND COURSES

[Notices of future events of interest to Division members are welcomed by the editors]

2001

March 22-25 National Earth Science Teachers Association - Annual Meeting, St. Louis, Missouri: (e-mail: fireton@kosmos.agu.org)

March 22-25 National Science Teachers Association 49th Annual Convention, St. Louis, Missouri (Web: www.nsta.org)

April 09-11 Geology is Universal - Joint AAPG and GSA Cordilleran Section: (e-mail: peter.weigand@csun.edu, Web: <http://www.geosociety.org/sectdiv/cord/01cdmtg.htm>)

April 18-20 SSA Annual Meeting, San Francisco, CA, USA (Web: <http://www.seismosoc.org/meetings/>)

May 17-19 New Developments in Metalliferous Hydrothermal Systems, Townsville, Queensland, Australia: e-mail: lucy.chapman@jcu.edu.au)

May 18-20 NAGT-ES Annual Spring Meeting, Columbia University NY, NY: (e-mail: mjpasow@worldnet.att.net, Web: <http://westy.jtwn.k12.pa.us/users/srl/NAGT.html>)

May 27-30 Annual GAC-MAC, St. Johns, Newfoundland, Canada: (e-mail: gl@zeppo.geosurv.gov.nf.ca, Web: <http://www.geosurv.gov.nf.ca>)

May 29-June 02 Spring Meeting AGU, Boston, MA: (e-mail: meetinginfo@agu.org, Web: www.agu.org/meetings/meetings.html)

June 03-06 AAPG, Denver, Colorado: (e-mail: convене@aapg.org, Web: <http://www.aapg.org/meetings/annual2001>)

June 07-12 Penrose Conference: Longevity and Dynamics of Rhyolitic Magma Systems Mammoth, California: (e-mail: k.knesel@earth.uq.edu.au, Web: <http://www.geology.washington.edu/bergantz/penrose-2001.htm>)

June 10-15 2001 WRI-10: International Symposium on Water-Rock Interaction, Sardinia, Italy: (e-mail: cidur@unica.it)

June 24-28 Earth System Processes, GSA and GSL, Edinburgh, Scotland: (e-mail: ian@utig.ig.utexas.edu, Web: <http://www.geosociety.org/meetings/edinburgh/index.htm>)

July 07-10 38th U.S. Symposium on Rock Mechanics - DC Rocks, Washington, DC, USA: (e-mail: elsworth@psu.edu, Web: <http://www.armarocks.org>)

August 31-September 12 Field Excursion to the Skaergaard Intrusion, Skaergaard area, Kangerdlugssuaq, East Greenland: (e-mail: andersen@csm.ex.ac.uk, Web: <http://www.ex.ac.uk/CSM/news/confs.htm>)

September 09-14 SEG, San Antonio, Texas: (e-mail: dhyer@seg.org, Web: <http://meeting.seg.org>)

September 24-28 International Archean Symposium

University of Western Australia, Perth, Western Australia: (e-mail: susanho@geol.uwa.edu.au, Web: <http://www.geol.uwa.edu.au/~ias>)

September 26-28 9th International Congress of the Geological Society of Greece, Athens: (Web: http://www.civil.ntua.gr/ege_9th_congress)

November 05-08 Geological Society of America Annual Meeting, Boston, MA : (e-mail: meetings@geosociety.org; Web: <http://www.geosociety.org/meetings/2001/index.htm>)

December 10-14 Fall AGU Meeting, San Francisco, CA (Web: <http://www.agu.org/meetings/meetings.html>)

*Special Conference and Field Trip***"MESOZOIC EXTENSIONAL TECTONICS IN EASTERN CHINA AND MONGOLIA"**

July 2-5th

The conference will be hosted by the Nei Mongol Bureau of Geology and Mineral Resources and is sponsored by the China National Natural Science Foundation and the U.S. National Science Foundation. Conveners are Zheng Yadong (Peking University; ydzheng@geoms.geo.pku.edu.cn) and Greg Davis (Univ. Southern California; China University of Geosciences/Beijing; gdavis@usc.edu).

The conference schedule is as follows:

July 1 (arrive in Hohhot)
July 2 Paper presentations
July 3 and 4 Field trips to the Cretaceous Hohhot metamorphic core complex and its low-angle extensional detachment fault
July 5 (AM) Summary papers and discussion

The aim of the conference is to understand the timing, geometry and kinematics of extensional tectonics in the eastern half of China and neighboring Mongolia. Major problems appear to exist in the geographic and temporal relationships between Mesozoic intraplate contractional and extensional deformation in this broad region. As such, papers that provide tight geochronologic controls on extensional deformation will be given highest priority for presentation.

The two-day field trip to the Hohhot metamorphic core complex will be led by Zheng Yadong, Greg Davis, and Brian Darby. The complex, lying just north of the city of Hohhot, has an along strike length in the Daqing Shan mountains of at least 100 km. Outstanding exposures of its extensional detachment fault will be visited, emphasizing the diverse and evolving nature of the detachment fault and associated footwall tectonites.

Fees for the conference have not yet been set. The number of participants must be limited to 80; if interested in attending; contact Zheng and Davis as soon as possible. Include some details of any paper you might want to present at the conference. The number of papers will have to be limited given the 1.5 days allotted for paper presentations. Hohhot, the capital of Inner Mongolia, is a pleasant clean modern city easily reached by frequent hour-long flights from Beijing.

**FUTURE MEETINGS, CONFERENCES, & COURSES**



Again, the March newsletter is too early to contain much information about new academic hires, but other great news is abundant.

Steve Reynolds (ASU) informs us that **Allen Glazner** of the Univ. of North Carolina received the Tanner Award for Excellence in Undergraduate Teaching, a prestigious, student-nominated teaching award accompanied by a big check. Our sources found out that his first response was "Great! I can get a new bike!", but he decided to take his family to France instead. What a guy!

Dave Pollard (Stanford) tells us that his former graduate student and current postdoc, **Taixu Bai**, was awarded the 'Ramsay Medal' by the Tectonic Studies Group at their annual meeting (Leeds University, UK). The medal was awarded for his paper on "Fracture spacing in layered rocks: a new explanation based on the stress transition" published in the *Journal of Structural Geology*, January 2000. The paper mixes numerical modeling using FEM with laboratory experiments to solve a complicated boundary value problem in elasticity theory motivated by the observation that the spacing of joints in sedimentary rocks often is regular and limited to a spacing that scales with the thickness of the fractured layer.

Scot Krueger has taken on the role of product manager for structural software (GeoSec2D/3D) at Paradigm Geophysical, replacing **John Byrd** who has moved on to Anadarko. Scot has lots of ideas about new features to add, based on his years in structural research at ARCO, but welcomes any suggestions or ideas about future directions in structural analysis software. He can be reached at skrueger@ParadigmGeo.com.

Dr. Lirim Hoxha, Geological Research Institute, Tirana, Albania has recently been appointed an University Honorary Fellow at Camborne School of Mines, Exeter University, UK.

SG & T's own **Basil Tickoff** was awarded the Donath Award for his integration of field, microstructural and modelling of processes in structural geology. Congratulations !

--Barbara John

THANKS !!

Charlie O nasch

for your years of commitment as secretary/treasurer. You really are the one who kept the Division running.

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On behalf of all current and former board members

Boston 2001 -A Geo-Odyssey

The 2001 GSA Annual Meeting ('*Boston 2001-Geo-Odyssey*') will be held November 5-8 in Boston, Mass. At the time of publication, GSA had not yet listed approved field trips, theme sessions or symposia. Watch *GSA Today* for the call for abstracts in the April edition. Preregistration for field trips and the meeting begins in June.

Abstract deadlines include :
 July 17, 2001 (paper)
 July 24, 2001 (electronic)

see-
<http://www.GEOSOCIETY.org/meetings/index.htm>

2000-2001 Structural Geology and Tectonics Division

Chair

Christian P. Teyssier
Dept. of Geology & Geophysics
108 Pillsbury Hall
310 Pillsbury Drive SE
University of Minnesota
Minneapolis, MN 55455-0219
ph: (612) 624-6801; fax: (612) 625-3819
teyssier@tc.umn.edu

First Vice Chair

Laurel B. Goodwin
New Mexico Institute of Mining and Technology
Department of Earth and Environmental Sciences
801 Leroy Place
Socorro, NM 87801-4796
ph: (505) 835-5178; fax: (505) 835-6436
lgoodwin@nmt.edu

Second Vice Chair

Martha Withjack
Dept. of Geology
Rutgers University
610 Taylor Road
Piscataway, New Jersey 08854
ph: (732) 445-6974; fax: (732) 445-3374
drmeow3@rci.rutgers.edu

Secretary-Treasurer

Peter J. Vrolijk
Exxon Production Research Company
P.O. Box 2189
Houston, Texas 77252-2189
ph: (713) 431-4151
peter.j.vrolijk@exxon.sprint.com

Past Chair

Jane E. Selverstone
Dept. of Earth & Planetary Sciences
200 Yale Blvd. NE
University of New Mexico
Albuquerque, NM 87131-1116
ph: (505) 277-6528
selver@unm.edu

*This newsletter is published biannually by the
Structural Geology & Tectonics Division of GSA.*

*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 June 15, 2001. Please send lengthy
items on a Mac disk, as e-mail text, or as an e-mail attachment.*

Newsletter Co-Editors

Barbara John
Department of Geology and Geophysics
University of Wyoming
Laramie, Wyoming
ph: (307) 766-4232; fax: (307) 766-6679
bjohn@uwoyo.edu

Mary Hubbard
Department of Geology
Kansas State University
Manhattan, Kansas
ph: (785) 532-2241; fax: (785) 532-5159
mhub@ksu.edu